AD0374945
01

ONR REPORT ACR-69

HUMAN ENGINEERING BIBLIOGRAPHY

1959 - 1960

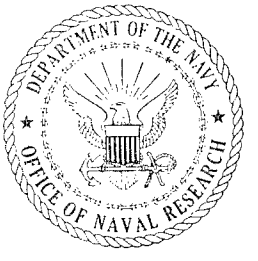
Prepared by

THE PROJECT STAFF

HUMAN ENGINEERING INFORMATION AND ANALYSIS SERVICE

Institute for Psychological Research
Tufts University

OCTOBER 1961



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

20030110167

Previous Bibliographies in this Series

* * * * *

"Human Engineering Bibliography, 1955-1956," prepared by The Project Staff, Human Engineering Information and Analysis Service, Tufts University, October 1957, Office of Naval Research Report ACR-24; Office of Technical Services, Department of Commerce, PB 131507 ($4.75); ASTIA (AD-149950).

"Human Engineering Bibliography, 1956-1957," prepared by The Project Staff, Human Engineering Information and Analysis Service, Tufts University, October 1958, Office of Naval Research Report ACR-32; Office of Technical Services, Department of Commerce, PB 131507S ($5.00); ASTIA (AD-205931).

"Human Engineering Bibliography, 1957-1958," prepared by The Project Staff, Human Engineering Information and Analysis Service, Tufts University, October 1959, Office of Naval Research Report ACR-43; Office of Technical Services, Department of Commerce, PB 161125 ($5.00); ASTIA (AD-235970).

"Human Engineering Bibliography, 1958-1959," prepared by The Project Staff, Human Engineering Information and Analysis Service, Tufts University, October 1960, Office of Naval Research Report ACR-55, Office of Technical Services, Department of Commerce, PB 171109 ($5.00); ASTIA (AD-258705).

Copies available at OTS--$5.00

ONR REPORT ACR-69

HUMAN ENGINEERING BIBLIOGRAPHY

1959 ——— 1960

Prepared by

THE PROJECT STAFF

HUMAN ENGINEERING INFORMATION AND ANALYSIS SERVICE

Institute for Psychological Research
Tufts University

OCTOBER 1961

Prepared under the joint sponsorship of the
ENGINEERING PSYCHOLOGY BRANCH
PSYCHOLOGICAL SCIENCES DIVISION
OFFICE OF NAVAL RESEARCH
CONTRACT Nonr 494(13)

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.

Human Engineering Information and Analysis Service
Project Staff

Principal Investigator
Paul G. Ronco, Ph.D.

Research Associates and Bibliographers
Edythe M. S. Anderson, M.A.
Leota Long Janke, Ph.D.
Peggy E. Pressman, M.A.
Louise B. Seronsy, Ph.D.

Research Assistants
Barbara Bhiladvala, B.S.
Diane Coulopoulos, B.A.
Linda Harris, B.S.
Ruth Stanford, B.A.

PREFACE

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 Engineering designed to meet the needs of individuals responsible for the development of equipment operated by military personnel. One method for partially meeting this objective is to prepare and disseminate useful bibliographies. The present bibliography is one of a series which, it is hoped, meets the criterion of utility.

ACKNOWLEDGMENTS

A compilation of published literature into a bibliographic system and repository is of necessity the cooperative effort of many individuals, agencies, and institutions. The present effort is no exception and the project staff gratefully acknowledges the exceptional aid and support it has received from the personnel of the Institute for Psychological Research, the Office of Naval Research, and the Armed Services Technical Information Agency. In addition, the following libraries were most helpful in making their facilities available to the project staff: Boston Medical Library, Boston Public Library, and several libraries at Harvard University and Massachusetts Institute of Technology, and the Eaton and Medical Libraries at Tufts University.

Gratitude is extended to the many authors and publishers who have made it possible for the project to acquire reprints and microfilm copies of materials for inclusion in the project's files.

TABLE OF CONTENTS

	Page
INTRODUCTION	
Purpose and Scope of the Bibliography	v
Instructions and Illustrations in the Use of the Present Bibliography	vi
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

Personnel responsible for the human factors considerations in the design and development of equipment have a major need for rapid and easy access to the literature pertinent to their work. The fact that the literature associated with human engineering derives from several hundred different journals and periodicals as well as a host of publications from governmental, industrial, and academic laboratories presents a compelling requirement for the development of useful bibliographic aids. The present bibliography is one of a planned series of annual bibliographies[1] of literature pertinent to human engineering, which has been designed to meet this requirement.

The scope and character of the present bibliography was influenced by two major considerations. The first related to the question of maximizing use of the bibliography is terms of ease and accuracy. The second consideration related to the selection of references as contents of the bibliography.

Recommendations and solutions relating to the design of the bibliography for facile use derived primarily from a report[2] which summarized an extensive study of bibliographic systems which might be used for human engineering literature. Specific features of the present bibliography which follow the recommendations of the report are the "Topical Outline of the Literature in Human Engineering" (Part I), the "Alphabetical Index to the Human Engineering Literature" (Part III), and the form and content of "Citations and Abstracts" (Part IV).

Regarding the selection of references for inclusion in the present bibliography, the project staff was influenced by several considerations. For one, the staff reviewed the interest and preoccupation of human engineers (as reflected in symposia, publications, etc.) and selected references to meet the broad spectrum of revealed interests. The validity of these choices has been partially assessed upon the basis of user reaction to the previously published bibliographies. A second consideration in the selection of references was the decision that the document had to be available to the project staff for detailed examination prior to coding and abstracting. This meant, for

---

[1]To date four such bibliographies have been published: "Human Engineering Bibliography, 1955-1956," ONR Report ACR-24, "Human Engineering Bibliography, 1956-1957," ONR Report ACR-32, "Human Engineering Bibliography, 1957-1958," ONR Report ACR-43, and "Human Engineering Bibliography, 1958-1959," ONR Report ACR-55.

[2]D.B. Devoe, Ann Solomon, and E.V. Saul, "A Proposed System for Bibliographic Services in Human Engineering," Contract Nonr 494(09), Tufts University Report submitted to Special Devices Center, Office of Naval Research, May 1955, 15 pp. and appendices.

the most part, that if the document was not among the acquisitions of the project it would not be included in the bibliography. However, since the acquisition of documents pertinent to human engineering is a major effort of the project, most documents will be referenced in these annual bibliographies over a period of years. The final major consideration was that, insofar as possible, the selected references for the present bibliography be from the publication period January 1960 to December 1960.[1] This requirement was modified to permit the inclusion of a moderate number of documents from earlier publication periods, which had only recently been acquired and which were judged especially relevant to human engineering.

In summation, then, the purpose of the present bibliography is to provide a useful compilation of references to the human engineering literature which reflects 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 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.

---

[1]Since a number of documents published during this period were not available for examination by the coding staff, they are not cited in the present bibliography. However, most of them should become available during the coming year and will probably be part of successive bibliographies of the present project, i.e., each successive bibliography in the series will attempt to include the citations which were not included in the previous publication.

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 cross-cutting 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 pertinent 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," "Bearing informa- scales," "Radar," 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 appropriate entries in Part IV.

TOPICAL OUTLINE OF
THE LITERATURE IN HUMAN ENGINEERING

(Revised September 1961)

Abridged Designations

Abridged from

"Human Engineering Bibliography, 1959-1960," Office of Naval Research Report ACR-69, prepared by The Project Staff, Human Engineering Information and Analysis Service, Institute for Psychological Research, Tufts University. (Office of Technical Services, Department of Commerce, $5.00.)

TOPICAL OUTLINE OF THE LITERATURE IN HUMAN ENGINEERING

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

- 1.1.0 Bibliographies and general references
- 1.2.0 Methods and design procedures
  - 1.2.1 Statistical methods
  - 1.2.2 Methods of task and personnel description
  - 1.2.3 Psychophysical methods
  - 1.2.4 Physiological methods
  - 1.2.5 Special techniques
- 1.3.0 General equipment and apparatus
- 1.4.0 Facilities in human engineering

2.0.0 SYSTEMS OF MEN AND MACHINES

- 2.1.0 Bibliographies and general references
- 2.2.0 Design of systems and operations
  - 2.2.1 Communication and information theory
  - 2.2.2 Game or decision theory and linear programming
  - 2.2.3 Computers and simulation
  - 2.2.4 Queueing theory and work measurement techniques
- 2.3.0 Research and evaluation of systems
  - 2.3.1 Assignment of functions to men or machines
  - 2.3.2 Groups as system components
  - 2.3.3 Communications systems
  - 2.3.4 Transportation systems
  - 2.3.5 Production maintenance and supply systems
  - 2.3.6 Air traffic control system

3.0.0 VISUAL INPUTS AND PROCESSES

- 3.1.0 Bibliographies and general references
- 3.2.0 Natural ambient lighting
  - 3.2.1 Daytime light
  - 3.2.2 Twilight and night
  - 3.2.3 Special conditions affecting visibility
  - 3.2.4 Glare
- 3.3.0 Artificial ambient lighting
  - 3.3.1 Considerations of illumination
  - 3.3.2 Lighting systems, outdoor
  - 3.3.3 Lighting systems, indoor
  - 3.3.4 Illumination, unusual characteristics
- 3.4.0 Lighting of instruments
  - 3.4.1 Direct lighting and flood-lighting
  - 3.4.2 Indirect lighting
  - 3.4.3 Color and intensity of illumination
  - 3.4.4 Comparisons of methods and types
- 3.5.0 Radarscopes and other cathode-ray displays
  - 3.5.1 Signal detectability
  - 3.5.2 Range and bearing scales and aids
  - 3.5.3 Size, shape, lighting, etc., of screen
- 3.6.0 Television and motion picture displays
- 3.7.0 Pictorial and symbolic displays
  - 3.7.1 Outside-in and inside-out displays
  - 3.7.2 Combining pictorial and symbolic display elements
  - 3.7.3 Comparisons among types of displays
- 3.8.0 Indicators and scales
  - 3.8.1 Counters
  - 3.8.2 Pointers
  - 3.8.3 Scales: shape, size, and direction of increase
  - 3.8.4 Scales: divisions and markings
  - 3.8.5 Design of scales for qualitative readings
  - 3.8.6 Evaluation and comparison of indicators and scales
- 3.9.0 Legibility of letters, numerals and other symbolic forms
  - 3.9.1 Design of characters
  - 3.9.2 Color and contrast between symbol and background
  - 3.9.3 Viewing conditions
- 3.10.0 Printed materials
  - 3.10.1 Graphs and tables
  - 3.10.2 Maps and charts
  - 3.10.3 Decals, check lists, instruction charts, etc.
  - 3.10.4 Evaluation of types of printed materials
  - 3.10.5 Photography and photo-interpretation
- 3.11.0 Camouflage or concealment
- 3.12.0 Visual coding
  - 3.12.1 Object characteristics
  - 3.12.2 Light coding
- 3.13.0 Optical aids
  - 3.13.1 Devices for visual enhancement
  - 3.13.2 Protective devices
- 3.14.0 Other factors affecting visual performance
- 3.15.0 Basic visual data related to the design and use of equipment
  - 3.15.1 Individual differences and anomalies
  - 3.15.2 Threshold visibility
  - 3.15.3 Adaptation, pre-adaptation, and pre-exposure
  - 3.15.4 Perception of color
  - 3.15.5 Brightness discrimination
  - 3.15.6 Acuity
  - 3.15.7 Special effects dependent upon fixation or exposure time
  - 3.15.8 Eye movements
  - 3.15.9 Perception of depth, distance, and size
  - 3.15.10 Perception of form, contour, and pattern
  - 3.15.11 Perception of number, angle, and direction
  - 3.15.12 Perception of movement
- 3.16.0 Equipment and methods for basic and applied problems in vision
  - 3.16.1 Tests of color vision
  - 3.16.2 Other tests of visual performance
  - 3.16.3 Equipment and methods for basic visual research problems
  - 3.16.4 Simulators for specific applied problems

4.0.0 AUDITORY INPUT AND PROCESSES, INCLUDING SPEECH PRODUCTION AND INTELLIGIBILITY

- 4.1.0 Bibliographies and general references
- 4.2.0 Ambient noise
  - 4.2.1 Measurement of noise level
  - 4.2.2 Noise reduction and control
  - 4.2.3 General industrial and equipment noise
  - 4.2.4 Aircraft and weapons noise
  - 4.2.5 Submarine and ship noise
  - 4.2.6 Effects of ambient noise and blast on performance
  - 4.2.7 Noise-induced hearing loss
- 4.3.0 Effects of auditory equipment components
  - 4.3.1 Input devices
  - 4.3.2 Transmission devices
  - 4.3.3 Output devices
- 4.4.0 Evaluations of specific systems in speech communication
  - 4.4.1 Telephone and intercom systems

4.4.2 Radio systems
4.5.0 Evaluations of specific systems in non-verbal auditory display
4.5.1 Intermittent warning and signaling devices
4.5.2 Telegraphic systems
4.5.3 Sonar and other underwater sound systems
4.5.4 Flybar
4.6.0 Characteristics of auditory signals in relation to coding
4.7.0 Special auditory skills
4.8.0 Basic data in the production and perception of speech
4.8.1 Basic characteristics of speech
4.8.2 Speech audiometry and articulation testing
4.8.3 Speech masking and the signal-to-noise ratio
4.8.4 Speech distortion
4.8.5 Individual differences and anomalies
4.8.6 Language design
For Training in voice communication - see 14.1.0
4.8.7 Synthetic speech
4.9.0 Basic data in audition
4.9.1 Basic attributes: pitch
4.9.2 Basic attributes: loudness
4.9.3 Basic attributes: timbre, duration, etc.
4.9.4 Thresholds and related phenomena
4.9.5 After-effects of stimulation
4.9.6 Stimulus mixture
4.9.7 Sound localization
4.9.8 Auditory patterns and meaning
4.9.9 Psychological scaling
4.9.10 Norms, individual differences, and anomalies
For Non-verbal auditory training - see 14.1.0
4.9.11 Physiological mechanisms
4.9.12 Equipment and methods in research in audition and speech

5.0.0 OTHER SENSORY INPUTS AND PROCESSES

5.1.0 Touch
5.1.1 Basic processes and data
5.1.2 Tactile coding
5.1.3 Vibratory stimuli used as signals and displays
5.1.4 Equipment and methods used in HE research on touch
5.2.0 Temperature sensitivity
5.2.1 Basic processes and data
5.2.2 Equipment and methods used in HE research on temperature sensitivity
5.3.0 Pain
5.3.1 Basic processes and data
5.3.2 Equipment and methods used in HE research in pain
5.4.0 Smell and taste
5.4.1 Basic processes and data
5.4.2 Olfactory and gustatory signals
5.4.3 Equipment and methods used in HE research on smell and taste
5.5.0 Kinesthesis
5.5.1 Basic processes and data
5.5.2 Coding and signalling through kinesthesis
5.5.3 Equipment and methods used in HE research on kinesthesis
5.6.0 Vestibular functions
5.6.1 Basic processes and data
5.6.2 Equipment and methods used in HE research on vestibular functions
5.7.0 Time perception

6.0.0 INPUT CHANNELS: CHOICE AND INTERACTION

6.1.0 Bibliographies and general references
6.2.0 Comparison of input channels
6.2.1 Comparisons of visual and auditory channels
6.2.2 Comparisons of channels other than visual and auditory
6.3.0 Intersensory effects
6.3.1 Facilitation and inhibition of reception
6.3.2 Factors determining orientation in space

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

7.1.0 Bibliographies and general references
7.2.0 Anthropometric measurements
7.2.1 Body size, stationary
7.2.2 Body size in motion or in unusual positions
7.3.0 Body mechanics
7.3.1 Extent of limb movement
7.3.2 Flexibility of movement
7.3.3 Muscular strength and endurance
7.4.0 Equipment and methods used in HE research on anthropometry
7.5.0 Basic physiological capacities
7.5.1 Equipment and methods in research on basic physiological capacities
7.6.0 Basic motor performance
7.6.1 Positioning movements
7.6.2 Repetitive and rhythmic movements
7.6.3 Manual dexterity
7.6.4 Reaction time
7.6.5 Handedness
7.6.6 Involuntary reflexes
7.6.7 Equipment and methods in HE research on basic motor performance
7.7.0 Complex motor performance
7.7.1 Watchkeeping performance
7.7.2 Tracking performance
7.7.3 Serial performance
7.7.4 Equipment and methods in HE research on complex motor performance

8.0.0 DESIGN OF CONTROLS AND INTEGRATION WITH DISPLAYS

8.1.0 Bibliographies and general references
8.2.0 Standardization of controls
8.3.0 Types of controls
8.3.1 Rotary movement controls
8.3.2 Linear movement controls
8.3.3 Other types of controls
8.3.4 Multifunction controls: combined controls
8.3.5 Comparisons among types of controls: choice of type of control
8.4.0 Control coding
8.4.1 Multiple dimensions
8.4.2 Labelling
8.5.0 Positioning and plane of operation of controls relative to operator
8.6.0 Special considerations relating to prolonged adjustment
8.7.0 Control dynamics
8.7.1 Display-control movement ratios
8.7.2 Control loading
For Human reaction times - see 7.6.4
8.7.3 Compatibility
For Tracking - see 7.7.2
8.7.4 Aided controls
8.7.5 Quickened displays

9.0.0 LAYOUT OF PANELS AND CONSOLES

9.1.0 Bibliographies and general references

9.2.0 Standardization of panels and consoles
9.3.0 Location of panel relative to operator and task
9.4.0 Grouping of components on panels and consoles
9.4.1 Ease of discrimination
9.4.2 Spatial dynamics
9.5.0 Specific orientation of parts

10.0.0 DESIGN OF WORK SPACE, EQUIPMENT, AND FURNITURE

10.1.0 Bibliographies and general references
10.2.0 Workplace design
10.2.1 Visibility
10.2.2 Ease and speed of movements
10.2.3 Stowage
10.3.0 Furniture specifications
10.3.1 Seating and body support
10.3.2 Seating arrangements
10.3.3 Work surfaces
10.4.0 Passageways, entrances, exits
10.5.0 Tools
10.6.0 Design for complex motor coordination tasks
10.7.0 Design for maintenance
10.8.0 Design for portability in the design of equipment
10.9.0 Design for safety
10.9.1 Motor vehicle safety
10.9.2 Air safety
10.10.0 Specific work places and equipments not elaborated below
10.10.1 Cockpits, space cabins, capsules
10.10.2 Aircraft
10.10.3 Sea and landcraft
10.10.4 Fire control (weapons) systems and equipment
10.10.5 Industrial equipment

11.0.0 CLOTHING AND PERSONAL EQUIPMENT

11.1.0 Bibliographies and general references
11.2.0 Clothing ensembles
11.2.1 Thermal protection
11.2.2 Pressure suits
11.2.3 Other types of protective clothing
11.2.4 Fabrics for clothing
11.3.0 Clothing components
11.3.1 Belting
11.3.2 Body gear
11.3.3 Headgear
11.3.4 Handgear
11.3.5 Footgear
11.4.0 Clothing size
11.5.0 Personal equipment
11.5.1 Ear defenders
For Protective devices - see 3.13.2
11.5.2 Sleeping bags
11.5.3 Packs and carriers
11.5.4 Parachutes, life jackets, and survival equipment
11.5.5 Prosthetics
11.6.0 Effects of combinations of clothing and personal equipment
11.7.0 Shelters
11.8.0 Equipment and apparatus used in HE research on clothing and personal equipment

12.0.0 SPECIAL ENVIRONMENTAL FACTORS AFFECTING PERFORMANCE

12.1.0 Bibliographies and general references
12.2.0 Thermal environment
12.2.1 Temperature, humidity, and air velocity
12.2.2 Thermal radiation
12.3.0 Toxic environments
12.4.0 Motion
12.4.1 Speed and acceleration
12.4.2 Vibration
12.4.3 Motion sickness
12.5.0 Altitude and depth
12.5.1 Atmospheric pressure
12.5.2 Oxygen requirements
12.6.0 Nuclear and cosmic radiation
12.7.0 Space travel
12.8.0 Sensory deprivation
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

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

13.1.0 Bibliographies and general references
13.2.0 Factors pertaining to the individual
13.2.1 Motivation and emotion
13.2.2 Intelligence and aptitudes
13.2.3 Thought processes
13.2.4 Attention, alertness, vigilance
13.3.0 Interactions between individual factors and work factors
13.3.1 Effects of individual understanding
13.3.2 Acceptability of equipment and/or task
13.3.3 Fatigue and behavior decrement
13.3.4 Stress
13.4.0 Work, rest, and efficiency
13.4.1 Conditions of work
13.4.2 Methods of work
13.4.3 Levels of complexity
13.4.4 Unusual characteristics of the work
13.5.0 Effects of physiological factors on performance
13.5.1 Sleep
13.5.2 Diet, food, and nutrition
13.5.3 Effects of drugs
13.5.4 Effects of aging

14.0.0 TRAINING AIDS AND DEVICES AND THEIR USE

14.1.0 Bibliographies and general references

15.0.0 OTHER AREAS OF PSYCHOLOGICAL RESEARCH PERTINENT TO HUMAN ENGINEERING

15.1.0 Personnel psychology relevant to HE
15.2.0 Social psychology relevant to HE

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 four 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	7
5.0.0	Other Sensory Inputs and Processes	10
6.0.0	Input Channels: Choice and Interaction	11
7.0.0	Body Measurements, Basic Physiological Limits in Motor Performance, Basic Motor Capacities, and Perceptual Motor Skills	12
8.0.0	Design of Controls and Integration with Displays	13
9.0.0	Layout of Panels and Consoles	14
10.0.0	Design of Work Space, Equipment, and Furniture	15
11.0.0	Clothing and Personal Equipment	16
12.0.0	Special Environmental Factors Affecting Performance	17
13.0.0	Other Individual Factors, Work Conditions, and Task Characteristics that Affect Behavioral Efficiency	18
14.0.0	Training Aids and Devices and Their Use	19
15.0.0	Other Areas of Psychological Research Pertinent to Human Engineering	20

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, 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.

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 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 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 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 - for evaluation of components see 10.10.0; for maintenance design factors see 10.7.0.

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, 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 (13.14.0).

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 presentation: continuous texts, maps versus charts, graphs versus tables.

3.10.5 Photography and Photo interpretation - includes techniques of analysis and interpretations 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 of 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; 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.

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 - sights, reticles, binoculars, periscopes; design factors, methods of use, effects on visual performance.

3.13.2 Visual Protective Devices - 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, 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 color vision tests see 3.16.1.

3.15.5 Brightness Discrimination - includes thresholds for contrast sensitivity, 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 after-effects, and after-images. 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, 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, colorimetry, and other 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 communications, 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.

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 NON-VERBAL 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, 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, 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 After-effects of Stimulation - includes auditory fatigue, threshold recovery, 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 Non-verbal 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 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.

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, 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 compatibility.

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

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 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.

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 in these capabilities, e.g., 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).

7.6.0 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), sonar listening (4.5.3, 4.7.0).

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 - 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 - factors affecting design and selection of knobs, cranks, wheels, etc.

8.3.2 Linear Movement Controls - 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. 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.,pushbutton 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 - gear ratios, coarse and fine tuning, gain, and attenuation.

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

For Human Reaction Times - see 7.6.4.

8.7.3 Compatibility - 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), continuous versus discontinuous.

For Tracking - see 7.7.2.

8.7.4 Aided Controls - applications, effectiveness, aiding constants.

8.7.5 Quickened Displays - applications, effectiveness, 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 and limits of working area on panels and consoles. 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 consoles.

9.4.1 Ease of Discrimination - for coding problems see 3.12.0, 5.5.2, 8.4.0.

9.4.2 Spatial Dynamics - 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 - general design principles and criteria of work units as well as layout of larger work areas.

10.2.1 Visibility - 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 - body clearance, distribution of equipment, location of tools, and reach distances (7.3.1, 9.3.0).

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

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

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 - loading gun inside tank, remote handling; excludes performance data (7.7.0).

10.7.0 DESIGN FOR MAINTENANCE - e.g., accessibility, manipulability; 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 - the role of human and situational 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.

10.9.1 Motor Vehicle Safety - includes studies on traffic and 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 - aerial collision risk, accident proneness, 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 Aircraft - also includes airborne equipment and related ground equipment, e.g., maintenance stands, storage systems, 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.

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.

11.2.1 Thermal Protection - includes electrically heated suits, arctic ensembles, coldbar suits, 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, etc.

11.3.0 CLOTHING COMPONENTS.

11.3.1 Belting - includes safety belts and 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, 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, hearing aids.

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 (7.3.3, 10.8.0).

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

11.5.5 Prosthetics - 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.

11.7.0 SHELTERS - includes housing, tents, 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 ARE INCLUDED.

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, air- and windblast (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, 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 wave-form 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, and impact injury (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; buffeting.

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

12.5.0 ALTITUDE AND DEPTH - (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, 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, radio-active materials, and nuclear reactors and explosions (7.5.0).

12.7.0 SPACE TRAVEL - includes problems peculiar to life outside of the earth's atmosphere, e.g., weightlessness, 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 - effects of isolation, lack of sensory stimulation, 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.

13.0.0 INDIVIDUAL FACTORS, WORK CONDITIONS, AND TASK CHARACTERISTICS THAT EFFECT 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 - 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 - 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 - 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, 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 - 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 - partial or selective perception and response, report (instructions), and perceptual anticipation.

13.3.2 Acceptability of Equipment and/or Task - includes consumer acceptance, attitude surveys pertinent to the design of equipment, 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 - variables that are intrinsic to the task and relatively independent of the particular operator.

13.4.1 Conditions of Work - accuracy and speed requirements, length of work periods, distribution of rest periods; excludes effects of environmental conditions, 12.0.0.

13.4.2 Methods of Work - 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; 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 EFFECTS OF PHYSIOLOGICAL FACTORS ON PERFORMANCE.

13.5.1 Sleep - 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 effect of vitamin and nutritional deficiencies upon performance, studies on food preferences, feeding problems, food allowances, etc.

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

13.5.4 Effects of Aging - includes the effects of aging on psychological and physiological functions, e.g., thought processes, 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	50	1,140	4,120	4,517	15,340	15,341	15,343
	15,344	15,348	16,017	16,038	16,040	16,044	16,048
	16,057	16,058	16,063	16,065	16,066	16,072	16,083
	16,110	16,152	16,256	16,293	16,318	16,363	16,442
	16,452	16,496	16,618	16,674	16,711	16,728	16,756
	16,835	16,846	16,989	17,103	17,111	17,276	17,314
	18,007	18,022	18,084	18,141	18,160	18,204	18,209
	18,212	18,218	18,221	18,255	18,328	18,348	18,387
1.2.0	16,614	16,656	16,766	17,115	17,118	17,154	17,169
	17,214	17,216	18,212	18,255	18,296	18,323	18,333
1.2.1	502	2,159	3,413	3,927	3,943	3,946	4,003
	4,670	15,330	15,365	15,366	15,367	15,368	15,387
	15,409	15,410	16,002	16,006	16,007	16,022	16,023
	16,045	16,051	16,052	16,054	16,068	16,072	16,079
	16,087	16,089	16,094	16,095	16,096	16,097	16,115
	16,185	16,210	16,211	16,215	16,247	16,263	16,269
	16,306	16,309	16,328	16,335	16,349	16,353	16,355
	16,379	16,387	16,392	16,394	16,419	16,432	16,444
	16,450	16,454	16,467	16,505	16,524	16,533	16,547
	16,557	16,576	16,581	16,583	16,585	16,635	16,640
	16,656	16,657	16,660	16,669	16,679	16,681	16,763
	16,766	16,793	16,801	16,815	16,830	16,855	16,864
	16,875	16,890	16,894	16,901	16,912	16,924	16,934
	16,946	16,951	16,977	17,009	17,013	17,019	17,021
	17,023	17,025	17,026	17,029	17,030	17,031	17,033
	17,034	17,045	17,046	17,079	17,102	17,162	17,186
	17,215	17,336	18,079	18,081	18,091	18,098	18,133
	18,152	18,190	18,238	18,280	18,289	18,292	18,303
	18,309	18,314	18,320	18,327	18,328	18,337	18,365
	18,372						
1.2.2	81	364	498	2,183	2,418	3,353	3,356
	3,371	3,389	3,459	4,029	4,255	4,482	4,515
	4,822	14,499	15,399	15,411	15,418	16,069	16,124
	16,181	16,190	16,209	16,247	16,261	16,262	16,281
	16,289	16,293	16,315	16,341	16,347	16,385	16,408
	16,415	16,439	16,440	16,451	16,550	16,639	16,727
	16,940	16,959	16,960	16,961	17,122	17,133	18,072
	18,086	18,124	18,141	18,271	18,282	18,294	18,297
	18,336	18,367	18,370	18,373	18,396		
1.2.3	4,063	15,410	15,423	16,002	16,007	16,013	16,026
	16,028	16,046	16,084	16,087	16,088	16,089	16,094
	16,095	16,096	16,127	16,187	16,364	16,432	16,450
	16,550	16,628	16,654	16,664	16,680	16,710	16,782
	16,845	16,876	16,931	17,015	17,020	17,030	17,034
	17,089	17,091	17,099	17,196	17,248	18,081	18,325
1.2.4	15,326	15,363	16,001	16,047	16,229	16,255	16,257
	16,337	16,436	16,554	16,574	16,663	16,775	16,889

Code Category Numbers	Accession Numbers						
1.2.4 (cont'd.)	16,890	16,944	16,958	17,118	17,127	18,264	
1.2.5	16,001	16,079	16,307	16,643	17,030	17,077	17,086
	18,024	18,367	18,368				
1.3.0	16,229	16,337	16,566	16,711	16,757	16,914	17,107
	17,144	17,214	18,018				
1.4.0	13,441	16,063	16,080	16,092	16,147	16,320	16,617
	16,949	18,112	18,184	18,216	18,218	18,221	18,278
2.1.0	50	3,367	4,003	15,343	16,016	16,017	16,056
	16,065	16,070	16,077	16,088	16,099	16,100	16,109
	16,190	16,250	16,256	16,291	16,333	16,363	16,684
	16,690	16,692	16,935	17,335	18,062	18,075	18,112
	18,145	18,239					
2.2.0	4,003	4,029	15,418	15,420	16,020	16,027	16,030
	16,037	16,069	16,097	16,135	16,159	16,356	16,433
	16,478	16,533	16,554	16,602	16,606	16,623	16,766
	16,953	17,000	17,004	17,290	17,292	17,336	18,023
	18,050	18,213	18,215	18,236	18,255		
2.2.1	3,913	3,967	3,968	4,017	4,037	4,126	4,381
	4,517	15,362	15,415	16,054	16,055	16,067	16,072
	16,093	16,131	16,165	16,214	16,266	16,329	16,335
	16,336	16,350	16,404	16,424	16,445	16,518	16,519
	16,523	16,699	16,810	16,811	16,823	16,831	16,859
	16,868	16,897	16,898	16,899	16,906	16,913	16,921
	16,932	16,933	16,984	16,994	16,995	16,999	17,013
	17,059	17,061	17,186	17,223	18,014	18,062	18,063
	18,172	18,198	18,302				
2.2.2	3,348	15,420	16,087	16,088	16,089	16,115	16,116
	16,135	16,405	16,406	16,450	16,467	16,614	16,635
	16,721	16,782	16,784	16,810	16,858	16,898	16,899
	16,930	16,931	16,981	17,013	17,189	17,193	17,281
	18,005	18,146	18,173	18,292	18,315	18,316	18,346
	18,347						
2.2.3	4,037	4,473	4,474	4,666	15,387	16,000	16,042
	16,051	16,053	16,072	16,117	16,135	16,163	16,165
	16,174	16,188	16,197	16,213	16,223	16,331	16,344
	16,386	16,392	16,402	16,405	16,407	16,420	16,433
	16,435	16,448	16,454	16,505	16,508	16,526	16,544
	16,555	16,658	16,667	16,700	16,739	16,763	16,784
	16,790	16,839	16,855	16,867	16,877	16,896	16,918
	16,930	17,101	17,102	17,155	17,157	17,274	17,297
	17,315	17,336	18,025	18,106	18,115	18,145	18,155
	18,160	18,190	18,278	18,340	18,341	18,342	18,343
	18,344	18,345	18,349				
2.2.4	4,029	15,366	15,367	15,368	15,369	16,685	16,855
	17,216	17,289	17,291	17,336	18,281		
2.3.0	3,367	16,072	16,100	16,136	16,197	16,255	16,305
	16,430	16,433	16,499	16,561	16,606	16,684	16,735
	16,739	17,003	17,004	17,235	17,297	18,031	18,033
	18,050	18,097	18,104				

Code Category Numbers	Accession Numbers						
2.3.1	4,136	11,176	15,362	16,020	16,037	16,054	16,098
	16,100	16,136	16,165	16,176	16,214	16,228	16,253
	16,263	16,269	16,278	16,288	16,289	16,291	16,356
	16,395	16,430	16,523	16,526	16,583	16,602	16,609
	16,658	16,696	16,746	16,763	16,848	16,895	16,915
	16,932	16,938	16,945	17,000	17,001	17,167	18,013
	18,128	18,148	18,193	18,198	18,241	18,242	18,243
	18,244						
2.3.2	2,236	3,919	3,920	3,933	3,945	14,499	15,349
	16,167	16,174	16,250	16,307	16,362	16,441	16,451
	16,530	17,143	17,318	18,014	18,028	18,075	18,189
	18,395						
2.3.3	2,452	4,436	4,440	15,405	16,020	16,031	16,032
	16,054	16,067	16,072	16,112	16,278	16,279	16,317
	16,345	16,384	16,406	16,415	16,435	16,443	16,458
	16,593	16,633	16,699	16,740	16,776	16,801	16,841
	16,897	16,898	16,899	16,927	16,933	16,938	18,012
	18,031	18,033	18,128	18,144	18,158	18,241	18,242
	18,243	18,244	18,269	18,296			
2.3.4	50	3,933	4,515	15,320	15,378	15,420	16,027
	16,031	16,037	16,042	16,069	16,083	16,086	16,091
	16,092	16,100	16,109	16,135	16,159	16,177	16,181
	16,197	16,279	16,341	16,363	16,384	16,386	16,402
	16,406	16,430	16,439	16,440	16,441	16,499	16,699
	16,869	16,893	16,916	16,930	16,940	18,010	18,026
	18,072	18,086	18,157				
2.3.5	364	452	498	661	3,356	3,367	3,371
	3,389	4,037	4,255	4,451	4,822	15,320	16,075
	16,086	16,292	16,435	16,534	16,567	16,595	16,623
	16,637	16,685	16,869	17,018	17,277	17,278	17,279
	17,282	17,289	18,026	18,031	18,050	18,054	18,119
	18,155	18,236	18,281	18,387			
2.3.6	4,343	4,387	4,440	16,031	16,244	16,279	16,288
	16,423	16,455	16,645	16,659	16,838	16,895	16,973
	17,118	18,092	18,107	18,158			
3.1.0	1,140	13,441	15,332	15,340	16,369	16,671	16,980
	18,112						
3.2.0	16,710	16,759	16,871	17,316			
3.2.1	16,803	18,227					
3.2.2	3,629	18,226	18,227				
3.2.3	3,629	16,011	16,134	16,819	16,879	17,316	
3.2.4	17,124	17,316	18,226				
3.3.0	16,145	16,176	16,750	16,754	18,229		
3.3.1	3,857	15,339	16,246	18,230	18,358		
3.3.2	4,118	4,296	4,298	4,458	4,459	15,433	16,134
	16,237	16,238	16,239	16,240	16,241	16,264	16,327
	16,459	16,489	16,707	16,723	16,792	16,873	16,942

Code Category Numbers	Accession Numbers						
3.3.2 (cont'd.)	18,037						
3.3.3	16,246	16,792					
3.3.4	16,241	16,599	16,716	16,965	16,968	17,146	17,148
	17,178	17,316	18,051	18,088			
3.4.0	4,677	16,162	16,246	16,940			
3.4.1	16,327	16,707					
3.4.2	3,453						
3.4.3	3,646	3,983	16,232	16,709			
3.4.4	16,477						
3.5.0	4,009	15,409	16,000	16,002	16,072	16,085	16,113
	16,145	16,177	16,222	16,288	16,486	16,498	16,503
	16,605	16,862	16,915	17,001	17,003	17,011	17,313
	18,000	18,179	18,375				
3.5.1	503	4,127	15,409	15,444	16,414	16,443	17,003
	17,313	18,000	18,002	18,011	18,313		
3.5.2	3,932	4,292	16,085	16,205	16,750	18,267	
3.5.3	3,989	4,016	16,035	16,990	16,992	18,267	
3.6.0	3,393	3,462	4,009	16,113	16,148	16,182	16,633
	18,205	18,207					
3.7.0	4,371	16,128	16,129	16,130	16,201	16,286	16,287
	16,459	16,474	16,486	16,489	16,498	16,627	16,794
	16,795	16,952	17,184	17,315	18,060	18,100	
3.7.1	3,987	4,300	16,177	16,271	16,282	16,370	16,499
	16,562	16,813	16,919	18,093	18,265	18,284	
3.7.2	16,196	16,538	17,315	18,265			
3.7.3	3,987	4,342	4,359	16,464	16,624	16,671	17,184
	18,027	18,059	18,238	18,311	18,358		
3.8.0	4,371	16,036	16,107	16,201	16,486	16,491	16,638
	16,794	16,795	16,800	17,315	18,001		
3.8.1	3,410	16,381					
3.8.2	15,360	16,036	18,312				
3.8.3	16,036	16,284					
3.8.4	3,646	16,036	18,312				
3.8.5	16,036	16,539	17,187	18,158	18,312		
3.8.6	4,297	4,364	15,360	16,284	16,589	16,731	16,741
	17,187						

Code Category Numbers	Accession Numbers						
3.9.0	3,968	4,000	4,383	16,009	16,420	16,446	16,538
	17,188	17,201	17,313	18,223			
3.9.1	2,452	3,453	3,964	4,436	16,334	16,886	17,313
	18,061	18,073					
3.9.2	2,452	16,002	16,007	16,013	16,148	16,377	16,985
	17,192	17,204	18,156	18,358			
3.9.3	2,452	3,453	3,964	4,436	16,005	16,013	16,148
	16,234	16,235	16,236	16,396	16,477	16,498	16,683
	16,696	16,710	16,719	17,191	17,192	17,217	17,254
	18,055	18,230	18,238				
3.10.0	3,446	16,015	16,627				
3.10.1	3,443	18,156	18,308				
3.10.2	16,170	16,304	16,417	16,715	18,008		
3.10.3	16,601						
3.10.4	4,383	16,965	16,991	17,188			
3.10.5	4,522	16,002	16,128	16,129	16,302	16,409	16,410
	16,517	16,696	16,879	16,926	16,963	17,001	17,211
	18,002	18,071	18,139	18,219	18,220	18,287	
3.11.0							
3.12.0	3,929	3,959	3,967	3,990	4,381	15,400	16,003
	16,006	16,008	16,012	16,014	16,170	16,377	16,503
	16,672	16,696	16,719	16,804	16,850	17,011	17,053
	17,176	17,313	18,070	18,156	18,158	18,205	18,223
	18,238	18,288					
3.12.1	3,425	3,857	3,929	3,998	4,048	15,360	16,002
	16,004	16,005	16,008	16,102	16,128	16,129	16,145
	16,164	16,170	16,222	16,283	16,803	16,818	16,922
	16,974	16,984	17,028	17,036	17,041	17,046	17,052
	17,053	17,089	17,091	17,197	17,204	17,244	18,055
	18,061	18,121	18,146	18,156	18,180		
3.12.2	15,433	16,036	16,208	16,237	16,330	16,377	16,707
	16,709	16,791	16,792	16,808	16,819	16,820	16,821
	16,872	16,873	17,211	18,224			
3.13.0	4,009	16,850					
3.13.1	4,378	4,379	16,002	16,265	16,483	16,489	16,532
	16,560	16,672	16,750	16,787	16,874	16,942	16,950
	18,019	18,205	18,207				
3.13.2	4,291	4,686	16,644	16,719	16,779	16,968	
3.14.0	2,452	3,635	3,967	3,968	3,983	4,017	4,378
	4,436	15,332	15,377	15,400	16,004	16,005	16,010
	16,035	16,050	16,085	16,102	16,127	16,128	16,129
	16,130	16,145	16,164	16,218	16,234	16,235	16,290
	16,373	16,376	16,527	16,593	16,613	16,719	16,726
	16,803	17,015	17,028	17,036	17,041	17,046	17,051

Code Category Numbers	Accession Numbers						
3.14.0 (cont'd.)	17,055	17,092	17,099	17,148	17,200	17,217	17,220
	17,316	18,088	18,103	18,180	18,223	18,284	18,318
3.15.0	3,442	16,084	16,185	16,199	16,231	16,234	16,236
	16,321	16,445	16,599	16,886	16,969	16,997	17,028
	17,032	17,051	17,099	17,160	17,191	17,205	18,060
	18,076	18,077	18,225	18,235	18,272	18,378	18,388
3.15.1	3,898	15,386	15,400	16,847	16,985	17,217	17,244
	18,225	18,323	18,354				
3.15.2	3,857	4,063	4,459	15,406	16,009	16,127	16,390
	16,403	16,479	16,704	16,712	16,872	17,028	17,160
	17,191	18,020	18,121	18,146	18,170	18,233	18,335
	18,357	18,360					
3.15.3	3,983	3,993	4,094	15,373	15,386	15,401	15,430
	16,127	16,172	16,513	16,514	16,515	16,516	16,704
	16,990	16,992	18,113	18,135	18,228	18,357	18,363
	18,377	18,388					
3.15.4	3,883	4,094	4,390	16,513	16,704	16,709	16,716
	16,791	16,818	16,847	16,872	16,968	16,974	16,986
	17,024	17,049	17,050	17,204	17,217	17,244	17,266
	17,285	17,328	18,121	18,180	18,225	18,233	18,234
	18,235	18,272	18,279	18,354	18,359	18,361	18,362
	18,376						
3.15.5	3,857	3,989	4,048	4,459	16,239	16,390	16,616
	16,968	16,985	16,986	17,032	17,058	17,087	17,175
	18,011	18,027	18,055	18,070	18,146	18,170	18,272
	18,356	18,357	18,374				
3.15.6	4,076	15,339	15,406	15,429	16,005	16,122	16,123
	16,183	16,234	16,235	16,236	16,541	16,712	16,886
	16,965	17,052	18,132	18,231	18,232		
3.15.7	15,444	16,199	16,232	16,498	16,616	16,990	17,058
	17,085	17,092	17,094	17,096	17,192	17,194	17,197
	17,206	17,210	17,217	17,254	17,294	18,135	18,320
	18,355	18,356	18,374				
3.15.8	3,986	15,392	15,416	16,002	16,033	16,121	16,138
	16,234	16,235	16,236	16,343	16,373	16,395	16,416
	16,540	16,541	16,548	16,591	16,609	16,683	16,744
	16,804	17,035	17,089	17,091	18,168	18,169	18,230
	18,232						
3.15.9	3,645	3,883	4,080	4,378	15,327	15,332	15,380
	15,400	15,416	15,444	16,007	16,010	16,011	16,125
	16,128	16,129	16,183	16,351	16,373	16,421	16,560
	16,591	16,648	16,738	16,814	16,964	17,028	17,041
	17,044	17,051	17,052	17,058	17,089	17,091	17,092
	17,094	17,149	17,192	17,220	17,315	18,036	18,055
	18,117	18,230	18,318				
3.15.10	503	2,243	3,635	3,857	4,017	4,383	15,400
	16,002	16,008	16,009	16,010	16,222	16,331	16,370
	16,390	16,446	16,616	16,624	16,744	16,886	16,964
	16,982	16,984	17,028	17,046	17,053	17,087	17,094

Code Category Numbers	Accession Numbers						
3.15.10 (cont'd.)	17,096	17,192	17,194	17,197	17,198	17,201	17,226
	17,244	17,249	17,254	17,313	18,027	18,061	18,196
	18,291						
3.15.11	16,009	16,286	16,564	16,670	16,886	17,028	17,047
	17,226	18,284					
3.15.12	4,076	15,407	15,429	16,234	16,235	16,236	16,283
	16,343	16,370	16,391	16,560	16,603	16,624	16,649
	16,738	16,857	17,035	17,085	17,092	17,094	17,149
	17,200	17,206	17,265	18,352	18,360		
3.16.0	16,592	16,650	16,787	18,061	18,305		
3.16.1	17,244	18,234					
3.16.2	2,226	3,420	4,042	15,416	16,122	16,123	16,375
	16,613	16,738	16,750				
3.16.3	3,635	3,970	4,006	4,008	4,063	4,094	15,429
	16,012	16,033	16,232	16,236	16,302	16,321	16,346
	16,395	16,548	16,646	16,787	16,818	16,974	17,035
	17,049	17,050	17,265	17,313	18,002	18,287	18,291
	18,303	18,355	18,389				
3.16.4	16,134	16,651	16,653	16,666	16,689	16,691	16,857
	17,149	17,315	18,231				
4.1.0	15,346	16,318	16,354	16,413	16,468	16,758	16,980
	18,112	18,122	18,186	18,330			
4.2.0	3,148	3,884	16,374	16,776	16,797	16,798	16,817
	17,073						
4.2.1	3,467	4,166	4,470	16,336			
4.2.2	3,467	3,884	3,921	4,166	16,153	16,244	16,374
	16,472	16,806	16,882	17,114	17,264	17,326	18,269
4.2.3	3,467	16,826					
4.2.4	3,148	3,467	15,378	16,243	16,472	16,786	16,806
	16,826	17,131	17,135	17,146			
4.2.5	15,336	16,816	16,822	16,840			
4.2.6	3,148	3,884	3,894	4,020	16,153	16,472	16,596
	16,786	17,228	18,051	18,371			
4.2.7	3,148	3,884	16,472	16,826	17,114	17,135	17,264
	17,326	18,137					
4.3.0	18,012						
4.3.1							
4.3.2							
4.3.3	17,072						
4.4.0	16,188	16,202	16,746	16,842	18,269		

Code Category Numbers	Accession Numbers						
4.4.1							
4.4.2	4,436	15,355	16,357	16,826	16,973	16,995	18,006
	18,021	18,142	18,144				
4.5.0	16,735						
4.5.1	16,788	16,797	16,798	16,817	16,822	16,851	
4.5.2							
4.5.3							
4.5.4							
4.6.0	4,470	16,350	16,921	18,288	18,290		
4.7.0	3,913	15,362	15,382	16,157	16,941	18,080	
4.8.0	1,820	15,350	16,054	16,188	16,202	16,266	16,383
	16,412	16,578	16,677	16,758	16,957	17,064	17,066
	18,058	18,125					
4.8.1	4,022	16,277	16,746	16,747	16,753	16,758	16,866
	16,993	17,064	17,065	18,064	18,094		
4.8.2	15,405	16,345	16,393	18,064			
4.8.3	3,148	3,884	16,345	16,472	16,753	16,816	16,826
	16,938	17,066	17,073	18,094			
4.8.4	15,350	15,384	15,390	15,402	15,403	15,410	16,094
	16,126	16,220	16,345	16,598	16,826	16,938	17,062
4.8.5	4,010	15,364	16,383	16,412	16,468	16,746	16,747
	16,758	18,332					
4.8.6	4,670	16,054	16,188	16,466	16,578	16,667	16,703
	16,746	16,747	16,993	17,065	17,178		
4.8.7	4,470	4,479	16,277	16,630	16,677	16,881	16,957
	17,074	18,058	18,140	18,185			
4.9.0	4,330	16,140					
4.9.1	3,921	16,140	16,154	16,743	16,996		
4.9.2	3,921	15,334	15,352	16,140	16,144	16,368	16,371
	16,594	16,655	16,743	16,996	17,067	17,068	17,072
	18,080	18,151	18,182	18,183	18,186		
4.9.3	16,140	16,721					
4.9.4	3,894	15,351	15,352	15,353	15,370	16,142	16,154
	16,158	16,472	16,840	16,996	17,059	17,060	17,061
	17,067	17,068	17,070	17,072	18,035	18,129	18,182
	18,183	18,290					
4.9.5	741	3,148	16,682	16,882	17,069	17,071	17,075
	17,114	17,116	18,137	18,186			
4.9.6	15,388						

Code Category Numbers	Accession Numbers						
4.9.7	2,029	4,464	16,254	17,073	18,330		
4.9.8	17,059	18,046					
4.9.9	16,140	18,186					
4.9.10	4,010	16,525	17,060	17,068	17,114	18,151	
4.9.11	3,148	15,351	15,356	16,298	16,323	16,360	16,494
	16,525	16,594	16,762	16,780	17,114	17,116	18,035
	18,137	18,177	18,385				
4.9.12	732	4,021	4,464	4,670	15,333	15,334	16,158
	16,368	16,371	16,393	16,780	16,822	17,064	17,068
	17,070	17,071	17,114	17,325	18,080	18,151	
5.1.0	16,257	16,980	17,293	18,239			
5.1.1	16,251	16,321	16,322	16,587	16,619	16,620	16,917
	17,038	17,040	17,222	18,117	18,211	18,240	18,241
	18,245						
5.1.2	3,425	3,929	16,587	17,078	17,176	17,177	17,222
5.1.3	16,187	16,338	16,518	16,519	16,619	16,620	16,874
	16,880	17,139	18,211	18,240	18,242	18,243	18,244
	18,319	18,321					
5.1.4	16,187	16,321	16,587	17,038	17,040		
5.2.0	16,632	16,917	16,980	17,271	18,131		
5.2.1	15,427	16,680	18,322				
5.2.2	18,322						
5.3.0	16,257	16,751	16,917	16,980	17,022	17,262	
5.3.1	3,253	15,353	17,039				
5.3.2	17,039	17,221					
5.4.0	16,428	16,429	16,980				
5.4.1	4,409	16,380	16,429	16,654	17,212	18,210	
5.4.2	4,409						
5.4.3	16,654	17,212	18,299	18,300			
5.5.0	16,257	16,369	16,980	18,194			
5.5.1	15,331	15,423	16,751	17,219	17,222		
5.5.2	17,043	17,205	17,210	18,060			
5.5.3							
5.6.0	15,419	16,369	16,980	17,108	18,136		
5.6.1	15,328	16,138	16,416	16,529	16,570	16,582	16,892

Code Category Numbers	Accession Numbers						
5.6.1 (cont'd.)	16,967	17,120	18,016				
5.6.2	16,138						
5.7.0	16,519	16,721	16,789	16,880	17,027	17,067	17,068
6.1.0	16,531	16,745	16,980	18,239	18,273		
6.2.0	17,058	18,179	18,242				
6.2.1	16,018	17,093	17,139				
6.2.2	16,321 18,245	16,322	16,706	17,139	18,117	18,211	18,243
6.3.0	15,403	17,044	18,332				
6.3.1	16,743	18,117	18,179	18,288			
6.3.2	4,007 17,084 18,136	4,379 17,146 18,273	16,002 17,147 18,284	16,061 17,148	16,062 17,149	17,047 17,194	17,058 18,085
7.1.0	17,182						
7.2.0	16,276	17,180					
7.2.1	3,924 18,123	4,399 18,276	16,521	16,559	16,596	16,925	17,163
7.2.2	15,357	15,408	16,799	16,900			
7.3.0	15,335	16,141	16,611	16,970	17,170	17,173	
7.3.1	16,141	16,521					
7.3.2	16,141						
7.3.3	4,026 16,141 17,170	4,139 16,259 17,171	4,141 16,453 17,181	4,398 16,828 17,283	15,404 16,852 18,274	15,439 16,911 18,307	16,119 17,044
7.4.0	4,400 16,422 18,175	4,685 16,596 18,264	5,880 16,611	15,357 16,661	15,408 16,731	16,119 16,900	16,276 17,128
7.5.0	3,916 15,338 16,361 16,676 16,911 17,083 17,129 17,249	4,139 16,175 16,378 16,713 16,971 17,117 17,137 18,017	4,146a 16,231 16,400 16,725 16,976 17,119 17,138 18,039	4,146b 16,232 16,476 16,752 16,979 17,120 17,150 18,082	4,375 16,233 16,507 16,765 16,998 17,121 17,171 18,263	5,876 16,267 16,596 16,834 17,081 17,122 17,172 18,274	15,329 16,272 16,636 16,902 17,082 17,125 17,180 18,366
7.5.1	15,326 16,549 16,905	16,203 16,566 16,978	16,221 16,663 17,083	16,274 16,698 17,127	16,311 16,736 17,144	16,359 16,775 17,218	16,476 16,889
7.6.0	15,361	17,249	18,264				

Code Category Numbers	Accession Numbers						
7.6.1	3,410	3,984	15,439	16,326	17,088	17,168	17,202
	18,307						
7.6.2	3,998	3,999	4,362	16,389	17,202	17,226	17,249
7.6.3	4,142	4,147	17,226	18,307			
7.6.4	1,857	3,436	3,883	3,999	4,127	15,337	15,363
	16,122	16,123	16,274	16,586	16,772	16,805	16,952
	17,037	17,076	17,211	18,306	18,317		
7.6.5							
7.6.6	4,147	5,385	15,427	16,586	17,114		
7.6.7	5,385	16,731	16,805	17,086			
7.7.0	505	2,228	3,631	4,126	16,000	16,065	16,538
	16,955	17,010	17,086	17,216	18,087	18,208	
7.7.1	4,495	15,382	16,050	16,085	16,098	16,099	16,102
	16,133	16,290	16,539	16,789	16,848	16,915	17,097
	17,136	18,051	18,052	18,093	18,270	18,286	18,288
	18,304	18,310	18,313	18,317			
7.7.2	2,162	3,400	3,997	4,008	4,076	4,136	4,393
	4,438	11,176	15,342	15,376	15,392	15,407	15,428
	15,440	16,108	16,111	16,132	16,144	16,283	16,288
	16,338	16,395	16,475	16,539	16,583	16,597	16,615
	16,701	16,702	16,714	16,735	16,774	17,003	17,010
	17,048	17,057	17,166	17,167	17,195	17,215	17,315
	18,053	18,059	18,069	18,148	18,178	18,302	18,311
	18,324	18,396					
7.7.3	2,178	3,348	4,381	15,337	16,122	16,123	16,182
	16,208	16,396	16,397	16,398	16,399	16,484	16,603
	16,612	16,613	16,741	16,813	16,895	17,173	17,208
	18,058	18,060	18,111	18,134	18,373		
7.7.4	370	2,162	3,997	16,000	16,597	16,612	16,613
	16,615	17,086	17,215	17,216	17,315	18,053	18,373
8.1.0	1,140	13,441	16,099	16,105	17,234		
8.2.0	3,425	16,206	16,491				
8.3.0	17,076						
8.3.1	3,425	15,331	16,352	16,852	18,311		
8.3.2	3,410	3,984	3,999	15,331	15,442	16,176	16,852
	17,164	18,311					
8.3.3	16,352	16,395	16,548	16,568	16,720	16,910	
8.3.4							
8.3.5	16,176	16,464	17,164				
8.4.0	3,425						

Code Category Numbers	Accession Numbers						
8.4.1							
8.4.2	16,176	17,076					
8.5.0	15,378	15,404	16,160	16,352	17,002	17,076	17,126
8.6.0							
8.7.0	4,438 16,583 16,952	15,428 16,638 16,987	15,440 16,720 18,001	16,449 16,735	16,464 16,794	16,486 16,795	16,538 16,932
8.7.1	15,342	16,144	16,592	17,048	18,178		
8.7.2	15,428	15,439	16,176	16,465	16,714	16,852	17,002
8.7.3	3,436 17,088	3,998 17,234	16,144	16,589	17,002	17,010	17,048
8.7.4	11,176	16,338	18,059				
8.7.5	16,338	16,475	18,093				
9.1.0							
9.2.0	3,986 18,209	4,388	16,221	16,486	16,638	16,824	16,893
9.3.0	3,998	3,999	15,408	16,160	16,162	17,168	
9.4.0	16,061	16,062	16,176	17,126			
9.4.1	3,929						
9.4.2	3,986						
9.5.0							
10.1.0	15,378						
10.2.0	1,820	3,931	15,378	15,408	16,914		
10.2.1	15,442	16,192	16,888				
10.2.2	15,442	16,888	17,168				
10.2.3							
10.3.0							
10.3.1	15,404 16,785 18,201	16,184 16,843	16,242 16,861	16,422 16,888	16,427 16,900	16,437 18,065	16,535 18,108
10.3.2	4,677	16,437	17,182				
10.3.3							
10.4.0	4,677 18,065	15,385 18,108	16,242 18,201	16,400	16,492	16,535	16,878

Code Category Numbers	Accession Numbers						
10.5.0							
10.6.0	15,357	16,686	16,720	16,841	17,183	17,234	18,134
10.7.0	3,367	4,451	16,075	16,230	16,534	16,567	16,637
	16,799	16,825	16,869	16,927	17,209	18,097	18,104
10.8.0	16,723	16,918					
10.9.0	4,050	4,673	15,378	16,563	17,122	17,272	17,341
	18,055	18,162	18,165	18,298			
10.9.1	4,050	16,208	16,238	16,264	16,294	16,642	16,971
	17,280	17,339	18,034	18,037	18,038	18,040	18,041
	18,042	18,043					
10.9.2	2,182	2,190	2,234	2,251	3,923	3,926	4,310
	4,325	16,137	16,242	16,267	16,296	16,310	16,427
	16,535	16,629	16,659	16,688	16,708	16,778	16,836
	16,843	16,861	16,920	17,112	17,115	17,118	17,140
	17,143	17,340	18,108	18,142	18,163	18,217	
10.10.0	16,602	16,739	17,182	17,209	18,104		
10.10.1	3,931	4,388	4,677	4,686	15,378	16,042	16,400
	16,492	16,510	16,511	16,527	16,535	16,694	16,715
	16,785	16,827	16,888	16,900	16,914	16,943	17,105
	17,126	17,149	17,238	18,201			
10.10.2	4,387	15,378	16,184	16,244	16,271	16,280	16,382
	16,449	16,464	16,486	16,542	16,629	16,638	16,645
	16,888	16,893	16,987	17,117	18,001		
10.10.3	16,177	16,862					
10.10.4	16,352	16,580	16,869	18,162	18,209		
10.10.5	16,602	18,206					
11.1.0	15,340	16,542	18,083				
11.2.0	16,542	17,182					
11.2.1	4,375	15,396	16,522	17,333	18,066	18,067	18,083
	18,089	18,120					
11.2.2	15,396	15,398	15,442	16,141	16,400	16,686	17,081
	17,082	17,084	17,142	18,120			
11.2.3	15,378						
11.2.4	16,203						
11.3.0	16,364	16,542					
11.3.1	16,511	17,084	18,163				
11.3.2	4,398	16,734					
11.3.3	3,415	4,005	4,374	4,528	4,791	15,355	15,377
	15,378	15,381	15,393	16,225	16,270	16,348	16,366

Code Category Numbers	Accession Numbers						
11.3.3 (cont'd.)	16,472	16,497	16,574	16,579	16,904	16,907	16,975
	17,081	17,082	18,116	18,163	18,276		
11.3.4							
11.3.5	3,935	16,155	16,217	16,722			
11.4.0	4,399	18,120					
11.5.0	16,509	16,542	18,029				
11.5.1	3,148	15,381	16,157	16,270	16,457	16,472	16,490
	16,666	16,882					
11.5.2	16,224	16,621					
11.5.3	4,026	4,398	4,400	16,734			
11.5.4	4,375	16,245	16,275	16,296	16,316	16,601	16,836
	16,888	16,972	18,108	18,165			
11.5.5	15,329	16,227	16,324	16,342	18,192		
11.6.0	15,377	15,442	16,137	16,259	16,686	16,914	17,165
	17,317						
11.7.0	16,925	18,165					
11.8.0	4,400	4,685	15,398	16,141	16,186	16,203	16,348
	16,364	16,574	16,632	16,686	16,722	16,734	18,083
12.1.0	15,340	15,345	16,063	16,071	16,078	16,081	16,101
	16,260	16,476	16,575	16,621	16,625	16,673	16,728
	16,756	16,764	16,926	17,111	17,182	18,160	
12.2.0	3,468	3,928	4,673	16,259	16,287	16,502	16,765
	16,954	17,105	17,178	17,232	17,233	17,331	17,332
	17,333	18,127					
12.2.1	3,468	3,916	3,928	4,012	4,142	4,290	4,375
	4,426	5,876	15,338	15,347	15,378	15,396	15,397
	15,422	16,019	16,029	16,155	16,175	16,212	16,249
	16,268	16,297	16,483	16,520	16,596	16,636	16,718
	16,828	16,958	16,966	16,976	16,979	17,082	17,110
	17,113	17,317	18,066	18,067	18,068	18,082	18,101
	18,131	18,153	18,201	18,268	18,331		
12.2.2	3,928	16,299	16,697	16,718	16,833	16,837	18,030
	18,067	18,068					
12.3.0	4,409	16,254	16,301	16,308	16,310	16,543	16,765
	16,856	16,954	16,956	16,971	17,146	17,327	17,334
	18,127	18,187	18,268				
12.4.0	16,108	16,111	16,207	16,296	16,378	16,765	16,892
	17,241	18,181					
12.4.1	4,133	6,557	15,395	16,061	16,062	16,100	16,249
	16,258	16,313	16,314	16,325	16,338	16,365	16,378
	16,403	16,462	16,493	16,510	16,529	16,568	16,570

Code Category Numbers	Accession Numbers						
12.4.1 (cont'd.)	16,571	16,573	16,596	16,600	16,676	16,688	16,730
	16,752	16,772	16,774	16,775	16,807	16,829	16,883
	16,884	16,885	16,887	16,948	16,972	16,988	17,112
	17,113	17,125	17,130	17,141	17,150	17,151	17,230
	17,231	17,256	17,257	17,260	17,270	18,016	18,017
	18,042	18,161	18,201	18,263	18,283		
12.4.2	15,328	16,143	16,378	16,411	16,711	16,884	17,135
	17,146	17,174	17,258	18,266			
12.4.3	3,895	3,896	16,588	16,596	17,120	17,130	17,149
	17,241						
12.5.0	15,358	15,359	16,019	16,296	16,437	16,438	16,765
	17,112						
12.5.1	3,415	15,396	16,207	16,551	16,596	16,708	16,714
	16,733	16,755	16,853	16,972	17,081	17,082	17,084
	17,105	17,117	17,261	18,129	18,167	18,201	
12.5.2	4,005	4,039	4,390	15,356	15,358	15,370	15,417
	15,421	16,100	16,191	16,193	16,194	16,195	16,297
	16,348	16,366	16,375	16,507	16,543	16,579	16,596
	16,907	16,943	16,956	16,971	17,081	17,082	17,107
	17,109	17,110	17,123	17,130	17,131	17,142	17,145
	17,238	17,269	17,334	18,201	18,268		
12.6.0	4,311	15,375	15,379	15,441	16,200	16,216	16,299
	16,366	16,438	16,471	16,480	16,543	16,569	16,662
	16,729	16,765	16,837	16,844	16,878	17,014	17,084
	17,104	17,153	17,268	17,272	17,316	17,334	18,015
	18,074	18,078	18,109	18,110	18,126	18,130	18,138
	18,160	18,165	18,166	18,191	18,331		
12.7.0	15,358	15,439	15,440	16,024	16,025	16,031	16,041
	16,042	16,047	16,061	16,062	16,065	16,066	16,071
	16,074	16,078	16,081	16,092	16,100	16,101	16,147
	16,160	16,162	16,173	16,178	16,179	16,180	16,189
	16,191	16,192	16,195	16,206	16,217	16,260	16,385
	16,400	16,418	16,463	16,469	16,480	16,493	16,506
	16,520	16,527	16,543	16,545	16,556	16,568	16,569
	16,575	16,582	16,584	16,588	16,607	16,621	16,672
	16,720	16,765	16,786	16,874	16,902	16,908	16,910
	16,943	16,954	16,983	16,998	17,014	17,017	17,106
	17,125	17,130	17,137	17,150	17,229	17,231	17,235
	17,238	17,239	17,240	17,268	18,030	18,057	18,090
	18,131	18,143	18,149	18,181	18,194		
12.8.0	15,383	16,043	16,050	16,064	16,120	16,161	16,178
	16,179	16,180	16,249	16,254	16,260	16,726	16,751
	16,783	16,941	17,022	17,106	17,235	17,236	17,251
	17,334	18,045	18,051	18,088	18,090	18,118	18,189
	18,208	18,275					
12.9.0	3,468	15,395	16,019	16,191	16,193	16,221	16,260
	16,325	16,332	16,365	16,373	16,461	16,462	16,463
	16,493	16,502	16,512	16,546	16,549	16,596	16,600
	16,607	16,632	16,675	16,694	16,772	16,783	16,807
	16,837	16,883	16,884	16,905	16,941	16,948	16,978
	16,988	17,106	17,128	17,207	17,227	17,317	18,057

Code Category Numbers	Accession Numbers						
12.9.0 (cont'd.)	18,067	18,068	18,102	18,131	18,143	18,266	
13.1.0	15,345	16,209	16,659	17,316	18,171		
13.2.0	661	2,199	3,919	3,920	15,425	16,018	16,052
	16,175	16,226	16,273	16,596	16,725	16,751	17,008
	17,127	17,129	17,203	17,216	17,224	18,085	18,118
	18,171	18,199					
13.2.1	452	2,183	3,460	4,144	4,243	4,245	4,392
	4,482	4,492	5,385	15,426	15,438	16,052	16,132
	16,149	16,178	16,179	16,180	16,290	16,428	16,596
	16,687	16,743	16,745	16,789	16,828	16,903	16,915
	16,961	17,027	17,060	17,095	17,128	17,251	18,052
	18,174	18,366					
13.2.2	546	4,254	15,425	16,026	16,340	16,365	16,388
	16,596	17,210	18,329	18,366	18,396		
13.2.3	108	484	1,857	4,035	4,243	15,327	15,405
	16,028	16,120	16,161	16,163	16,213	16,340	16,358
	16,447	16,531	16,596	16,745	16,757	16,848	16,931
	16,952	16,961	17,015	17,027	17,156	17,159	17,196
	17,198	18,052	18,125	18,171	18,195	18,270	18,275
	18,329	18,338	18,339	18,364			
13.2.4	3,409	3,990	4,495	15,410	16,002	16,018	16,021
	16,026	16,094	16,095	16,102	16,133	16,178	16,179
	16,180	16,290	16,388	16,416	16,570	16,596	16,967
	17,045	18,051	18,052	18,053	18,103	18,270	18,310
	18,370						
13.3.0	2,183	4,139	17,224				
13.3.1	3,964	3,967	3,968	4,245	4,426	4,492	16,506
	16,570	16,967	17,044	18,052	18,103	18,159	18,310
13.3.2	4,005	4,392	4,492	16,186	16,351	16,364	16,876
	18,095	18,342					
13.3.3	3,409	4,139	4,141	4,144	4,392	4,398	4,495
	15,378	15,425	15,426	15,438	16,119	16,132	16,295
	16,530	16,971	17,170	17,171	17,172	18,176	18,208
13.3.4	3,353	3,409	3,460	4,020	4,423	4,492	5,385
	16,026	16,260	16,295	16,426	16,461	16,530	16,596
	16,725	16,728	17,113	17,116	17,121	17,172	17,231
	17,316	18,095	18,200	18,283			
13.4.0							
13.4.1	2,178	3,409	3,631	4,139	4,144	4,392	16,018
	16,021	16,085	16,132	16,133	16,156	17,121	17,136
	18,159	18,370					
13.4.2	18,220						
13.4.3	16,565	16,814	17,054	18,159			
13.4.4	4,146a	4,146b	13,400	15,383	16,061	16,062	17,008
	17,117	17,152					

Code Category Numbers	Accession Numbers						
13.5.0	13,400	15,383	16,047	16,373	16,728	16,775	17,127
	17,136	17,259	18,286				
13.5.1	15,338	16,151	16,295	16,742	16,745	16,979	17,095
	17,121	17,134	17,236	18,174	18,304	18,307	18,369
13.5.2	4,146a	4,146b	4,423	4,526	15,417	16,195	16,426
	16,438	16,542	16,643	16,647	16,668	16,687	16,705
	16,718	16,876	16,925	16,958	17,014	17,123	17,134
	17,141	17,171	17,203	17,237	17,240	18,095	18,138
	18,164	18,300	18,369				
13.5.3	3,895	3,896	4,142	4,144	4,145	4,147	4,390
	4,392	4,393	16,146	16,175	16,295	16,436	16,473
	16,678	16,971	17,027	17,140	17,213	17,225	18,174
13.5.4	15,386	16,172	16,860	17,054	17,118	17,140	17,179
	17,185	17,244	17,249	18,113	18,295	18,301	18,317
	18,326						
14.1.0	81	108	250	281	364	452	498
	505	546	2,161	2,178	2,186	2,220	2,225
	2,228	2,418	2,747	2,748	3,338	3,356	3,389
	3,393	3,404	3,438	3,445	3,446	3,462	3,631
	3,632	3,970	4,017	4,020	4,029	4,325	4,362
	4,473	4,474	4,522	4,666	4,822	15,234	15,361
	15,371	15,372	15,376	15,378	15,382	15,425	16,020
	16,022	16,034	16,042	16,076	16,085	16,086	16,093
	16,108	16,111	16,139	16,151	16,165	16,171	16,181
	16,192	16,202	16,208	16,218	16,226	16,293	16,315
	16,326	16,331	16,339	16,370	16,376	16,386	16,389
	16,396	16,398	16,399	16,402	16,408	16,447	16,457
	16,484	16,501	16,504	16,506	16,523	16,534	16,537
	16,553	16,555	16,562	16,564	16,565	16,577	16,593
	16,603	16,624	16,637	16,651	16,653	16,675	16,689
	16,691	16,701	16,702	16,724	16,727	16,743	16,744
	16,747	16,804	16,812	16,814	16,825	16,848	16,857
	16,875	16,881	16,882	16,891	16,927	16,928	16,929
	16,941	16,945	16,947	16,981	17,042	17,043	17,045
	17,056	17,057	17,060	17,080	17,090	17,156	17,158
	17,161	17,190	17,200	17,201	17,205	17,217	17,219
	17,243	17,318	18,014	18,025	18,028	18,069	18,072
	18,086	18,107	18,115	18,132	18,134	18,141	18,157
	18,202	18,270	18,324	18,325	18,334	18,352	18,375
	18,378	18,379	18,395				
15.1.0	339	382	502	2,161	2,186	2,199	2,226
	3,371	3,459	3,938	4,014	4,042	4,254	4,337
	4,343	4,426	4,482	15,411	16,341	16,347	16,423
	16,451	16,528	16,825				
15.2.0	2,236	16,436	16,860	16,981	17,196	17,224	17,318
	18,003	18,075	18,173	18,189	18,199		

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 approximately 3000 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
AAF Complex Coordination Test	7.6.7	13
Abdominal - extension measures	7.2.1	12
Aberrations		
chromatic	3.15.1	6
optical	3.15.1	6
Absolute pitch	4.9.1	9
Absolute thresholds (see Thresholds)		
Acceleration		
as coding stimulus	5.5.2	11
	5.6.1	11
effects on performance	12.4.1	17
measurement of	12.4.0	17
	12.9.0	18
Acceptibility		
of equipment	13.3.2	19
of food	13.5.2	19
of task	13.3.2	19
Access Dimensions	10.2.0	15
	10.2.3	15
Accessibility		
general workplace	10.2.0	15
stored items	10.2.3	15
Accident		
prevention	10.9.0	15
	10.9.1	16
	10.9.2	16
probability vs. accident rate	10.9.0	15
proneness	10.9.0	15
	10.9.1	16
	10.9.2	16
Accident rates		
aging	13.5.4	19
aircraft	10.9.2	16
and noise and blast	4.2.6	8
and safety aids	10.9.0	15
industrial	10.9.0	15
motor vehicles	10.9.1	16
Accident records	10.9.0	15
Accident Report Form, supervisor	10.9.0	15
Accidents, sea	10.9.2	16
Accidents, types and causes of	10.9.0	15
	10.9.1	16
	10.9.2	16
Accident survival	10.9.1	16
	10.9.2	16
Acclimatization	12.1.0	17
cold	12.2.1	17
high altitudes	12.5.2	18
Accommodation, visual	3.15.9	7
Achromatic color	3.15.4	6
Achromatopia	3.15.1	6
Acoustic power level measurements	4.2.1	8
Acoustic reflex	4.9.5	10
	4.9.11	10
Acoustic shielding	4.2.2	8
Acrobatics		
air, "g" forces in	12.4.1	17
body movements	7.6.0	12
Acromial height	7.2.1	12
	10.3.1	15
Action potentials, muscle	7.3.3	12
Activity analysis	1.2.2	1
Acuity		
auditory	4.9.4	10
olfactory	5.4.1	11
pain	5.3.1	11
stereoscopic	3.15.6	7
	3.15.9	7
taste	5.4.1	11
temperature	5.2.1	11
visual	3.15.6	7
visual, tests of	3.16.2	7
Adaptation		
auditory	4.9.5	10
chromatic	3.15.3	6
	3.15.4	6
cutaneous	5.1.1	10
dark	3.15.3	6
gustatory	5.4.1	11
light	3.15.3	6
olfactory	5.4.1	11
pain	5.3.1	11
tactile	5.1.1	10
to high-altitude effects	12.5.0	17
to tilt	5.5.1	11
	5.6.1	11
	6.3.2	12
Adjustment		
personality	13.2.0	18
	13.2.1	18
psychophysical methods	1.2.3	1
Adjustment errors in aircraft accidents	10.9.2	16
Aerial maps	3.10.2	5
Aerial photography	3.10.5	6

Search Term	Code Category	Page
Aerodynamic simulators	1.3.0	2
Aeroembolism	12.5.1	18
Aero Medical Equipment Laboratories, Human Engineering Branch	1.4.0	2
Aero Medical Field Laboratory, Holloman Air Development Center	1.4.0	2
Aero Medical Laboratory, Wright Air Development Center	1.4.0	2
Aerotitis media	12.5.1	18
Aesthetic preference	13.2.3	18
After-effects (see After-image)		
After-image	3.15.7	7
After-sensation, warmth	5.2.1	11
Aging, effects of	13.5.4	19
Aided controls	8.7.4	14
Aided tracking	7.7.2	13
	8.7.4	14
Aids		
bearing information	3.5.2	4
optical	3.13.0	6
Aiming movements, factors affecting	7.6.1	12
Aiming performance, illumination levels	3.3.1	3
Air blast	12.2.1	17
equipment related	13.4.4	19
Airborne equipment	10.10.2	16
Airborne particles and organisms	12.3.0	17
Airborne vibrations, effect on man	12.4.2	17
Air conditioning	12.2.0	17
	12.2.1	17
Aircraft, camouflage	3.11.0	6
Aircraft, evaluation	10.10.2	16
Aircraft accidents	10.9.2	16
Aircraft carrier approach light system	3.3.2	3
Aircraft Combat Control Center, research and evaluation	2.3.3	2
	2.3.6	3
Aircraft communication systems	2.3.3	2
	4.4.0	8
radio	2.3.3	2
	4.4.2	8
telephone and intercom	4.4.1	8
Aircraft controls	8.2.0	13
Aircraft design		
human engineering evaluations	10.10.2	16
in aircraft accidents	10.9.2	16
Aircraft emergency evacuation	10.4.0	15
	10.9.2	16
Aircraft fuel, health hazards of	12.3.0	17
Aircraft gunner's workplace	10.2.0	15
Aircraft gunner's, etc., cont.	10.10.2	16
Aircraft instrument arrangement, principles of	9.2.0	14
Aircraft interception	2.2.4	2
	2.3.3	2
Aircraft lighting systems	3.3.2	3
Aircraft noise	4.2.4	8
Aircraft recognition, coding cues	3.12.0	6
	3.15.10	7
Aircraft seats	10.3.1	15
Aircraft stalls	10.9.2	16
Air Defense System	2.3.4	3
Air Field, lighting system	3.3.2	3
Air Force Cambridge Research Center	1.4.0	2
Air Material Command Program	1.4.0	2
Air Movement	12.2.1	17
Air photo, interpretation	3.10.5	6
Airplane (see Aircraft)		
Air pollution, insecticide spraying	12.3.0	17
Airport lighting maintenance systems	2.3.5	3
	3.3.2	3
Airport traffic control quarters	10.10.2	16
Air reconnaisance	2.3.3	2
	3.12.0	6
Air safety (see Aircraft accidents)		
Air-sea rescue gear	11.5.4	17
detectability	3.12.0	6
	11.5.4	17
Air sickness (see Motion sickness)		
Air-to-air search	2.3.3	2
	3.12.0	6
	3.15.9	7
Air traffic control	2.3.6	3
cursor-coordinated display	3.7.2	4
television displays	3.6.0	4
Air traffic control systems displays	2.3.6	3
	3.5.0	4
	3.6.0	4
Air Training Command Human Resources Research Center	1.4.0	2
Air velocity	12.2.1	17
Alcohol		
effects on judgment	13.5.3	19
in driving accidents	10.9.1	16
in industrial accident causation	10.9.0	15
Alertness	13.2.4	18
Alertness indicator	13.2.4	18
	13.5.1	19
Algebraic summation of responses	1.2.1	1
Algorithm, railway transport scheduling	2.3.0	2
Allocating functions to men	2.3.1	2
Altimeters	3.8.0	5
in aircraft accidents	3.8.0	5
	10.9.2	16

Search Term	Code Category	Page
Altitude		
effects of high	12.5.0	17
	12.5.1	18
	12.5.2	18
research, equipment and tests	12.9.0	18
tolerance	12.5.0	17
Ambient humidity	12.2.1	17
Ambient lighting		
artificial	3.3.0	3
natural	3.2.0	3
Ambient noise and blast	4.2.6	8
accident rates	4.2.6	8
industrial efficiency	4.2.6	8
performance	4.2.6	8
Ambient temperature	12.2.1	17
Amblyopia	3.15.1	6
Ambulances	10.10.3	16
American Institute for Research	1.4.0	2
American Optical Sight Screeners	3.16.0	7
Ammunition containers, human engineering evaluation of	10.10.0	16
Amplifiers and attenuators	4.3.2	8
Analgesics	5.3.0	11
	13.5.3	19
Analog computers	2.2.3	2
Analog electronic correlator, multi-channel	2.2.3	2
Analog pilot simulator	2.2.3	2
	7.7.4	13
Analog simulator, communication systems	2.2.3	2
Analog speech synthesizer	4.9.12	10
Anchoring effects		
thought processes	13.2.3	18
visual	3.15.11	7
Anechoic chamber	4.9.12	10
Anesthesia	5.1.1	10
	5.3.1	11
	13.5.3	19
AN/FPS-3A Radar, Human Engineering Evaluation	10.10.2	16
Angiosiotoma	3.15.1	6
AN/GRD-9 Direction Finder Set, Human Engineering Evaluation	10.10.2	16
Angular bearing, estimation of	3.15.11	7
Aniseikonia	3.15.1	6
Ankle measurements	7.2.1	12
Annoyance levels, body vibration	12.4.2	17
Annoyance threshold, noise	4.2.2	8
Annunciator, automatic	4.9.12	10
Anomaloscopes	3.16.3	7
Anoxia	12.5.2	18
Anthropometry		
components of variance	7.4.0	12
methods and equipment	7.4.0	12
nomographs	7.4.0	12
working positions	7.2.2	12
	7.4.0	12
Anthropometry, military aviation	7.1.0	12
Antifogging, in helmet design	11.3.3	16
Antifrosting, in helmet design	11.3.3	16
Anti-"g" suits	11.2.2	16
Anti-radiation clothing	11.2.3	16
Anxiety	13.2.1	18
Apparent movement	3.15.12	7
Apparent shape	3.15.10	7
Apparent size	3.15.9	7
Apparent slant	3.15.11	7
Appetite	13.5.2	19
Applied Psychology Research Unit Cambridge, England	1.4.0	2
Apprehension, span of visual	3.15.11	7
Approach landing indicators	3.8.0	5
	10.10.2	16
Aqua lung	11.5.0	17
Arctic climate		
and exercise	12.2.1	17
clothing	11.2.1	16
studies of	12.2.0	17
	12.2.1	17
Arctic ensembles	11.2.1	16
Arctic survival rations	13.5.2	19
Area, discrimination of object	3.12.1	6
Arm		
length	7.2.1	12
reach	7.3.1	12
rests	10.3.1	15
Armed Forces Institute of Pathology (AFIP)	1.4.0	2
Arm force positions	7.3.3	12
Arm-hand movement precision	7.6.1	12
Armored suits	11.2.3	16
	11.3.2	16
Armored vehicle communication systems, evaluation of	4.4.1	8
	4.4.2	8
Armored vests	11.3.2	16
Arm strength tests	7.3.3	12
Army Medical Research Laboratory	1.4.0	2
Army personnel, body measurements	7.2.1	12
Army research and development facilities	1.4.0	2
Articulation		
techniques of testing	4.8.2	9
	4.8.6	9
tests, construction of	4.8.2	9
	4.8.6	9
Artificial atmospheres	12.9.0	18
Artificial limbs	11.5.5	17
Artificial stuttering	4.8.4	9
Asbestos suits	11.2.1	16
Astigmatism	3.15.1	6
Astronautics, space flight applications	12.7.0	18

Search Term	Code Category	Page
Atmosphere, sealed cabin	12.5.1	18
	12.5.2	18
	12.7.0	18
Atmosphere control		
space vehicles	12.5.2	18
	12.7.0	18
submarine	12.5.2	18
Atmospheric optics	3.2.0	3
Atmospheric pollution	3.2.0	3
	12.3.0	17
Atomic burns	12.2.2	17
Attention span	13.2.4	18
auditory	13.2.4	18
visual	13.2.4	18
Attenuation (controls)	8.7.1	14
Attitude		
change	13.2.1	18
indicators	3.7.1	4
tests, in job assessment	1.2.2	1
towards equipment	13.3.2	19
towards task	13.3.1	19
	13.3.2	19
Audiogyric effect	6.3.2	12
Audiometry		
equipment and methods	4.9.12	10
standards for	4.9.12	10
threshold data	4.9.4	10
Audio-visual monitoring, interactions	6.3.1	12
Audio-warning displays	4.5.1	8
Audition, basic data	4.9.0	9
aftereffects of stimulation	4.9.5	10
anomalies	4.9.10	10
auditory patterns and meaning	4.9.8	10
duration	4.9.3	10
individual differences	4.9.10	10
loudness, pure and complex tones	4.9.2	9
physiological mechanisms	4.9.12	10
pitch, pure and complex tones	4.9.1	9
reaction times	7.6.4	13
repetitive stimulation	4.9.8	10
sound localization	4.9.7	10
stimulus mixture	4.9.6	10
thresholds and related phenomena	4.9.4	10
timbre	4.9.3	10
Audition, effects of aging	4.9.10	10
	13.5.4	19
Auditory		
acuity	4.9.4	10
adaptation	4.9.5	10
detection	4.7.0	9
fatigue	4.9.5	10
flight guidance systems	4.5.4	9
flutter rate discrimination	4.6.0	9
	4.9.8	10
guidance for the blind, a device	11.5.0	17
localization	4.9.7	10
monitoring	4.7.0	9
(non-verbal) display systems	4.5.1	8
	4.5.2	9
	4.5.3	9
	4.5.4	9
numerousness	4.6.0	9
	4.9.8	10
orientation	4.9.7	10
patterns	4.9.8	10
perspective	4.9.6	10
signals, characteristics of	4.6.0	9
skills, conditions affecting	4.2.6	8
	4.7.0	9
thresholds	4.9.4	10
Auditory equipment components	4.3.0	8
input devices	4.3.1	8
output devices	4.3.3	8
transmission devices	4.3.2	8
Auditory inputs and processes, bibliographies	4.1.0	7
Auditory search	4.7.0	9
Auditory thresholds, temporary shifts	4.9.5	10
Aural harmonics	4.9.6	10
Aural reading devices	11.5.1	16
Autistic Distortion	13.2.0	18
Auto-correlation function	1.2.1	1
Autokinetic illusion	3.15.7	7
	3.15.12	7
	6.3.2	12
Automatic check out	2.3.5	3
	10.7.0	15
Automatic control systems	2.2.3	2
Automatic Ground Control Approach System (AGCA)	2.3.6	3
Automatic learning devices	14.1.0	20
Automatic maintenance	2.3.5	3
Automation	2.3.0	2
	2.3.1	2
Automobile-barrier impact	10.9.1	16
	12.4.1	17
Automobile safety	10.9.1	16
Aviation deafness	4.2.7	8
Aviation intercom systems, evaluation of	4.4.1	8
Aviation medicine		
bibliography	1.1.0	1
environmental factors	12.1.0	17
safety	10.9.2	16
Aviation psychology	1.1.0	1
Avitaminosis	13.5.2	19
Background noise	4.2.0	7
	4.9.4	10
Backlash, with controls	8.7.2	14
Backlighting, instruments	3.4.2	4
Back rests	10.3.1	15

Search Term	Code Category	Page
Bailout	10.4.0	15
"Ball-bank" indicator, performance with	3.8.0	5
Ballistic vests	11.3.2	16
Barany chair	12.9.0	18
Barometric pressure	12.5.1	18
Basal metabolic rate	7.5.0	12
Basic motor activity	7.6.0	12
Basic motor capacities	7.6.0	12
Batelle reader for the blind	4.8.6	9
	11.5.1	16
Batting (baseball)	7.7.0	13
Beacons	3.3.2	3
Bearing information aids	3.5.2	4
Bearing information scales	3.5.2	4
Beats, auditory	4.9.6	10
Behavior decrement	13.3.3	19
Bells	4.5.1	8
Belting	11.3.1	16
Belts, emergency	11.3.1	16
Bends (Caisson Disease)	12.5.1	18
Bent knee girth	7.2.1	12
Bezold-Brücke effect	3.15.0	6
Bias in statistics	1.2.1	1
Bibliographies		
audition	4.1.0	7
basic motor capacities	7.1.0	12
body measurements	7.1.0	12
clothing and personal equipment	11.1.0	16
color vision	3.1.0	3
controls and displays	8.1.0	13
engineering psychology	1.1.0	1
equipment	10.1.0	15
furniture	10.1.0	15
human engineering	1.1.0	1
individual factors and task characteristics	13.1.0	18
input channels	6.1.0	11
kinesthesis	5.5.0	11
layout of panels and consoles	9.1.0	14
olfaction	5.4.0	11
optics	3.1.0	3
pain	5.3.0	11
personal equipment	11.1.0	16
sky brightness	3.1.0	3
special environmental factors	12.1.0	17
systems of men and machines	2.1.0	2
taste	5.4.0	11
temperature sensitivity	5.2.0	11
touch and vibration	5.1.0	10
vestibular functions	5.6.0	11
visibility	3.1.0	3
vision	3.1.0	3
work space	10.1.0	15
Binary communication	2.2.1	2
Binary data analysis	1.2.1	1
Binary number names	1.2.0	1
Binaural communication systems	2.3.3	2
Binaural pitch disparity	4.9.1	9
Binocular		
disparity	3.15.9	7
field	3.15.9	7
fusion	3.15.9	7
rivalry test	3.16.2	7
vision	3.15.9	7
Binoculars	3.13.1	6
Bio-electric		
equipment	1.3.0	2
methods	1.2.4	1
Bio-kinetic analysis	7.6.7	13
Biological statistics	1.2.1	1
Biomechanics, body	7.3.0	12
Biosatellites, decompression	12.5.1	18
Bisecting movements, speed and accuracy	7.6.1	12
Biserial coefficients	1.2.1	1
Bit	1.2.1	1
Black body radiation	12.2.2	17
Blackout	12.4.1	17
Blackout suits	11.2.2	16
Blackout thresholds	7.5.0	12
	12.4.1	17
Blast		
effect on performance (see ambient noise and blast)		
protection suits	11.2.3	16
Blast-injection olfactometry	5.4.3	11
Blindness, color	3.15.1	6
	3.15.4	6
Blind spot	3.15.0	6
Blinking reflex	7.6.6	13
Blinking signal light	3.12.2	6
Blood		
boiling	12.5.1	18
oxygen saturation	12.5.2	18
Boards, plotting	3.7.1	4
Bocci image	3.15.7	7
Body		
build	7.2.1	12
clearance	10.2.2	15
density	7.2.1	12
dimensions	7.2.0	12
	7.2.2	12
dimensions and furniture specifications	10.3.0	15
force system, analysis of	7.3.3	12
locomotion	7.6.0	12
measurements, stationary	7.2.1	12
measurements with arctic uniform	7.2.1	12
mechanics	7.3.0	12
movement, perception of	5.5.1	11
position, perception of	5.5.1	11
	6.3.2	12
position and vestibular function	5.6.0	11
size, bibliography	7.1.0	12
size, racial types	7.2.1	12
specific gravity and body build	7.2.0	12

Search Term	Code Category	Page
Body, cont.		
support	10.3.1	15
surface area	7.2.1	12
sway	5.6.1	11
types	7.2.0	12
wear	11.3.2	16
Body mechanics, research methods and equipment	7.4.0	12
Body temperatures	5.2.1	11
	7.5.0	12
Boiler-maker's ear	4.2.7	8
Bone conduction, vibrations	12.4.2	17
Boots	11.3.5	16
Boredom	13.2.4	18
Braille	5.1.2	10
Break-off phenomenon (see Spatial orientation)		
Breathing capacity	7.5.0	12
tests of	7.5.1	12
Brightness		
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
of sky	3.2.1	3
tonal	4.9.3	10
British information sources	1.4.0	2
Brownian movement, aural detection	4.9.4	10
B-scope	3.5.0	4
Buffeting	12.4.2	17
Burns		
cold	12.2.1	17
radiation	12.6.0	18
Bust measurements	7.2.1	12
Button design	11.3.0	16
Caffein, effect of	13.5.3	19
Caisson disease	12.5.1	18
California Test of Personality	1.2.2	1
Caloric intake and energy expenditure	7.5.0	12
	13.5.2	19
Calorimeter	5.2.2	11
Calorimetry	1.2.4	1
Camouflage	3.11.0	6
equipment evaluation	3.11.0	6
nets	3.11.0	6
suits	3.11.0	6
	11.2.0	16
tents	3.11.0	6
	11.7.0	17
visual principles	3.11.0	6
Canadian-Arctic Five-Man Ration Pack	13.5.2	19
Canadian research centers	1.4.0	2
Canned food	13.5.2	19
Canopies, cockpit	10.10.1	16
Capsule	10.10.1	16
Carbon dioxide toxicity	12.5.2	18
Cardiovascular indices	7.5.0	12
Cargo handling equipment, evaluation of	10.9.0	15
	10.10.0	16
Cargo handling system	2.3.5	3
analysis and methodology	2.3.0	2
	2.3.4	3
Car lights	3.3.2	3
Carriers (aircraft), approach light system	2.3.6	3
	3.3.2	3
Carriers (packs)	11.5.3	17
Cartography	3.10.2	5
Cathode-ray tube displays	3.5.0	4
Catwalks	10.10.0	16
Caution indicators (see Warning lights and Warning devices)		
Central form perception	3.15.10	7
Centrality indices	1.2.5	1
	2.2.3	2
Centrifugal acceleration, effect on vision	3.14.0	6
Centrifuge, human	12.9.0	18
Cervical height	7.2.1	12
Chambers, altitude	12.9.0	18
Channel capacity, auditory signals	4.6.0	9
Characters, design of	3.9.1	5
Charts	3.10.2	5
Checkerboard test	3.16.2	7
	3.16.3	7
Check lists	1.2.2	1
	3.10.3	5
Chemical protective clothing	11.2.0	16
Chest measures	7.2.1	12
Chi-square calculation, aircraft accidents	10.9.2	16
Choice behavior	2.2.2	2
Choice time (See Reaction time)		
Chokes (dyspnea)	12.5.1	18
Chopping, speech distortion	4.8.4	9
Chromatic abberation	3.15.1	6
Chromatic adaptation	3.15.3	6
Chronography	7.6.7	13
Cinematography	7.6.7	13
Clark earmuff	11.5.1	16
Clark glove	11.3.4	16
Clason projector	3.16.0	7
Classification equations	1.2.1	1
Click-pitch threshold	4.6.0	9
	4.9.1	9
Climate		
effect on performance	12.2.0	17
tolerance	12.2.1	17
Climate chamber	12.9.0	18
Clipping, speech distortion	4.8.4	9
Closure	13.2.3	18
Clothing		
bibliographies	11.1.0	16
effect on work space	11.6.0	17

Search Term	Code Category	Page
Clothing, cont.		
equipment and research methods	11.8.0	17
fabrics	11.2.4	16
protective	11.2.0	16
restriction tests	11.8.0	17
restrictive effects	11.6.0	17
roughness, discomfort due to	5.1.1	10
size	11.4.0	16
Clothing components		
belting	11.3.1	16
body armor	11.3.2	16
footgear	11.3.5	16
handgear	11.3.4	16
headgear	11.3.3	16
Clothing ensembles		
anti-radiation clothing	11.2.3	16
chemical protection	11.2.3	16
decontamination	11.2.3	16
fabrics	11.2.4	16
pressure suits	11.2.2	16
radiant heat protection	11.2.1	16
thermal protection	11.2.1	16
Clothing-equipment combinations	11.6.0	17
Clothing roughness scale	5.1.4	10
"Clo" values	11.2.4	16
method of calculation	11.8.0	17
Clutter		
and visual performance	3.14.0	6
scope	3.5.1	4
Cochlear response	4.9.12	10
Cockpits, human engineering evaluation of	10.10.1	16
Codes, safety	10.9.0	15
Coding		
auditory	4.6.0	9
controls	8.4.0	14
visual	3.12.0	6
Coding cues for aircraft recognition	3.12.0	6
Coefficient of constraint	1.2.1	1
Cognition (see Thought Processes)		
Cold		
acclimatization	12.2.1	17
burn	12.2.1	17
exposure, effect on electrocardiograms	12.2.1	17
mapping	5.2.1	11
	5.2.2	11
stress	12.2.1	17
tolerance	12.2.1	17
weather clothing	11.2.1	16
	12.2.1	17
weather diet (see also 13.5.2)	12.2.1	17
weather equipment	11.5.0	17
	12.2.1	17
weather face masks	11.3.3	16
weather living, military training practices	12.2.1	17
Coldbar suits	11.2.1	16
College of Aeronautics Laboratory	1.4.0	2
Collision injury research, methods	10.9.0	15
Collision lights	3.3.2	3
Collisions		
aircraft	2.3.6	3
	10.9.2	16
motor vehicles	10.9.1	16
Collision warning systems	3.5.0	4
	10.9.2	16
Color		
adaptation	3.15.4	6
blindness	3.15.1	6
conspicuity of	3.9.2	5
	3.12.1	6
	3.15.4	6
constancy	3.15.4	6
deficiency	3.15.1	6
	3.15.4	6
densitometer	3.16.1	7
discrimination	3.12.1	6
	3.15.4	6
filters	3.13.2	6
in food preference	13.5.2	19
memory	3.15.4	6
perception of	3.15.4	6
preference	3.15.0	6
role in safety	3.12.1	6
	10.9.0	15
sensitivity	3.15.4	6
tests	3.16.1	7
Color coding, controls	3.12.1	6
Colored smokes, assessment of	3.16.2	7
Colorimeters	3.16.3	7
Colorimetry	3.16.3	7
Color vision	3.12.0	6
	3.15.4	6
tests of	3.16.1	7
Combat hat	11.3.3	16
Combat information centers (CIC)	2.3.3	2
Combat information centers, research and evaluation	2.3.3	2
Combat stress	13.4.4	19
Combination tones	4.9.6	10
Comfort	13.3.3	19
lighting	3.4.0	4
seats	10.3.1	15
Communication		
nets	2.2.3	2
patterns	2.2.3	2
role in accident prevention	10.9.0	15
simulator	4.9.12	10
theory	2.2.1	2
Communication and Navigation Laboratory, Wright Air Development Center	1.4.0	2
Communications, air traffic control	2.2.3	2
	2.3.6	3
Communication systems, etc., see next page		

Search Term	Code Category	Page
Communication systems, evaluation and classification, cont.	2.2.3	2
Communication systems evaluation (see Speech communication systems, Auditory displays, non-verbal)		
Comparisons, monocular-binocular	3.15.9	7
	3.15.10	7
	3.15.11	7
Compatibility, clothing-equipment combinations	11.6.0	17
Compensatory tracking, factors affecting	7.7.2	13
Complex noise	4.2.0	7
Complex psychomotor performance, factors in	7.7.0	13
Complex reaction time	7.6.4	13
Complex tones	4.9.6	10
Compression, speech distortion	4.8.4	9
Computers	1.3.0	2
	2.2.3	2
Computers and simulation, systems techniques	2.2.3	2
Computer systems	2.2.3	2
Concealment (see Camouflage)		
Concept formation	13.2.3	18
Conduction, bone	12.4.2	17
Conference reports, heterogeneous human engineering	1.1.0	1
Confidence, decision theory	1.2.1	1
	2.2.2	2
Confidence limits, tables of	1.2.1	1
Configural analysis	1.2.1	1
Consolidated night vision tester	3.16.2	7
Conspicuity of colors	3.9.2	5
	3.12.1	6
	3.15.4	6
Constancy		
brightness	3.15.5	7
color	3.15.4	6
distance	3.15.9	7
size	3.15.9	7
Constant errors	1.2.1	1
Constant stimuli, psychophysical methods	1.2.3	1
Constraint, coefficient of	1.2.1	1
Contact Analog display, submarine control	2.2.3	2
	3.7.0	4
Contact burn	12.2.1	17
Contact chemoreception	5.3.1	11
Contact lenses	3.13.1	6
	3.13.2	6
Contagion mask	11.3.3	16
Contamination	12.3.0	17
Contextual map for decision making	2.2.0	2
Contingency techniques	1.2.1	1
Continuity principle, control relationships	8.7.3	14
Continuous spectrogram	4.2.1	8
Contour, perception of	3.15.10	7
Contrast		
color	3.15.4	6
foveal simultaneous	3.15.5	7
ratio	3.9.2	5
	3.12.1	6
thresholds	3.15.2	6
Contrast-brightness threshold meter	3.16.3	7
Control adjustments, prolonged	8.6.0	14
Control design, general references	3.1.0	3
	4.1.0	7
	8.1.0	13
Control design and selection, guidebook	8.1.0	13
Control-display compatibility	8.7.3	14
Control-display integration, general references	8.1.0	13
Control-display ratios	8.7.1	14
tracking proficiency	7.7.2	13
Control dynamics	8.7.0	14
Control functions, systems	2.3.0	2
Control handles	8.3.3	14
Control knobs	8.3.1	13
Controlled blast technique	5.4.3	11
Controller system lags	8.7.4	14
Control loading	8.7.2	14
Control manipulation areas	10.2.2	15
Control operation, hand vs. foot	8.3.5	14
Control panels	9.2.0	14
	9.3.0	14
Control position	8.2.0	13
	9.4.0	14
Control resistances	8.7.2	14
Controls		
coding and labelling	8.4.0	14
comparisons of types	8.3.5	14
Crane cabs	8.3.4	14
human eye	8.3.3	14
labelling	8.4.2	14
location	10.2.2	15
multidimensions	8.4.1	14
multifunction	8.3.4	14
positioning relative to operator	8.5.0	14
remote	8.3.3	14
sensitivity and amplification	8.7.0	14
visibility	10.2.1	15
Control sticks	8.3.2	13
Control tower communication systems, evaluation of	4.4.1	8
	4.4.2	8
Control tower language	4.8.6	9
Control towers, design and layout	2.3.6	3
Control towers for air traffic, evaluation	2.3.6	3
Control types, comparisons	8.3.5	14

Search Term	Code Category	Page
Convection	12.2.1	17
Convergence	3.15.9	7
Conviction, decision theory	1.2.1	1
	2.2.2	2
Cooperative collision warning system		
design factors	3.5.0	4
in air safety	10.9.2	16
Coriolis acceleration	6.3.2	12
Corneal sensitivity	5.3.1	11
Correlational techniques	1.2.1	1
Correlatogram analysis	1.2.1	1
Cosmic radiation	12.6.0	18
Cost effectiveness analysis	1.2.5	1
Counters	3.5.2	4
	3.8.1	5
Counting	3.15.11	7
Crank controls, design of	8.3.1	13
Crank handle	8.3.1	13
Crashes (see Accidents)		
Crash-impact engineering	10.9.1	16
Crash location beacon	3.3.2	3
	10.9.2	16
Crash-resistant fuel tanks	10.9.2	16
Crash snubbing test	10.9.1	16
Crash survival, seating orientation	10.3.2	15
Creativity	13.2.3	18
effects of aging on	13.2.3	18
	13.5.4	19
Crew effectiveness	2.3.2	2
Crew effectiveness, prediction	2.2.1	2
Critical band analysis	4.2.1	8
Critical flicker frequency	3.15.7	7
Critical incident technique	1.2.5	1
Critical task areas, location of	10.2.1	15
Cross-correlation	1.2.1	1
Cross modality matching	6.3.0	12
Crotch length	7.2.1	12
Crozier-Holway Discriminometer	3.16.3	7
Cupolometry	12.9.0	18
Cursors	3.5.2	4
Curvilinear regression	1.2.1	1
Cushions	10.3.1	15
Cutaneous pain, production of	5.3.1	11
Cutaneous pain reception	5.3.1	11
Cutaneous sensitivity, communication	5.1.0	10
	5.1.3	10
Cybernetics	1.2.1	1
Damping	4.2.2	8
Dark adaptation	3.15.3	6
Data, discarding	1.2.1	1
Data handling systems	2.2.3	2
Data 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	16
Deafness		
aviation	4.2.7	8
industrial	4.2.7	8
temporary	4.9.5	10
Decals	3.10.3	5
Deceleration	12.4.1	17
as coding stimulus	5.5.2	11
forces in aircraft accidents	10.9.2	16
forces in automobile accidents	10.9.1	16
	12.4.1	17
Decibel loss	4.2.7	8
	4.6.0	9
	4.9.5	10
Decision-making		
group characteristics in	2.3.2	2
thought process	13.2.3	18
Decision theory	2.2.2	2
Decompression sickness	12.5.1	18
Decontaminants, toxic effects of	12.3.0	17
Decontamination suits	11.2.3	16
Deformation, skin	5.1.1	10
Degradation and visual performance	3.14.0	6
Delayed sidetone	4.8.3	9
	4.8.4	9
Delay lines	4.3.2	8
Density		
filters	4.9.12	10
tonal	4.9.3	10
Deodorizing	5.4.1	11
Deprivation		
food	13.5.2	19
sensory	12.8.0	18
sleep	13.5.1	19
Depth perception	3.15.9	7
kinetic	3.15.9	7
	3.15.12	7
tests for	3.16.2	7
Desert clothing	11.2.1	16
Desert stress	12.2.1	17
Design for safety (see Safety design)		
Detectability, radar signal	3.5.1	4
Detection, visual	3.11.0	6
	3.12.0	6
Detectors		
radar	3.5.1	4
thermal	11.2.1	16
	12.2.1	17
Deuteranomalous vision	3.15.1	6
Deuteranopia	3.15.1	6
Devices		
warming	11.2.1	16
warning	3.12.2	6
	4.5.1	8
Dials	3.8.0	5
divisions and markings	3.8.4	5
lighting of	3.4.0	4

Search Term	Code Category	Page
Dials, cont.		
shape, size, direction of increase	3.8.3	5
Diet	13.5.2	19
Dietary allowances	13.5.2	19
Difference and summation tones	4.9.6	10
Differential thresholds (see Thresholds)		
Diffraction	3.2.0	3
	3.3.0	3
	3.12.0	6
Digestibility test	13.5.2	19
Digital computer	2.2.3	2
Digital readout indicators	3.8.1	5
Digital skin temperature	7.5.0	12
	12.2.1	17
Dimensional analysis, movement	7.6.0	12
Dimensions		
cockpit	10.10.1	16
human figure	7.2.1	12
Diplacusis, binaural	4.9.1	9
Diplopia	3.15.1	6
Direction		
estimation of object	3.15.11	7
of increase for scales and indicators	3.8.3	5
of movement relationships	8.7.3	14
	9.5.0	15
	10.2.2	15
perception of	3.15.11	7
Directional hearing (see Sound localization)		
Directional orientation of movement, panels and consoles	9.5.0	15
Directional signals	3.12.2	6
Disaster training	14.1.0	20
Discrete vs. continuous display, tracking proficiency	7.7.2	13
Discrimination		
color	3.9.2	5
	3.12.1	6
	3.15.4	6
intensity	3.12.1	6
	3.15.5	7
tactile	5.1.1	10
Discrimination function	1.2.1	1
Discriminatory analysis	1.2.1	1
Disorders, perceptual	3.15.1	6
Disorientation	6.3.2	12
Disparity, binocular	3.15.9	7
Dispatching (see Scheduling)		
Display combination, pictorial and symbolic elements	3.7.2	4
Display-control arrangement, ease of discrimination		
standard	9.4.1	14
grouping of components	9.4.0	14
standardization	9.2.0	14
user standards	9.4.2	15
Display-control compatibility	8.7.3	14
Display-control units, layout	9.1.0	14
	9.4.0	14
Displays		
location	9.3.0	14
radar	3.5.0	4
television	3.6.0	4
three-dimension radar	3.5.1	4
vibrotactile	5.1.3	10
Distance perception	3.15.9	7
Distortion		
and visual performance	3.14.0	6
	3.15.1	6
autistic	13.2.3	18
Distress signals for radiotelephone	4.4.2	8
	4.5.1	8
Distribution		
of aircraft accidents	10.9.2	16
of industrial accidents	10.9.0	15
of information, communication nets	2.3.3	2
Diurnal cycle, physiological	13.5.0	19
Diving (deep sea), decompression	12.5.1	18
Diving suits	11.2.2	16
Division of labor within a system	2.3.2	2
Division of scales	3.8.4	5
Dominance		
eye	3.15.0	6
hand	7.6.5	13
Door handles	8.3.0	13
	10.4.0	15
Doors, access	10.4.0	15
Doorways	10.4.0	15
Doppler hovering indicator	4.5.4	9
Doppler sonar	4.5.3	9
Double vision (see Diplopia)		
Drift index, tracking	7.7.2	13
Driver rating scales	10.9.1	16
Driver reference time	10.9.1	16
Driving habit check list	10.9.1	16
Driving performance	7.7.3	13
Driving visibility in motor vehicle accidents	10.9.1	16
Drugs, effects of	13.5.3	19
decision making	13.2.3	18
	13.5.3	19
visual performance	3.14.0	6
Dual pointer instruments	3.8.2	5
Dummy, anthropomorphic test	7.5.1	12
	10.9.1	16
Dummy-damage diagnosis in motor vehicle impact studies	10.9.1	16
Dye markers	3.12.1	6
Dynamic acuity	3.15.6	7
Dynamic body measurements	7.2.2	12
	7.4.0	12
Dyspnea (chokes)	12.5.1	18

Search Term	Code Category	Page
Ear defenders	11.5.1	16
Ear muffs	11.5.1	16
Earphones	4.3.3	8
Earphone sockets	4.3.3	8
Ear plugs	11.5.1	16
Ear protectors	11.5.1	16
Ear sensitivity	4.8.2	9
	4.9.4	10
Ease of discrimination and panel layout	9.4.1	14
Eastman test	3.16.1	7
	3.16.2	7
Ecological systems space travel	12.5.2	18
	12.7.0	18
Edge gradient	3.15.10	7
Edge lighting, instruments	3.4.2	4
Effective temperature	12.2.1	17
Ego-involvement	13.2.1	18
Ejection capsule	10.10.1	16
Ejection seat	10.3.1	15
Elastic resistances	8.7.2	14
Elbow girth	7.2.1	12
Elbow strength measures	7.3.3	12
Electrical accelerometer in motor vehicle impact studies	10.9.1	16
Electrical pursuit meter (null balance)	7.7.4	13
Electrocardiogram	1.2.4	1
Electrodes, surface	1.2.4	1
Electroencephalogram	1.2.4	1
Electroendosnosis	5.1.1	10
Electroluminescent lighting	3.4.4	4
Electromyography	7.6.7	13
Electronic counter measures	2.2.3	2
Electronic equipment design, guidebook of	1.1.0	1
	10.1.0	15
Electronic equipment maintenance		
guidebook for design	10.7.0	15
symposium	2.3.5	3
	10.7.0	15
Electronic pseudophone	4.9.12	10
Electronic tachistoscope	3.16.3	7
Electroretinogram	3.16.3	7
Embedded-figures test	3.15.10	7
	3.16.2	7
Embeddedness	3.15.10	7
Emergency		
belts	11.3.1	16
lights	3.3.2	3
	3.12.2	6
rations	13.5.2	19
Emissivity	12.2.2	17
Emmetropia	3.15.1	6
Empty field myopia	3.15.9	7
Empty visual field, visual detection	3.14.0	6
Encoding of information	1.2.1	1
End cues, effect on positioning movement	7.6.1	12
Energy expenditure	7.5.0	12
Engagement of agressive forces, assessment	1.2.2	1
Engineering psychology, bibliography	1.1.0	1
Engine noise	4.2.3	8
	4.2.4	8
	4.2.5	8
Enhancement, brightness (see Brightness enhancement)		
Entopic stray light, measurement of	3.16.3	7
Entrances	10.4.0	15
Entropy	1.2.1	1
Environment, automotive	10.9.1	16
Environmental factors in motor vehicle safety	10.9.1	16
Environmental factors (special types)	12.1.0	17
Environment and nutritional requirements	13.5.2	19
Eosinophil count as measure of psychological stress	7.5.1	12
	13.3.4	19
Epidemiological approach to safety	10.9.0	15
Equal contour scaling, auditory data	4.9.9	10
Equal discriminability scaling	1.2.3	1
Equipment		
accessibility	10.2.3	15
	10.7.0	15
arrangement	10.2.2	15
	10.2.3	15
distribution and location of	10.2.2	15
human engineering evaluations	10.10.0	16
maintenance	10.7.0	15
manipulability	10.7.0	15
noise	4.2.3	8
personal, effect on work space	11.6.0	17
portability	10.8.0	15
techniques of assessment	10.1.0	15
Ergometer	1.2.4	1
Ergonomics and accidents	10.9.0	15
Error analysis	1.2.1	1
Escape		
capsules	10.10.1	16
design for	10.4.0	15
safety problems in	10.9.0	15
seats	10.3.1	15
Escape capsule dimensions	10.3.1	15
Escape systems	10.10.1	16
Estimation of magnitude, psychophysical method	1.2.3	1
Estimations, predictive value	1.2.1	1
Evacuation slide	10.10.0	16
Evaporative cooling	12.2.1	17
Exercise, effect on strength	7.3.3	12

Search Term	Code Category	Page
Exercise in decompression sickness	12.5.1	18
Exits	10.4.0	15
Expanders and limiters	4.3.2	8
Expansion, speech distortion	4.8.4	9
Expectancy (vigilance)	13.2.4	18
Experimental conditions, psychophysical thresholds	1.2.3	1
Explosive decompression	12.5.1	18
Exposure apparatus, visual	3.16.0	7
	3.16.3	7
Exposure suits	11.2.1	16
Exposure time		
auditory effects	4.6.0	9
visual effects	3.9.3	5
	3.15.7	7
Extent of limb movement	7.3.1	12
	9.3.0	14
	10.2.0	15
Eye		
blink rate as a measure of psychological stress	7.5.1	12
	13.3.4	19
dominance	3.15.0	6
fixations, instrument flight	9.4.2	15
movements	3.15.8	7
movements, electrical recording	3.16.3	7
shields	3.13.2	6
Eyestrain (see Visual fatigue)		
Fabrics, clothing	11.2.4	16
Faceometer	7.4.0	12
Facial vision	4.9.7	10
Facilitation and inhibition, multi-input channels	6.3.1	12
Facilitation of production, work models	2.3.5	3
Facilities in human engineering	1.4.0	2
Factor analysis	1.2.1	1
Failure or Unsatisfactory Report System (FUR)	10.9.2	16
Farnsworth 100-hue color test	3.16.1	7
Farsightedness	3.15.1	6
Fasteners, clothing	11.3.0	16
Fasting	13.5.2	19
Fatigue		
accidents	10.9.0	15
and pain receptor	5.3.1	11
and tracking	7.7.2	13
and visual performance	3.14.0	6
effect on physiological capacities	7.5.0	12
	13.3.3	19
indices	13.3.3	19
olfactory	5.4.1	11
physiological	13.3.3	19
subjective	13.3.4	19
systemic	13.3.3	19
Fatigue, cont.		
uniforms	11.2.0	16
visual	3.14.0	6
Fear	13.2.1	18
Feedback		
delayed speech	4.8.1	9
kinesthetic	5.5.1	11
Feeding problems	13.5.2	19
Fenestration	3.2.1	3
Ferrograph, two-channel	4.9.12	10
Field, visual	3.14.0	6
Field of view	10.2.1	15
Field of vision	3.14.0	6
Field sleeping gear	11.5.2	17
Figural aftereffects		
kinesthesis	5.5.1	11
vision	3.15.7	7
Filtering, controls	8.7.0	14
Filters		
auditory	4.3.2	8
optical	3.13.2	6
Finger pressure control	7.3.3	12
Finger tremor	7.6.6	13
Fire control systems	10.10.4	16
Fire-fighting clothing	11.2.3	16
Fire-fighting equipment, evaluation	10.10.0	16
Fire potentials in aircraft accidents	10.9.2	16
Fixation	3.15.7	7
Fixtures, lighting	3.3.3	3
Flak suits	11.3.2	16
Flares		
battle field illumination	3.3.2	3
signal	3.12.2	6
Flavor		
evaluation of	5.4.1	11
	13.5.2	19
identity control	13.5.2	19
measurement	5.4.1	11
	13.5.2	19
quality control	13.5.2	19
Flents earplug	11.5.1	16
Flesch Reading Ease Formula	1.2.5	1
Flexibility of body movement	7.3.2	12
Flicker		
light source	3.3.4	3
	3.15.7	7
subjective sensations	13.4.4	19
Flicker fusion	3.15.7	7
Flight		
cabins, evaluation of	10.10.1	16
control systems	3.8.0	5
	8.7.0	14
data panels	3.8.0	5
deck clothing	11.2.3	16
feeding	13.5.2	19
guidance systems, auditory	4.5.4	9
guidance systems, visual	3.7.0	4
helmet	11.3.3	16
instruments, spacing	9.4.2	15
progress strips	3.10.3	5

Search Term	Code Category	Page
Flight, cont.		
simulators	14.1.0	20
trainers, human engineering evaluation of	10.10.0	16
Floodlights	3.3.2	3
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	6
Fluorescent materials, evaluation	10.10.0	16
Fluorescent paint	3.12.0	6
	3.14.0	6
Flybar	4.5.4	9
Flying personnel, body measurements	7.2.1	12
Flying TAF Non-Fatal Hypoxia Incident Report	10.9.2	16
	12.5.2	18
Fog, effect on visibility	3.2.3	3
Fog horns	4.5.1	8
Folding chair	10.3.1	15
Folding partition, efficiency of movement	10.2.2	15
Food	13.5.2	19
packets.	13.5.2	19
preference	13.5.2	19
preference, testing methodology	1.2.5	1
	13.5.2	19
supplements	13.5.2	19
tablets	13.5.2	19
Foot		
controlled tracking	7.7.2	13
dimensions, interrelationships, soldiers	7.2.1	12
strength	7.3.3	12
Footgear	11.3.5	16
Force resistances, controls	8.7.2	14
Forces exertable, shoulder and elbow joints	7.3.3	12
Forearm girth	7.2.1	12
Formants of speech	4.8.1	9
Form perception	3.15.10	7
differentiation	3.12.0	6
recognition	3.9.0	5
	3.15.10	7
Foul weather clothing	11.2.1	16
Foveal vision	3.15.0	6
Fractional resistances	8.7.2	14
Fractionation		
judgments	1.2.3	1
of pain sensation	5.3.2	11
of sweetness	5.4.3	11
technique	1.2.3	1
Free escape	10.9.0	15
	12.5.1	18
"Freeway" highways	10.9.1	16
Frequency analyzer	1.3.0	2
Frequency modulators	4.3.2	8
Frequency sensitivity, auditory	4.9.1	9
Frostbite	12.2.1	17
Frozen foods	13.5.2	19
Fumes, noxious	5.4.2	11
	12.3.0	17
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	15
Fusion, binocular	3.15.9	7
Gain (controls)	8.7.1	14
Gait	7.3.0	12
Galvanic skin response	1.2.4	1
fatigue indicator	13.3.3	19
Gambling		
cognitive aspects	13.2.3	18
mathematical theories of	1.2.1	1
	2.2.2	2
variance preferences in	1.2.1	1
	2.2.2	2
Game theory	1.2.1	1
	2.2.2	2
techniques	2.2.0	2
Gamma	3.15.12	7
Ganzfeld	3.15.10	7
Gas		
atmospheric	12.3.0	17
masks	11.3.3	16
Gastrointestinal Survey	1.2.5	1
Gear ratios	8.7.1	14
Geiger counters	4.5.1	8
George Washington University	1.4.0	2
"g" forces, tolerances	12.4.1	17
Glare	3.2.4	3
	3.3.4	3
Glasses	3.13.1	6
	3.13.2	6
Gloves	11.3.4	16
Glucostatic theory	13.5.2	19
	13.5.3	19
Goggles	3.13.1	6
	3.13.2	6
Goldmann-Weekers adaptometer	3.16.3	7
Graph displays	3.10.0	5
Graphs	3.10.1	5
Gravitational stress	12.4.1	17
Gravity-free state (see Weightlessness)		
Graybiel's hypothesis	3.15.7	7
Greyout	12.4.1	17
Grids	3.5.2	4
Grips, control stick	8.3.3	14
Grip strength	7.3.3	12
Ground-controlled approach radar, (GCA) system evaluation	2.3.2	2
	2.3.6	3
Group, etc., see next page		

Search Term	Code Category	Page
Group, cont.		
interview method	1.2.5	1
leaders, assessment of small unit	1.2.2	1
orientation method in accident prevention	10.9.0	15
	10.9.2	16
productivity	2.2.0	2
research techniques	1.2.0	1
	2.2.0	2
	15.2.0	20
structure in work organization	2.3.2	2
Group communication	2.3.2	2
Grouping of controls, concentric shafts vs. parallel	8.3.5	14
	8.5.0	14
	9.4.1	14
Grouping of instruments, check reading	3.8.5	5
	9.4.0	14
	9.4.1	14
Group psychology (systems) bibliography	2.1.0	2
Guided missiles		
evaluation	10.10.2	16
training of personnel	14.1.0	20
Gust loads in seat design	10.3.1	15
Gust scale	5.4.1	11
Gust scale of taste	5.4.3	11
Halo error	13.2.1	18
Hand		
cranking	7.6.2	13
dimensions	7.2.1	12
signals, flight line	3.12.0	6
Handbooks, heterogeneous human engineering	1.1.0	1
Handedness, effect on performance	7.6.5	13
Handedness and skill	7.6.5	13
Handgear	11.3.4	16
Handgrip controls, design of	8.3.3	14
Handles	8.3.1	13
	8.3.3	14
Handrails, human engineering evaluation of	10.10.0	16
Hand size measurements	7.2.1	12
	11.4.0	16
Hand-warming device	11.3.4	16
Hand wheel location, tracking	8.5.0	14
Hand wheel tracking, force resistances	8.7.2	14
Hardy-Rand-Rittler test	3.16.1	7
Harmonic Analysis, tracking behavior	7.7.2	13
	7.7.4	13
Harmonics, aural	4.9.6	10
Harness, safety	11.3.1	16
Harvard-type white noise generator	4.9.12	10
Hats	11.3.3	16
Hazards, escape	10.4.0	15
Haze	3.2.3	3
Headache	5.3.1	11
Headgear	11.3.3	16
Headlamp illumination intensity in motor vehicle accidents	3.3.2	3
	10.9.1	16
Headlight		
glare	3.3.4	3
illumination	3.3.2	3
Head measurements nomograph	7.2.1	12
Headphones	4.3.3	8
Headrests, motor vehicle safety	10.9.1	16
Hearing (see Audition)		
Hearing, normal standards	4.2.7	8
	4.9.4	10
	4.9.10	10
Hearing aids	11.5.1	13
Hearing conservation	4.2.2	8
	4.2.7	8
Hearing loss		
for speech, measurement of	4.8.2	9
permanent (see Noise-induced hearing loss)		
temporary	4.9.5	10
Hearing tests, types	4.9.4	10
Heat		
casualties in military training, control	12.2.1	17
exchange	12.2.1	17
injury	12.2.1	17
limits	12.2.1	17
load	12.2.1	17
loss (cutaneous)	5.2.1	11
perception	5.2.1	11
stress	12.2.1	17
stress index	12.2.0	17
tolerance	12.2.1	17
Heated suits	11.2.1	16
Hecht-Schlaer adaptometer	3.16.3	7
Hecht-Schlaer discriminometer	3.16.3	7
Helicopter		
airborne equipment	10.10.2	16
instrumentation	3.7.0	4
	3.8.0	5
	3.8.6	5
lighting system (landing)	3.3.2	3
Helmets	11.3.3	16
Heterophoria	3.15.1	6
High altitude		
adaptation to	12.5.0	17
gloves	11.3.4	16
research stations	1.4.0	2
	12.9.0	18
sickness	12.5.1	18
	12.5.2	18
suits	11.2.2	16
Highly audible phrases	4.8.6	9
Highway safety	10.9.1	16
Highway signs	3.9.1	5
Hip measurements	7.2.1	12

Search Term	Code Category	Page
Holloman Air Development Center	1.4.0	2
Horizon illusion	3.15.7	7
Hospital beds, human engineering evaluation of	10.10.0	16
Hot dry temperature endurance	12.2.1	17
Hot weather		
clothing (see also 11.2.0, 11.3.0)	11.2.1	16
living, military training practices	12.2.1	17
uniforms	11.2.1	16
Housing, human engineering evaluation of	10.10.0	16
	11.7.0	17
Howard-Dolman test	3.16.2	7
Howitzers, human engineering evaluation of	10.10.0	16
Hue	3.15.4	6
Human centrifuge	12.9.0	18
Human Control Dynamic Analysis Facility, The	1.4.0	2
Human Engineering Laboratory Aberdeen Proving Grounds	1.4.0	2
Human engineering study of control tower console	9.2.0	14
Human engineers, organization of	1.1.0	1
Human Factors Division, Air Research and Development Command	1.4.0	2
Human Factors Research	1.1.0	1
Human lags	7.6.4	13
Human morphology	7.1.0	12
Human operator vs. machine, basis for choice	2.3.1	2
Human Resources Research Office	1.4.0	2
Human Resources Research Office, bibliography	1.1.0	1
Human survival (see Survival)		
Humidity	12.2.1	17
Hunger regulation	13.5.2	19
Hypermetropia	3.15.1	6
Hyperopia	3.15.1	6
Hyperventilation	12.5.2	18
	13.5.0	19
Hypoxia	12.5.0	17
ICAO phonetic alphabet	4.8.6	9
Identification vests (flight deck)	11.3.2	16
Illumination		
color of	3.3.1	3
	3.4.3	4
level of	3.3.1	3
	3.4.3	4
pattern, inversion of	3.3.4	3
preference for level of	3.3.1	3
uniformity	3.3.1	3
Illusions, see above		
Illusions, cont.		
autokinetic	3.15.12	7
	6.3.2	12
oculo-gyral	6.3.2	12
visual	3.15.7	7
Imagery	13.2.3	18
Immersion suits	11.2.1	16
Impact injury	12.4.1	17
Impact noise, measurement of	4.2.1	8
Impaired hearing and performance	4.2.7	8
Impermeable protective suits	11.2.3	16
Impregnated clothing	11.2.3	16
	11.6.0	17
Inadvertent activities in aircraft accidents	10.9.2	16
Incentives	13.2.1	18
Incidental memory in problem solving	13.2.3	18
Indicator response, psychophysical thresholds	1.2.3	1
Indicator systems		
comparison of types of	3.8.6	5
layout of	9.2.0	14
	9.3.0	14
	9.4.0	14
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		
in audition	4.9.10	10
in vision	3.15.0	6
	3.15.1	6
Individual interview method	1.2.5	1
Industrial		
deafness	4.2.7	8
hearing conservation programs	4.2.2	8
injury rates	10.9.0	15
noise	4.2.3	8
safety	10.9.0	15
special purpose mask	11.3.3	16
systems	2.3.0	2
Industrial equipment controls, standardization	8.2.0	13
Inertial resistances	8.7.2	14
In-flight feeding	13.5.2	19
Information		
assessment	1.2.5	1
	2.2.0	2
flow	2.2.1	2
	2.2.3	2
processing	2.2.3	2
	13.2.3	18
retrieval	2.2.1	2
theory	2.2.1	2
Information analysis		
speech	4.8.1	9

Search Term	Code Category	Page
Information analysis, cont.		
symbolic codes	3.9.0	5
Infrared		
backgrounds	3.2.0	3
	3.4.3	4
radiation	12.2.2	17
sensitivity of eye	3.15.2	6
skiascope	3.16.3	7
Injuries, types occuring in accidents	10.9.0	15
	10.9.1	16
	10.9.2	16
Input channels		
choice and interaction	3.15.0	6
	4.9.0	9
	6.1.0	11
comparisons	6.2.0	11
intersensory effects	6.3.0	12
Insecurity	13.2.1	18
Inside-out displays	3.7.1	4
Insight	13.2.3	18
Insomnia	13.5.1	19
Institute for Associated Research	1.4.0	2
Institute of Occupational Health	1.4.0	2
Instruction cards and charts	3.10.3	5
Instrument		
alignment, panel design	9.4.1	14
boards and panels, coding of	3.12.1	6
boards and panels, layout of	9.4.1	14
layout	9.4.1	14
Instrument landing system, airborne	10.10.2	16
Instrument lighting	3.4.0	4
color	3.4.3	4
comparison of methods	3.4.4	4
comparison of types	3.4.4	4
direct lighting	3.4.1	4
edge	3.4.2	4
floodlighting	3.4.1	4
illumination intensity	3.4.3	4
indirect	3.4.2	4
rear	3.4.2	4
Instrument panel design	9.1.0	14
Instruments		
dual pointer	3.8.2	5
lighting of (see Instrument lighting)		
Insulation requirements, clothing	11.2.1	16
Integrated display panels	9.2.0	14
Integrated instruments	3.8.0	5
Integrating audio spectrometer	4.9.12	10
Integration and coordination, systems	2.2.2	2
Intellectual Ability (see Intelligence)		
Intelligence	13.2.2	18
effects of aging on	13.5.4	19
Intelligence, cont.		
tests	1.2.2	1
	1.2.5	1
	13.2.2	18
Intelligibility of speech	4.8.0	9
Intelligibility tests	4.8.2	9
	4.8.6	9
Interaural noise, cross correlation	4.9.7	10
Interaural phase cues	4.9.7	10
Intercom communication systems, evaluation	4.4.1	8
International Language for Aviation	4.8.6	9
Interrupters	4.3.2	8
Intersensory effects, interaction of input channels	6.3.0	12
Inter-Society Color Council Color Aptitude Test	3.16.1	7
Interval scale	1.2.3	1
Interview methods	1.2.5	1
Inventory control systems	2.3.0	2
Involuntary movements	7.6.6	13
Irradiation, cosmic and nuclear	12.6.0	18
Ishihara test	3.16.1	7
Isolation, effects of	12.8.0	18
Isophotes	3.2.0	3
Jamming, communications systems	2.2.3	2
Jerkins	11.2.1	16
Jet air transportation, human factors problems	1.1.0	1
Jet engine muffler	4.2.2	8
Jet transport design	10.10.2	16
Job analysis	1.2.2	1
Job check list	1.2.2	1
Job information methods	1.2.2	1
Job satisfaction	13.3.2	19
Johns Hopkins University Institute for Cooperative Research	1.4.0	2
Johnson noise	4.2.0	7
Joint functional regression	1.2.1	1
Judgment	13.2.3	18
Jump boots	11.3.5	16
Keinath-Scanning Technique	1.2.5	1
Kelvin temperature	12.2.2	17
Keyset	2.2.3	2
Keyset configuration	9.4.2	15
Keystone View Telebinoculars	3.16.0	7
Kindel earmuff	11.5.1	16
Kinematic muscle study machine	7.4.0	12
Kinesiology	7.2.2	12
Kinesthesis		
basic data	5.5.1	11
bibliographies	5.5.0	11
coding through	5.5.2	11

Search Term	Code Category	Page
Kinesthesis, cont.		
equipment and research methods	5.5.3	11
Kinesthetic reaction time	5.5.1	11
	7.6.4	13
Kits, human engineering evaluation of	10.10.0	16
Knapsacks	11.5.3	17
Kneeling heights	7.2.2	12
Knob		
configuration	8.3.1	13
	9.4.0	14
	9.4.1	14
controls, design of	8.3.1	13
controls, force resistances	8.7.2	14
gripping surface	8.3.1	13
setting, accuracy of	7.6.1	12
spacing	8.3.1	13
	9.4.0	14
Knobs, tactual discrimination of	5.1.2	10
Knowledge of results and psychophysical thresholds	1.2.3	1
Knutson Personal Security Inventory	1.2.5	1
Labels	3.10.3	5
Labyrinthine stimulation	5.6.1	11
Landcraft, evaluations	10.10.3	16
Landings, crash	10.9.2	16
Language		
analysis	1.2.5	1
	4.8.6	9
	4.8.7	9
design	4.8.6	9
structure	4.8.6	9
Language engineering	4.8.6	9
Lap belts	11.3.1	16
Lateral dominance	7.6.5	13
Leadership (group)	2.3.2	2
Lead-lag intervals	8.7.5	14
Learning	14.1.0	20
Leg		
reach	7.3.1	12
strength	7.3.3	12
Legibility	3.9.0	5
Lenses	3.13.1	6
	3.13.2	6
Lesions, skin	11.6.0	17
Letters, legibility of	3.9.0	5
Level of aspiration	13.2.1	18
Lever controls, design of	8.3.0	13
Lever positioning, accuracy of	7.6.1	12
Lever target designation	8.4.0	14
Life jackets	11.5.4	17
Life preservers	11.5.4	17
Life-support systems	12.5.2	18
	12.7.0	18
Life vests	11.5.4	17
Light		
adaptation	3.15.3	6
coding	3.12.2	6
Light, cont.		
daytime	3.2.1	3
night	3.2.2	3
twilight	3.2.2	3
Lighting		
artificial ambient	3.3.0	3
back	3.4.2	4
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	3
natural ambient	3.2.0	3
plastic edge	3.3.3	3
rear	13.1.0	18
sandwich type (see Lighting, plastic edge)		
systems, indoor	3.3.3	3
systems, outdoor	3.3.2	3
Light meters	3.16.0	7
Limb movement		
extent of	7.3.1	12
flexibility of	7.3.2	12
Limbs, artificial	11.5.5	17
Linearity, human operator	2.3.1	2
Linear programming	2.2.0	2
	2.2.2	2
Linear pursuit	7.7.2	13
Linear regression	1.2.1	1
Linear scales	3.8.3	5
Line spectrogram, audition	4.2.1	8
Line symbols in map design	3.10.2	5
Linguistic context	4.8.6	9
Lip reading	14.1.0	20
Liquid foods	13.5.2	19
Listening		
distributed attention	13.2.4	18
selective	4.8.5	9
Load carrying		
performance	7.3.3	12
	11.5.3	17
systems	11.5.3	17
Localization, tactile	5.1.1	10
Localization in the blind	4.9.7	10
Logistics	2.2.0	2
cybernetic theory	1.2.1	1
Longshore safety	10.9.0	15
Loudness		
adaptation (see Auditory fatigue)		
binaural vs. monaural stimulation	4.9.2	9
level discrimination	4.9.2	9
level identification	4.9.1	9
	4.9.2	9
recruitment phenomena	4.9.2	9
summation	4.9.2	9
Loudness scales	4.9.9	10
Loudspeakers	4.3.3	8
Low ambient temperature exposure, effect on performance	12.2.1	17
Luckiesh-Moss Visibility Meter	3.16.3	7
Luminaires	3.3.2	3

Search Term	Code Category	Page
Luminaires, cont.	3.3.3	3
Luminance gradients	3.15.5	7
Luminance thresholds	3.15.2	6
Luminosity functions	3.15.2	6
Mach bands	3.15.5	7
Mach effect	12.4.1	17
Machine constants, control operation	8.7.4	14
Machine noise	4.2.3	8
Mackworth Clock Test	3.16.2	7
Macro-motion studies	1.2.2	1
Magnifiers for radar scope	3.5.2	4
	3.13.0	6
Magnitude estimation	1.2.3	1
Maintenance scheduling and trouble shooting, research and evaluation	2.3.0	2
	2.3.5	3
	10.7.0	15
Maintenance systems	2.3.5	3
bibliography	2.1.0	2
Malathion, use in spraying by airplane	12.3.0	17
Malodor	5.4.2	11
Management control problems	2.1.0	2
Man-machine operation chart	2.2.0	2
Man-machine systems, design of	10.10.0	16
Mannikins	1.3.0	2
	11.8.0	17
Manpower utilization, job analysis of	1.2.2	1
Manual		
controls, design factors	8.3.0	13
dexterity	7.6.3	13
movements, components of	7.6.0	12
performance	7.6.3	13
tracking	7.7.2	13
Maps	3.10.2	5
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	20
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
Markov-Process	1.2.1	1
Marksmanship, training	14.1.0	20
Marksmanship (rifle)	7.7.0	13
low illumination (night visibility)	3.2.2	3
	3.3.1	3
performance	7.7.3	13
startle	7.6.6	13
Marksmanship (rifle), cont.		
training	14.1.0	20
Masked thresholds, auditory	4.9.4	10
Masking		
in camouflage	3.11.0	6
in speech	4.8.3	9
in symbol recognition	3.9.3	5
in visual tasks	3.14.0	6
odors	5.4.1	11
sonar listening	4.7.0	9
Masks		
civilian protective	11.3.3	16
gas	11.3.3	16
oxygen	11.3.3	16
Massachusetts Institute of Technology, Electronics Laboratory	1.4.0	2
Mast Pedestal Sight Manipulation Test	7.7.4	13
Matching	1.2.1	1
Mathematical		
analysis (see Statistical analysis)		
methods	1.2.1	1
models	1.2.1	1
Maximum likelihood estimate of information	1.2.1	1
Measurement precision	1.2.1	1
Meatendra	13.5.2	19
Meat tenderizing	13.5.2	19
Mechanized translation	4.8.6	9
Medical Research Council (Great Britain)	1.4.0	2
Medical Research Laboratory (New London)	1.4.0	2
Melody recognition	4.9.8	10
Memo-motion photography	1.2.5	1
	3.10.5	6
Meniere's disease	4.2.7	8
Mental set	13.3.1	19
Message		
procedures	4.8.6	9
transmission	2.2.3	2
Meters		
brightness	3.16.3	7
noise	4.9.12	10
Method		
of absolute judgments	1.2.3	1
of adjustment	1.2.3	1
of constant stimuli	1.2.3	1
of constant stimulus differences, statistical analysis	1.2.1	1
of limits	1.2.3	1
Micro-melodies	4.9.8	10
Micromotion techniques	1.2.2	1
Microphones, types and placement	4.3.1	8
Military decision theory	2.2.0	2
Military physiology, special environmental factors	12.1.0	17
Military reference man, etc.,	see next page	

Search Term	Code Category	Page
Military reference man (anthropometric)	7.2.1	12
Military spelling alphabets	4.8.6	9
Miniaturization, maintenance for	10.7.0	15
Miniaturized equipment guide	1.1.0	1
Mirror Image Words	3.9.1	5
Missiles		
equipment	10.10.0	16
systems	2.3.0	2
Mittens	11.3.4	16
Mixed astigmation	3.15.1	6
Model analysis	1.2.2	1
Models		
communication systems	2.2.3	2
operations research	2.2.0	2
probabilistic	1.2.1	1
	2.2.0	2
Mode-of-operation coding, controls	8.4.1	14
Modulation	4.9.6	10
Modulation threshold	3.15.2	6
Momsen Lung (see Submarine escape appliance)		
Monaural cues, auditory localization	4.9.7	10
Monitoring, air traffic control	2.3.6	3
Monitoring behavior	7.7.1	13
	13.2.3	18
Monitoring functions, systems	2.2.4	2
	2.3.1	2
Monitoring performance	7.7.1	13
Monocular vision	3.15.1	6
Monotonous environments	12.8.0	18
Monotony	12.8.0	18
	13.2.4	18
Monte Carlo methods	1.2.1	1
Moon illusion	3.15.9	7
Morale	13.2.1	18
groups	2.3.2	2
Morphological codes	7.2.0	12
Morse Code	4.6.0	9
Morse Code training	14.1.0	20
Motion picture displays	3.6.0	4
Motion sickness		
detection of susceptibility	1.2.5	1
prevention	12.4.3	17
preventives	13.5.3	19
stereotypes	12.4.3	17
symptoms	12.4.3	17
Motivation	13.2.1	18
tests of	1.2.5	1
Motor performance	7.6.0	12
component analysis	7.6.0	12
research methods and equipment	7.6.7	13
Motor response patterns, mathematical description	1.2.1	1
	7.6.0	12
	7.7.0	13
Motor skills aptitudes	7.1.0	12
Motor vehicle accidents	10.9.1	16
Motor vehicle impact studies	10.9.1	16
Motor vehicle safety (see Motor vehicle accidents)		
Motor vehicle seat	10.3.1	15
Movement		
between points, speed and accuracy	7.6.1	12
compatibility, display-control	8.7.3	14
components, repetitive tasks	7.6.2	13
forces acting on human body	12.4.0	17
precision, controls	8.7.1	14
range of	7.3.1	12
ratios, controls	8.7.1	14
restrictive effect of clothing	11.8.0	17
speed, basic	7.6.0	12
types of	7.6.0	12
Movements, eye	3.15.8	7
Multi-channel communication systems, theory	2.2.1	2
Multi-channel listening	4.4.1	8
	4.7.0	9
Multi-channel voice communication systems	4.4.1	8
Multi-function controls, design of	8.3.4	14
Multi-manned aircraft, research and evaluation	2.3.1	2
Multinominal distribution	1.2.1	1
Multiple criterion technique	1.2.2	1
Multiple display, monitoring	7.7.1	13
Multiple image photography	5.5.3	11
	7.6.7	13
	7.7.4	13
Multiple regression	1.2.1	1
Multipliers and dividers	4.3.2	8
Multivariate information analysis	1.2.1	1
Multivariate transmission analysis	1.2.1	1
Munsell colors	3.16.3	7
Muscle action potentials	7.3.3	12
Muscle, mechanical properties	7.3.0	12
Muscular endurance	7.3.3	12
Muscular strength	7.3.3	12
Muscular tension	7.3.3	12
Myopia	3.15.1	6
empty field	3.15.9	7
Nagel anomaloscope	3.16.1	7
Narcosis, deep sea divers	12.5.2	18
Narcotics	13.5.3	19
National Institute of Health	1.4.0	2
NATO phonetic alphabet	4.8.6	9
Naval Aviation Ordnance Test Station	1.4.0	2
Naval Aviation Safety Center	1.4.0	2
Naval School of Aviation Medicine and Research	1.4.0	2

Search Term	Code Category	Page
Navigation charts	3.10.2	5
Navigation systems, airborne	10.10.2	16
Navy Lantern Test	3.16.0	7
Navy Z-2 Antiblock Suit, effect on work space	11.6.0	17
Near-accident reports	10.9.1	16
	10.9.2	16
Near accidents	10.9.1	16
	10.9.2	16
Nearsightedness	3.15.1	6
Neck measures	7.2.1	12
Negative "g"	12.4.1	17
Netfessel's pursuit apparatus	7.7.4	13
Neural quantum theory	3.15.0	6
Neural quantum thresholds	3.15.2	6
Neuro-hypothalamic theory	13.5.2	19
	13.5.3	19
New London Navy Lantern Test	3.16.1	7
Nicotine	13.5.3	19
Night		
blindness	3.15.1	6
driving efficiency	10.9.1	16
glasses	3.13.0	6
	13.4.1	19
lighting, motor vehicle accidents	10.9.1	16
vision	3.15.2	6
	3.15.3	6
vision trainers	3.16.4	7
	14.1.0	20
Night vision, Vitamin A	3.15.2	6
Night vision tests	3.16.2	7
Nitrogen narcosis	12.3.0	17
Nitrous oxide (NO_2), effect on behavior	12.3.0	17
Noise		
aircraft	4.2.4	8
armored vehicles	4.2.3	8
equipment	4.2.3	8
guided missiles	4.2.4	8
industrial	4.2.3	8
motor	4.2.3	8
office	4.2.3	8
rockets	4.2.4	8
shipboard	4.2.5	8
submarine	4.2.5	8
Noise, visual	3.14.0	6
Noise analyzer system	4.2.0	7
Noise composition	4.2.1	8
Noise control	4.2.2	8
vibration isolation	4.2.2	8
Noise criteria for office quieting	4.2.2	8
Noise degradation, visual legibility	3.9.2	5
Noise fields, classifications	4.2.0	7
Noise frequency, effect on behavior	4.2.6	8
Noise-induced hearing loss, characteristics of	4.2.7	8
Noise level, measurement	4.2.1	8
Noise levels, tolerable	4.2.2	8
Noise meters, airplanes	4.2.4	8
Noise operated interphone system	4.4.0	8
Noise-reducing devices	4.2.2	8
Noise reduction	4.2.2	8
Noise spectrum, analyses	4.2.1	8
Noise susceptibility index	4.9.5	10
Noise tolerance		
loudness level	4.2.2	8
speech interference level	4.2.2	8
Nomographs	1.2.1	1
Non-auditory cues and localization	4.9.7	10
Non-parametric statistics	1.2.1	1
Non-verbal auditory training	14.1.0	20
Noxious odors	5.4.2	11
	12.3.0	17
Nuclear aircraft	12.7.0	18
Nuclear radiation	12.6.0	18
Number telling methods	4.8.6	9
Numerals, legibility of	3.9.0	5
Numerals and letters - form	3.9.1	5
Numerical transformations	1.2.1	1
Nutrition	13.5.2	19
Nystagmus	3.15.8	7
	5.6.1	11
Obesity	7.2.0	12
Object		
characteristics, discriminability of	3.12.1	6
direction, estimation of	3.15.11	7
Observational methods	1.2.5	1
Observation interview method	1.2.5	1
Obstacles, visibility in workspace	10.2.1	15
Occupational health, bibliography	1.1.0	1
Occupational information, human engineering	1.1.0	1
Occupational Medical Foundation (see Institute of Occupational Health)		
Ocular dominance	3.15.0	6
Ocular fatigue	3.14.0	6
Ocular tests	3.16.2	7
Ocular tremor	3.15.8	7
Oculo-agravic effect	6.3.2	12
Oculo-gyral illusion	3.15.7	7
	6.3.2	12
Odor detection (see Olfaction)		
Office Scientific Research and Development (OSRD), catalogue of reports	1.1.0	1
Ohio State University Research Foundation	1.4.0	2
Olfaction		
basic data	5.4.1	11
bibliographies	5.4.0	11
equipment and research methods	5.4.3	11
signals	5.4.2	11
Olfactometer	5.4.3	11

Search Term	Code Category	Page
Olfactometry, blast-injection	5.4.3	11
Olfactory mechanisms	5.4.1	11
Olfactory sensitivity	5.4.1	11
Operating controls, panel layout and arrangement	9.1.0	14
Operational readiness, assessment technique	1.2.5	1
Operations research	2.2.0	2
Operative temperature	12.2.1	17
Operator position		
effect on location of controls	8.5.0	14
effect on visual performance	3.14.0	6
effect on work space design	10.6.0	15
Optical		
aids, motor vehicle safety	10.9.1	16
aids, vision	3.13.0	6
equipment systems	3.16.0	7
filters, general	3.13.2	6
shimmer	3.5.0	4
surveillance	3.12.0	6
tone generator	4.9.12	10
Optics, atmospheric	3.2.0	3
Ordinal scale	1.2.1	1
Ordinance equipment, human engineering evaluation of	10.10.0	16
Organization of men, factors in	2.2.2	2
Orientation, spatial	6.3.2	12
Orientation angle, panels and consoles	9.3.0	14
Ortho-Rater	3.16.2	7
Osmics	11.3.0	16
Outside-in displays	3.7.1	4
Overall pattern in map design	3.10.2	5
Oximeter, two-channel earpiece	12.9.0	18
Oxygen		
deprivation (see Hypoxia)		
helmet	11.3.3	16
masks	11.3.3	16
requirements	12.5.2	18
toxicity	12.3.0	17
	12.5.2	18
warning signal generator	4.5.1	8
Ozone, toxic effects	12.3.0	17
Pace length	7.3.1	12
Packboards	11.5.3	17
Packs	11.5.3	17
Pain		
acuity	5.3.1	11
adaptation	5.3.1	11
and skin temperature	5.3.1	11
as signal	5.3.1	11
basic data	5.3.1	11
bibliographies	5.3.0	11
equipment and research methods	5.3.2	11
high intensity noise	4.9.4	10
	5.3.1	11
Pain, cont.		
intensity of	5.3.1	11
localization	5.3.1	11
perception of	5.3.1	11
scaling of	5.3.2	11
thresholds	5.3.1	11
Paired comparison vs. rating scale method	1.2.1	1
Palatability	13.5.2	19
Palmar resistance	1.2.4	1
Palmar sweat indicator	1.2.4	1
Panels		
and chassis layouts, general considerations	9.1.0	14
and console arrangement, priority ratings	9.4.0	14
and consoles, standardization	9.2.0	14
Pantograph radar	3.5.0	4
Parachutes	11.5.4	17
Parafoveal vision	3.5.0	4
	3.14.0	6
Parallax, movement	3.15.12	7
Partial pressure glove	11.3.4	16
Passageways	10.4.0	15
Past experience, effect on visual perception	3.15.0	6
	3.15.9	7
	3.15.10	7
	3.15.11	7
	3.15.12	7
Pattern perception	3.15.10	7
Pattern playback	4.8.7	9
	4.9.12	10
Patterns of communication, systems	2.2.3	2
	2.3.3	2
Patterns of work distribution, systems	2.2.2	2
	2.3.1	2
Pay incentive and psychophysical thresholds	1.2.3	1
	13.2.1	18
Payoff, game theory	1.2.1	1
Pedal controls, design of	8.2.0	13
	8.3.2	13
Perceived movement of self, visual cues	6.3.2	12
Perceptible signal	3.15.10	7
Perception		
central form	3.15.10	7
color	3.15.4	6
contour	3.15.9	7
	3.15.10	7
depth	3.15.9	7
general	6.1.0	11
of body position, factors affecting	6.3.2	12
of direction	3.15.11	7
of motion	3.15.12	7
of self	13.2.1	18
of space	3.15.9	7
	6.3.2	12

Search Term	Code Category	Page
Perception, cont.		
span of	3.15.0	6
	3.15.11	7
time	5.7.0	11
visual number	3.15.11	7
Perceptual		
anticipation	13.3.1	19
closure	3.15.7	7
	3.15.10	7
fluctuation, as fatigue index	13.3.3	19
illusion	6.3.2	12
isolation	12.8.0	18
motor skills	7.7.0	13
motor tasks, perceptual errors	7.7.0	13
satiation	3.15.3	6
	12.2.0	17
	13.3.2	19
set	3.15.7	7
	13.2.4	18
	13.3.1	19
Perceptual anticipation, tracking	13.2.4	18
Performance		
effect of task factors	13.4.0	19
	13.4.1	19
	13.4.4	19
motor	7.6.0	12
	7.7.0	13
Performance evaluation, work groups	2.2.1	2
	2.3.2	2
Peripheral		
blindness	3.15.1	6
cues	3.14.0	6
	13.5.0	19
field of vision	3.14.0	6
	3.15.0	6
Peripherality indices	1.2.5	1
	2.2.3	2
Periscopes	3.13.1	6
Perseveration	13.2.3	18
Personal equipment		
bibliographies	11.1.0	16
carriers	11.5.3	17
clothing combinations	11.6.0	17
ear defenders	11.5.1	16
equipment and research methods	11.8.0	17
filters	3.13.0	6
goggles	3.13.2	6
life jackets	11.5.4	17
motor performance related to	10.6.0	15
packs	11.5.3	17
parachutes	11.5.4	17
prosthetics	11.5.5	17
restrictions on work space	10.5.0	15
sleeping bags	11.5.2	17
special glasses	13.4.1	19
submarine escape devices	10.4.0	15
	11.5.4	17
Personal equipment, cont.		
visors	3.13.2	6
	13.4.1	19
Personality	13.2.1	18
Personality characteristics		
habitual traffic violator	10.9.1	16
	13.2.1	18
Navy enlisted personnel	13.2.1	18
Personnel, general problems	15.1.0	20
Personnel chute escape	10.4.0	15
Perspective illusion	3.5.1	4
	3.15.9	7
Pharmacology and toxicology, drugs and their effects on performance	13.5.3	19
Phase-plane technique, tracking study application	7.7.2	13
Phoneme detector	4.9.12	10
Phonemic analysis	4.8.1	9
Phonetically-balanced word lists	4.8.2	9
	4.8.6	9
Phonetic analysis	4.8.1	9
Phonetic research, information theory	4.8.1	9
Phonetics, experimental	4.8.1	9
Phoria	3.15.1	6
tests of	3.16.2	7
Phosphenes		
method	3.16.3	7
theory	3.15.0	6
Phosphene thresholds	3.15.2	6
Phosphors (radar)	3.5.1	4
Photic stimulation, intermittent, prolonged periods	3.3.4	3
	13.4.4	19
Photoelectric corneal reflex method	3.15.8	7
	3.16.3	7
Photoelectric plethysmograph	1.2.4	1
Photographic detail	3.10.5	6
Photography	3.10.5	6
Photo interpretation	3.10.5	6
Photo interpretation, fatigue factors	3.14.0	6
Photometers	3.16.0	7
	3.16.3	7
Photometry	3.16.0	7
Photopic vision	3.15.0	6
Physical fitness, job analysis of	1.2.2	1
Physical proficiency tests	7.5.1	12
Physical stress and performance	13.4.4	19
Physiological capacities		
acceleration	12.4.1	17
limits in motor performance	7.3.3	12
Physiological methods and equipment	1.2.4	1
Pictorial displays	3.7.0	4
Pilot performance	7.7.3	13
Pilot reaction times	7.6.4	13

Search Term	Code Category	Page
Pilot stress	10.9.2	16
	13.4.4	19
Pitch		
characteristics of short tones	4.6.0	9
	4.9.1	9
discrimination	4.9.1	9
shifts	4.9.5	10
Pitch-intensity functions	4.9.1	9
	4.9.2	9
Plane of controls relative to operator	9.3.0	14
Plethysmograph	1.2.4	1
Pneumatic life preserver	11.5.4	17
Point biserial coefficients	1.2.1	1
Pointer alignment position, check reading	3.8.5	5
Pointer-Drum Altimeter	3.8.6	5
Pointers	3.8.2	5
Polarization	3.2.0	3
	3.3.4	3
Pollution, atmospheric	12.3.0	17
Population differences in hearing	4.9.10	10
Population entropy	1.2.1	1
Portability in equipment design	10.8.0	15
Portable Heart Beat Recorder	1.2.4	1
Portable Interphone Trainer	14.1.0	20
Position coding controls	3.12.0	6
	5.5.2	11
	8.4.1	14
	9.4.0	14
Positioning		
movements, speed and accuracy	7.6.1	12
of components on panels, ease of discrimination	9.4.1	14
of controls relative to operator	8.5.0	14
Position of controls and displays	8.5.0	14
remote handling	8.5.0	14
standardization	8.2.0	13
Positive "g"	12.4.1	17
Positive radial acceleration	12.4.1	17
Post-prandial lassitude	13.5.2	19
Posture	7.3.0	12
Power development, hand movements	7.3.3	12
Power output in man	7.3.3	12
Power spectra	1.2.2	1
PPI Scope	3.5.0	4
	3.5.1	4
Preadaptation	3.15.3	6
Predetermined time standards, productivity of subsystems	2.2.1	2
	2.3.0	2
	2.3.2	2
Predictions, validity of	1.2.1	1
Preferences		
food	13.5.2	19
olfactory	5.4.1	11
Preferences, cont.		
research methods	1.2.2	1
taste	5.4.1	11
Prehension hooks	11.5.5	17
Preplanning technique, trouble shooting	2.3.4	3
	2.3.5	3
Presbycusis	4.9.10	10
Presbyopia	3.15.1	6
Pressure adaptation time	5.1.1	10
Pressure breathing	12.5.1	18
	12.5.2	18
Pressure suits	11.2.2	16
spatial requirements	11.6.0	17
Preventive maintenance program in accident prevention	10.9.0	15
Printed materials		
comparisons of types of	3.10.4	5
general descriptions	3.10.0	5
Prism vergence	3.15.8	7
Probability of seeing functions	3.15.3	6
Probability statistics	1.2.1	1
Probability theory, applied to communication systems	2.2.3	2
	2.3.3	2
Probit method, application to fitting an ogive	1.2.1	1
Problem-solving	13.2.3	18
group	2.3.2	2
rigidity-flexibility	13.2.1	18
	13.2.3	18
	13.3.1	19
Problem-solving efficiency, group	2.2.1	2
	2.3.2	2
Procedural analysis	1.2.2	1
	2.2.0	2
Production control systems	2.3.0	2
Production scheduling	2.3.1	2
	2.3.5	3
Production systems	2.3.5	3
Productivity		
of a system, evaluation	2.2.0	2
	2.2.1	2
psychological	13.2.1	18
Proficiency tests	1.2.2	1
maintenance	2.3.5	3
Proficiency training	14.1.0	20
Profile classification, motor vehicle operators	10.9.1	16
Projection equipment, human engineering evaluation of	10.10.0	16
Projectors	3.16.3	7
Prolonged performance	13.4.1	19
Prone position		
effect on location of controls	8.5.0	14
	9.3.0	14
effect on visual performance	3.14.0	6
in layout of cockpits	10.10.1	16
Proprioception	5.5.0	11

Search Term	Code Category	Page
Proprioceptive cues	6.3.2	12
Prosthetics	11.5.5	17
Protanomalous vision	3.15.1	6
Protanopia	3.15.1	6
Protective devices, visual	3.13.2	6
Protective lenses	3.13.2	6
Protective masks	11.3.3	16
Protective suits	11.2.0	16
Proximity warning devices (aircraft)	3.12.2	6
Pseudophone, electronic	4.9.12	10
Psychogalvanic responses	1.2.4	1
Psychological factors in accidents	10.9.0	15
Psychological measures (see Psychological tests)		
Psychological scaling		
auditory data	4.9.9	10
pain	5.3.1	11
taste	5.4.1	11
	5.4.3	11
vision	3.16.3	7
weights (veg)	5.5.1	11
	5.5.3	11
Psychological stress	13.2.1	18
	13.4.4	19
Psychological tests	1.2.5	1
Psychomotor performance, effects of aging on	13.5.4	19
Psychomotor tests	7.7.4	13
Psychopharmacology, bibliography	13.1.0	18
	13.5.3	19
Psychophysical methods	1.2.3	1
Psychophysical threshold measures	1.2.3	1
Public address systems	4.4.2	8
Pulfrich effect	3.15.9	7
Purdue peg board	7.6.7	13
Purkinje Phenomenon	3.15.3	6
Pursuit apparatus, dual compensatory	7.7.4	13
Pursuit tracking, factors affecting	7.7.2	13
Push-and-pull forces	7.3.3	12
Pushbutton controls, designs of	8.3.2	13
Pyrotechnics	3.3.2	3
Q-Sort	1.2.2	1
Quality control	1.2.1	1
	2.3.5	3
Questionnaire, survey method	1.2.2	1
	1.2.5	1
Queueing	2.2.0	2
	2.2.2	2
	2.2.3	2
	2.2.4	2
Quickened displays	8.7.5	14
Quickening	8.7.5	14
controls	8.7.0	14
in man-machine systems	2.3.1	2
Quickening, cont.		
in man-machine systems	8.7.5	14
of control loops, tracking proficiency	7.7.2	13
Radar	3.5.0	4
pantograph	3.5.0	4
screen, physical variables of	3.5.1	4
	3.5.3	4
screen orientation	3.5.3	4
signal detection	3.5.1	4
simulators	3.16.4	7
	14.1.0	20
workroom lighting	3.3.3	3
	14.1.0	20
Radar approach control system	2.3.6	3
Radarscope photography	3.5.0	4
	3.10.5	6
Radarscopes	3.5.0	4
training in	14.1.0	20
Radiant heat	5.2.1	11
	12.2.2	17
Radiation		
black body	3.16.3	7
cosmic	12.6.0	18
diet requirements	13.5.2	19
nuclear	12.6.0	18
protection	10.9.0	15
	11.2.3	16
	12.6.0	18
protection, gloves	11.3.4	16
	12.6.0	18
sickness	12.6.0	18
thermal	12.2.2	17
ultraviolet	12.2.2	17
Radiation detection equipment, human engineering evaluation of	10.10.0	16
Radiation injury	12.6.0	18
Radiation protective clothing	11.2.3	16
Radioactive materials	12.6.0	18
Radioactivity of human body	12.6.0	18
Radio communication systems, evaluation of	4.4.2	8
Radio communication systems, jamming	4.4.2	8
Radio intelligibility	4.4.2	8
Radio interphone (AN/URC-7)	4.4.2	8
Radiological hazards	12.2.2	17
	12.6.0	18
Radio meter	12.9.0	18
Radio range	4.5.1	8
Radiotelephony distress signals	4.6.0	9
Radon (radioactive air concentration)	12.6.0	18
RAF Near-Point Rule	3.16.3	7
Railway transportation systems	2.3.4	3
Randomness, testing for	1.2.1	1
Random (Gaussian) noise	4.2.0	7

Search Term	Code Category	Page
Random signal generator, tracking research equipment	7.7.4	13
Range		
effect	7.7.0	13
finders	3.13.1	6
information aids, scales	3.5.2	4
ranging	7.7.2	13
rings	3.5.2	4
Rate		
patterns, movement	7.6.2	13
vs. velocity tracking	7.7.2	13
Rate-aided control	8.7.4	14
Rating procedures, communication nets	2.2.1	2
	2.3.2	2
	2.3.3	2
Rating scale vs. paired comparison method	1.2.1	1
Rations	13.5.2	19
Ratio scale	1.2.3	1
Ratio scaling, auditory data	1.2.3	1
	4.9.9	10
Reach distance, work place design	9.3.0	14
	10.2.2	15
Reaction time	7.6.4	13
Readability	3.10.4	5
Reading machines	11.5.1	17
Reading span	3.14.0	6
	3.15.0	6
	3.15.8	7
	3.15.11	7
Rear lighting, instruments	3.4.2	4
Rebreathing apparatus, multipurpose	11.3.3	16
Recognition		
form	3.15.2	6
	3.15.10	7
performance	3.9.0	5
threshold, visual	3.15.10	7
Reconnaissance, visual	3.2.0	3
	3.12.0	6
Recording procedures, language	4.8.6	9
Recruitment (loudness) tests	4.9.2	9
Recruitment phenomena	4.9.2	9
	4.9.3	10
Rectilinear oscillation of body, perception of	6.3.2	12
Recurrence equations	1.2.1	1
Redout	12.4.1	17
Reduced stimulation, effect on performance	12.8.0	18
Reduction coding	9.4.0	14
Redundancy		
figure	3.9.1	5
	3.14.0	6
information	2.2.1	2
	2.3.3	2
problem solving	13.2.3	18
References, general (see Bibliographies)		
Reflectance	3.15.0	6
	3.15.5	7
Refractory period, psychological	7.6.4	13
Repetitive movements	7.6.2	13
Replication, influence of error	1.2.1	1
Requirement setting	1.2.2	1
methodology	1.2.2	1
Rescue equipment		
aircraft	10.10.2	16
sea and land craft	10.10.3	16
"Resonance" in tracking	7.7.2	13
Resonance synthesizer	4.8.7	9
	4.9.12	10
Respiration	7.5.0	12
Respiratory		
closed support systems	12.5.2	18
	12.7.0	18
measurement devices	1.2.4	1
reaction time	7.6.4	13
resistance	7.5.0	12
	12.5.1	18
Response predictability	1.2.1	1
Response readiness	13.2.4	18
Response time delay	13.2.4	18
Rest		
allowances, compensating	13.4.1	19
periods	13.4.1	19
Results, extrapolation of	1.2.1	1
Reticles	3.13.1	6
Retinal light distribution	3.16.3	7
	5.6.1	11
Reviews, heterogeneous human engineering	1.1.0	1
Reward	13.2.1	18
Rhythm perception	4.9.8	10
Rifle sights	3.13.1	6
Risk probabilities, decision making	1.2.1	1
	13.2.3	18
Risk taking	1.2.1	1
	13.2.3	18
Road layout	10.9.1	16
Road safety	10.9.1	16
Roadside signs, motor vehicle safety	10.9.1	16
Rocket-fuel-resistant clothing	11.2.3	16
Rocket noise	4.2.4	8
Rocket storage	10.2.3	15
Room acoustics	4.2.0	7
	4.2.2	8
Room fenestration	3.2.1	3
Rotary oscillation of body, perception of	6.3.2	12
Rotary pursuit performance	7.7.2	13
Rotating chair	5.5.3	11
	12.9.0	18
Rucksacks	11.5.3	17
Rudder bars, design of	8.3.2	13
Running, speed and velocity	7.3.3	12
Runway marking systems	3.12.0	6

Search Term	Code Category	Page
Runway marking systems, cont.	10.9.2	16
Runways		
lighting systems of	3.3.2	3
roles in safety	10.9.2	16
Saccadic eye movements	3.15.8	7
Safe-Driver Inventory	10.9.1	16
Safety		
belts	11.3.1	16
belt tensiometer	10.9.1	16
	11.3.1	16
design	10.9.0	15
	10.9.1	16
	10.9.2	16
education	10.9.0	15
harness	11.3.1	16
manuals	10.9.0	15
radiation hazards	12.6.0	18
shoes	11.3.5	16
Safety Factors Rating Scale	10.9.0	15
SAGE (semiautomatic ground environment) system	2.3.0	2
SAM Peg Moving Test	7.6.7	13
Sample-data tracking	7.7.2	13
Sample entropy	1.2.1	1
Sample theory	1.2.1	1
SAM Single Dimension Pursuit Test	7.7.4	13
SAM Steadiness Aiming Test	7.6.7	13
Satellite, environment	12.7.0	18
Satiation, kinesthetic	5.5.1	11
Scales		
bearing information	3.5.2	4
comparisons of types of	3.8.6	5
general design	3.8.3	5
	3.8.4	5
	3.8.5	5
of sensation, construction	1.2.3	1
Scheduling		
operations research	2.2.0	2
	2.2.2	2
shop	2.2.4	2
	2.3.5	3
Schneider Index	1.2.5	1
	13.3.3	19
Scientific method in operations research	2.2.0	2
Scotoma, central - in night vision	3.2.2	3
	3.3.2	3
	3.3.4	3
	3.15.1	6
Scotopic thresholds	3.15.2	6
Scotopic vision	3.2.2	3
	3.15.0	6
Scott noise level analyzer	4.2.1	8
Scramblers	4.3.2	8
Screen-Maddox Rod Test	3.16.2	7
Seacraft, evaluation	10.10.3	16
Seadrome lighting	3.3.2	3
	10.10.3	16
Sea markers	3.12.2	6
Search lights	3.3.2	3
glare	3.3.2	3
	3.3.4	3
Seasickness	12.4.3	17
Seat		
cushion assemblies	10.3.1	15
design, safety factors in	10.3.1	15
pans	10.3.1	15
reference point	10.2.0	15
	10.3.0	15
	10.3.1	15
suspension	10.3.1	15
Seating arrangement	10.3.2	15
Sea water, ingestion of	13.5.2	19
Selective listening	4.8.5	9
Selective placement, job analysis of	1.2.2	1
Self-esteem	13.2.1	18
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	16
in air safety	10.9.2	16
Semantic constraints	2.2.1	2
	2.3.3	2
	4.8.6	9
Semantic information theory	1.2.0	1
	2.2.1	2
	2.3.3	2
Sensitivity		
color	3.15.4	6
corneal	3.15.0	6
	5.3.0	11
distribution of tactile	5.1.1	10
Sensitometer	3.16.3	7
	5.1.4	10
Sensory deprivation	12.8.0	18
Sensory discrimination in accidents	10.9.0	15
Sensory testing panels	5.4.3	11
Sensory thresholds, correlations	6.2.0	11
Sequence tabulator	1.2.5	1
Sequencing aircraft for landing	2.3.2	2
	7.7.3	13
Sequential		
dependencies	1.2.1	1
performance	7.7.3	13
response tendencies	1.2.3	1
Serial performance	7.7.3	13
Servomechanisms, bibliography	1.1.0	1
	2.1.0	2
Servo system, man as an element	2.3.1	2
Set		
affective	13.2.1	18
	13.2.4	18
	13.3.1	19
cognitive	13.2.3	18
	13.3.1	19

Search Term	Code Category	Page
Set, cont.		
perceptual	13.3.1	19
psychophysical thresholds	1.2.3	1
	13.3.1	19
Shallow-diving blackout	12.5.1	18
Shallow water rescue apparatus	11.5.4	17
Shape coding	3.12.1	6
controls	8.4.1	14
Shelters	11.7.0	17
nuclear explosion	12.6.0	18
temperature	12.2.1	17
Shielding		
acoustic	4.2.2	8
radiation	11.2.3	16
	12.2.2	17
Ships		
communication system, evaluation of	4.4.1	8
	4.4.2	8
evaluation of	10.10.3	16
noise	4.2.5	8
Shivering	7.6.6	13
stimulus	5.2.1	11
	7.6.6	13
Shoes	11.3.5	16
Shoulder length	7.2.1	12
Shuttle process	2.2.4	2
Sickness, decompression	12.5.1	18
Sights, optical aids	3.13.1	6
Signal		
auditory	4.5.1	8
	4.6.0	9
detection, groups of observers	2.2.1	2
	2.3.2	2
detection radar	3.5.1	4
gustatory	5.4.2	11
launchers, evaluation of	10.10.0	16
lights	3.12.2	6
olfactory	5.4.2	11
rate of presentation	13.4.1	19
	13.4.3	19
thermal	5.2.1	11
visual	3.12.2	6
Signal flags, visibility	3.9.0	5
Signal light patterns, motor traffic	10.9.1	16
Signalling devices (see Warning devices)		
Signals, visual	3.12.0	6
Signal-to-noise ratio determination, whistle-point method	4.8.3	9
	4.9.12	10
Signs, motor vehicle driving	3.9.0	5
	10.9.1	16
Silhouettes	3.9.1	5
Simple reaction time	7.6.4	13
Simulation studies, Air Traffic Control	2.3.6	3
Simulation techniques	1.2.5	1
	2.2.0	2
Simulation techniques, cont.	2.2.3	2
	14.1.0	20
Simulator		
air traffic control	2.3.6	3
automobile driving	1.3.0	2
	3.16.4	7
	10.9.1	16
flight	2.2.3	2
types and use in visual research	3.16.4	7
	14.1.0	20
Simulators	2.2.3	2
for training	14.1.0	20
Single stimuli, psychophysical methods	1.2.3	1
Sirens	4.5.1	8
Sitting height	7.2.1	12
Size		
clothing	11.4.0	16
coding, controls	8.4.1	14
perception	3.15.9	7
Sizing system, gloves	11.3.4	16
	11.4.0	16
Skiascope, infrared	3.16.3	7
Skilled motor performance	7.6.0	12
	7.6.2	13
	7.6.3	13
Skilled Response Test	1.2.2	1
	7.7.4	13
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	16
Slant, judgments of	3.15.11	7
Slant visibility	3.2.0	3
	3.15.0	6
	3.15.11	7
Slave manipulator	8.3.3	14
Sled pulling test	7.5.1	12
Sleep	13.5.1	19
Sleep deprivation	13.5.1	19
decision making	13.2.3	18
Sleeping bags	11.5.2	17
Small military unit effectiveness, assessment	1.2.2	1
	2.3.2	2
Smell (see Olfaction)		
Smog constituents	12.3.0	17
Smoking, effects of	13.5.3	19
Sneezing	7.6.6	13
Social communication, elements in	2.2.1	2
	2.3.3	2
Sociometric assessment	1.2.2	1
	2.2.0	2
	2.3.2	2
Socks	11.3.5	16
Solar radiation	12.2.2	17

Search Term	Code Category	Page
Somatic responses, involuntary	7.6.6	13
Somatotypes	7.2.1	12
Somatotyping	7.4.0	12
Somesthesis	5.3.1	11
	5.5.1	11
	5.5.2	11
Sonar		
listening	4.6.0	9
	4.7.0	9
system	4.5.3	9
training	14.1.0	20
Sonic vibrations, effect on man	4.2.6	8
	12.4.2	17
Sonographic analysis	4.9.12	10
Sound		
absorber	4.2.2	8
absorb helmet	11.3.3	16
control, muffler attenuation	4.2.2	8
field, minimum detectable	4.9.4	10
localization	4.9.7	10
proofing	4.2.2	8
reproducing equipment	4.9.12	10
spectrograph	4.9.12	10
Sound localization, visual-auditory interactions	6.3.0	12
	6.3.1	12
Space		
cabins	10.10.1	16
capsule	10.10.1	16
environment	12.7.0	18
myopia	3.15.9	7
perception	3.15.9	7
travel	12.7.0	18
Space exploration, bibliography	12.1.0	17
Space flight		
diets	13.5.2	19
re-entry acceleration	12.4.1	17
systems	2.3.4	3
vision	3.14.0	6
work-rest patterns	13.4.1	19
Space flight decompression	12.5.1	18
Space flight simulator	12.9.0	18
Space requirements		
effect of body size	7.2.2	12
	10.2.2	15
	10.4.0	15
effect of clothing	11.6.0	17
Spacing		
between controls, ease of discrimination	9.3.0	14
	9.4.0	14
Spacing requirements of scale divisions	3.8.4	5
Span of Apprehension Test	3.16.0	7
Span of attention	13.2.4	18
auditory	13.2.4	18
visual	3.15.0	6
Span of perception	3.15.0	6
Span of visual apprehension	3.15.0	6
	3.15.11	7
Spatial dynamics, panel layout	9.4.2	15
Spatial orientation	6.3.2	12
effect of motion sickness drugs	13.5.3	19
Speaker anomalies	4.8.5	9
Speaker intelligibility differences	4.8.5	9
Special Devices Center, Office of Naval Research	1.4.0	2
Special injury scale	10.9.1	16
Special techniques	1.2.5	1
Spectral analysis	1.2.1	1
	3.6.0	4
Spectral density analysis, tracking behavior	7.7.2	13
Spectral sensitivity function	3.15.4	6
Spectrographic analysis, noise	4.9.12	10
Specular reflections, visibility	3.3.4	3
Speech		
analyzer, automatic	4.9.12	10
audiometry, development of material	4.8.2	9
	4.8.6	9
audiometry tests, construction of	4.8.2	9
	4.8.6	9
Batelle reader for the blind	4.8.6	9
	11.5.1	17
coding apparatus	4.9.12	10
communication systems, human engineering evaluations	4.4.0	8
	4.4.1	8
	4.4.2	8
compression system	4.9.12	10
distortion	4.8.4	9
thresholds	4.8.2	9
Speech intelligibility	4.8.3	9
acoustical measurement	4.8.2	9
amplitude modulation	4.8.4	9
anomalies	4.8.5	9
delay distortion	4.8.4	9
effect of high altitudes	4.8.4	9
	12.5.1	18
effect of oxygen mask	4.8.4	9
	11.3.3	16
frequency distortion	4.8.4	9
individual differences	4.8.5	9
interactions between source and receiver	4.8.3	9
side-tone amplification	4.8.4	9
side-tone delay	4.8.4	9
signal-to-noise ratio	4.8.3	9
thresholds	4.8.2	9
transmission and confirmation of messages	4.8.3	9
	14.1.0	20
Speech making		
with noise	4.8.3	9
with pure tones	4.8.3	9
with simultaneous speech	4.8.3	9

Search Term	Code Category	Page
Speech power	4.8.1	9
Speech production and perception, basic data	4.8.0	9
articulation testing	4.8.2	9
audiometry	4.8.2	9
characteristics of speech	4.8.1	9
distortion	4.8.4	9
individual differences in listening, speaking, interpreting	4.8.5	9
language design	4.8.6	9
masking	4.8.3	9
mathetical and statistical methods	1.2.1	1
	4.8.0	9
	4.9.12	10
signal-to-noise ratio	4.8.3	9
span of attention	13.2.4	18
synthetic speech	4.8.7	9
training in voice communication	14.1.0	20
Speech signals, automatic production	4.9.12	10
Speech sounds, basic characteristics	4.8.1	9
Speech spectra	4.8.1	9
Speech test signal	4.8.2	9
	4.8.6	9
Speech typewriter	4.9.12	10
Sperry Zero Reader, quickening instrument	2.3.1	2
	8.7.5	14
Sphygmomanometer	1.2.4	1
Spot symbols in map design	3.10.2	5
Stabilometer	7.6.7	13
Standardization, panels and consoles	9.2.0	14
Standardization of controls and displays	8.2.0	13
	10.9.0	15
Standard safety color codes	3.12.1	6
Startle reactions, anticipatory	7.6.6	13
Starvation	13.5.2	19
Statistical analysis	1.2.1	1
aircraft accidents	10.9.2	16
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
Statistical data presentation	1.2.1	1
Statistical decision function	1.2.1	1
Statistical linguistics	1.2.1	1
	4.8.6	9
Statistical quality control	1.2.1	1
Statistical techniques	1.2.1	1
Stature	7.2.0	12
Steadiness measurements	7.3.3	12
tests	7.6.7	13
Steering control devices	8.3.0	13
Step function displacements, tracking performance	7.7.2	13
Step test	7.3.3	12
Stereophonic sound	4.9.7	10
Stereophotogrammetric map	3.10.2	5
	3.16.0	7
Stereoscope	3.16.0	7
Stereoscopic acuity	3.15.9	7
Stereoscopic instruments	3.13.1	6
Stereoscopic vision	3.15.9	7
Stereotypes, motion	8.7.3	14
Stick controls, design of	8.3.2	13
Stick forces	8.7.2	14
Sticks, control	8.3.2	13
Stimulus compatibility, input channels	6.3.1	12
Stimulus mixture, auditory	4.9.6	10
Stimulus order and spacing, psychophysical thresholds	1.2.3	1
Stochastic methods	1.2.1	1
Stochastic model	1.2.1	1
	2.2.0	2
Stowage	10.2.3	15
Strabismus	3.15.1	6
Street lighting evaluator	3.3.2	3
Street noise	4.2.3	8
Strength human capabilities	7.3.3	12
Strength testing bibliography	7.1.0	12
Stress accelerative	12.4.1	17
combat	13.4.4	19
heat	12.2.1	17
indices of	13.4.4	19
physical	13.4.4	19
psychological	12.8.0	18
	13.4.4	19
vibration	12.4.2	17
visual effects	3.14.0	6
Stresscoat technique in motor vehicle accident investigation	10.9.1	16
Stroke width	3.9.1	5
Structure, workgroup	2.3.2	2
Structure borne vibrations, effect on man	12.4.2	17
Stuttering	4.8.5	9
artificial	4.8.4	9
Subjective magnitudes, scaling	1.2.3	1
Subjects, choice of - in experiment	1.2.0	1
Sublanguages	4.8.6	9
Subliminal perception	3.15.2	6
	3.15.7	7
Submarine atmosphere control	12.5.2	18
controls, quickening	8.7.0	14
	8.7.5	14
escape devices	11.5.4	17

Search Term	Code Category	Page
Submarine, cont.		
medicine, bibliography	1.1.0	1
noise	4.2.5	8
safety	10.9.0	15
systems problems	2.3.0	2
Submarine Escape Appliance	11.5.0	17
	11.5.4	17
Submarines, evaluation of	10.10.3	16
Subsystem performance, effect on overall system	2.3.1	2
	2.3.2	2
Subsystems analysis	2.2.0	2
Suits		
asbestos	11.2.1	16
electrically heated	11.2.1	16
protective	11.2.0	16
Sulphur dioxide - smoke, air, toxic effects	12.3.0	17
Sunglare	3.2.4	3
Sunglasses	3.13.2	6
Sun radiation	12.2.2	17
Supine position		
effect on location of controls	8.5.0	14
	9.3.0	14
effect on visual performance	3.14.0	6
effect on work space design	10.6.0	15
in layout of cockpits	10.10.1	16
Supply systems	2.3.5	3
Surface electrodes	1.2.4	1
Surveillance, Air Defense Direction Center	2.3.3	2
	2.3.4	3
	2.3.6	3
Surveillance, visual	3.12.0	6
Survival		
accidents	10.9.0	15
	10.9.1	16
	10.9.2	16
arctic	12.2.0	17
	12.2.1	17
climatic conditions	12.2.0	17
	12.2.1	17
equipment	10.10.2	16
group performance	2.3.2	2
rations	13.5.2	19
tropics	12.2.0	17
	12.2.1	17
water balance	7.5.0	12
	13.5.2	19
Susceptibility to accidents	10.9.0	15
	10.9.1	16
	10.9.2	16
Sweat loss	12.2.1	17
Swing		
sickness	12.4.3	17
test	1.2.5	1
Switchboards, evaluation of	10.10.0	16
Switches	8.3.1	13
	8.3.2	13
Symbolic codes	3.12.1	6
Symbolic displays	3.7.0	4
Symbolic forms		
color of symbol and background	3.9.2	5
contrast of symbol and background	3.9.2	5
legibility of	3.9.0	5
viewing conditions	3.9.3	5
Symbol recognition, masking	3.9.3	5
Symbols, legibility	3.9.0	5
Symposia, heterogeneous human engineering	1.1.0	1
Synthetic speech, uses	4.8.7	9
System evaluation	1.2.2	1
	2.2.0	2
Systems		
design, general principles and criteria	2.2.0	2
evaluations, general principles and criteria	2.2.0	2
general works and bibliographies	2.1.0	2
of men and machines, bibliographies	2.1.0	2
of men and machines, simulation of	2.2.0	2
	2.2.3	2
requirements, analysis of	2.2.0	2
	2.3.0	2
Systems Research Laboratory, Rand Corporation	1.4.0	2
Tables, printed	3.10.1	5
TACAN system (short-range, tactical, omnibearing distance measuring system)	2.3.0	2
Tachistoscopes	3.16.3	7
Tactical defense, assessment	1.2.2	1
Tactile		
coding	5.1.2	10
	8.4.1	14
identification	5.1.1	10
sensitivity, distribution of	5.1.1	10
stimulation	5.1.3	10
Tactual (see Tactile)		
Tank crew problems, assessment	1.2.2	1
Tank crew training	14.1.0	20
Tanks, evaluations of	10.10.3	16
Tapley Performance Meter	10.9.1	16
Tapping	7.6.2	13
Target degradation, effects on visual search	3.14.0	6
Target designator, radar	3.5.2	4
Target detectability	3.2.0	3
	3.12.0	6
	3.12.1	6
	3.14.0	6
Tartini tones	4.9.6	10
Task		
assessment, techniques of	1.2.2	1
duration	13.4.1	19

Search Term	Code Category	Page
Task, cont.		
load, work organization for systems	2.3.1	2
physical stress	13.4.4	19
rest periods	13.4.1	19
Task Breakdown Sheets	1.2.2	1
Taste		
accentuation of	5.4.1	11
basic data	5.4.1	11
bibliographies	5.4.0	11
equipment and research methods	5.4.3	11
identification	5.4.1	11
mechanisms of	5.4.1	11
signals	5.4.2	11
tests	5.4.3	11
Taylor Manifest Anxiety Scale	1.2.5	1
Taylor-Pracejus illumination recorder	3.16.0	7
Teaching machines	14.1.0	20
Team effectiveness	2.3.2	2
Team effectiveness research	2.2.1	2
	2.3.0	2
	2.3.2	2
Technical Conference Method	1.2.2	1
Technical information communication (USAF)	1.4.0	2
	2.1.0	2
Techniques for collection and analysis of communication data	2.2.0	2
	2.2.1	2
	2.2.3	2
Telebinoculars, Keystone View	3.16.0	7
Telegraphic listening	4.7.0	9
Telegraphic systems	4.4.1	8
Telemetry, methods of measurement	1.2.4	1
	11.8.0	17
Telephone systems, evaluation of	4.4.1	8
Telephonic speech	4.4.1	8
	4.8.7	9
Telescopes	3.13.1	6
Telescopes and telescopic sights, ordnance	3.13.1	6
Telespectacles	3.13.2	6
Television	3.6.0	4
bandwidth	3.6.0	4
displays	3.6.0	4
photography	3.10.5	6
Temperature	12.2.1	17
tolerance	12.2.1	17
Temperature sensitivity		
basic data	5.2.1	11
bibliographies	5.2.0	11
equipment and research methods	5.2.2	11
thermal signals	5.2.1	11
Temporal correlation techniques	1.2.1	1
Temporal discrimination	3.12.2	6
	5.7.0	11
Temporal Finger Maze	5.1.4	10
Temporal patterns, discrimination of	4.9.8	10
visual	3.14.0	6
Tension	13.3.3	19
Tents	11.7.0	17
Terminal system, Air Traffic Control	2.3.2	2
	2.3.6	3
Terrain Test	3.16.1	7
Test construction, statistical aspects of	1.2.1	1
Test efficiency, statistical aspects of	1.2.1	1
Texts, heterogeneous human engineering	1.1.0	1
Texture		
discrimination of object	3.12.1	6
in design of material	5.1.2	10
of photographs	3.10.5	6
Thematic Apperception Test	1.2.5	1
Thermal assessment techniques	12.9.0	18
Thermal balance in man and temperature	12.2.1	17
Thermal protection ensembles	11.2.1	16
Thermal protective fabrics	11.2.4	16
Thermal radiation	12.2.2	17
Thermal sensation	5.2.1	11
Thermal sensitivity, mapping	5.2.2	11
Thermal stress	12.2.1	17
Thermonuclear radiation	12.2.2	17
Thought processes	13.2.3	18
effects of aging on	13.5.4	19
Thresholds		
acceleration	12.4.1	17
auditory	4.9.4	10
kinesthetic	5.5.1	11
olfactory	5.4.1	11
pain	5.3.1	11
tactile	5.1.1	10
taste	5.4.1	11
temperature	5.2.1	11
vibration	5.1.1	10
visual	3.15.2	6
Threshold variability, comparison of visual and auditory	6.2.1	11
Tibiale height	7.2.1	12
Tilt	5.6.1	11
postural	5.5.1	11
Tilt chair	12.9.0	18
Tilt table	12.9.0	18
Timbre	4.9.3	10
Time and motion studies	1.2.2	1
	13.4.2	19
Time and motion techniques	7.6.7	13
	13.4.2	19
Time and unit scheduling, railway transportation	2.3.0	2
	2.3.4	3
Time constants, aided tracking	7.7.2	13
	8.7.4	14
Time constants, control operation	8.7.4	14

Search Term	Code Category	Page
Time delay constants, control operation	8.7.4	14
Time estimation	5.7.0	11
Time lag, controls	8.7.4	14
Time pattern, voluntary movements	7.6.0	12
	7.6.2	13
Time perception	5.7.0	11
Time sequential analysis	1.2.2	1
	1.2.5	1
	2.2.0	2
Time sharing	2.2.3	2
	3.8.5	5
	7.7.1	13
Time-study engineers, in-plant training	1.2.2	1
	14.1.0	20
Tinnitus tones	4.9.5	10
Tobacco	13.5.3	19
Toggle switches, design of	8.3.2	13
Tolerance levels, acceleration	12.4.1	17
Tolerance levels, body vibration	12.4.2	17
Tolerances, climatic	12.2.0	17
Tolerance standards, noise	4.2.2	8
Tonal gaps	4.9.1	9
Tone		
auditory	4.9.1	9
in map design	3.10.2	5
Tones, difference and summation	4.9.6	10
Tools	10.5.0	15
Tooth pulp, as pain receptor	5.3.1	11
Torque, rotary electric knobs	8.3.1	13
Torque exerted on handwheel, effect of limb position	7.3.3	12
Torques, control loading	8.7.2	14
Touch and vibration		
basic data	5.1.1	10
bibliographies	5.1.0	10
coding	5.1.2	10
equipment and research methods	5.1.4	10
texture	5.1.2	10
use as stimuli	5.1.3	10
Toxic environments	12.3.0	17
Toxicity, oxygen	12.5.2	18
Toxic substances, thresholds limit values	12.3.0	17
Tracing performance, steadiness	7.3.3	12
	7.6.1	12
Tracking	7.7.2	13
bibliography	7.1.0	12
comparison of auditory and visual	6.2.1	11
handwheel controls	8.3.1	13
performance	7.7.2	13
research equipment	7.7.4	13
skill	7.7.2	13
visual	3.15.8	7
	7.7.2	13
Traffic control problems, aircraft	2.2.4	2
	2.3.6	3
Traffic density in air safety	10.9.2	16
Traffic flow problem, analysis	2.2.0	2
Traffic problems		
aircraft	2.3.0	2
	2.3.6	3
	10.9.2	16
motor vehicle	2.3.0	2
	10.9.1	16
Traffic signal lights	3.12.2	6
Traffic signs, motor vehicle safety	10.9.1	16
Trainers	14.1.0	20
maintenance	2.3.5	3
Training simulators	14.1.0	20
Tranquilizing drugs	13.5.3	19
Transfer functions (human), mathematical analysis	1.2.1	1
Transfer functions of human operator	2.3.1	2
Transillumination	3.4.2	4
Transportation system evaluations	2.3.0	2
	2.3.4	3
Transportation systems personnel, training	14.1.0	20
Transport units, railway transportation	2.3.0	2
	2.3.4	3
Transverse g	12.4.1	17
Tremography	7.6.7	13
Tremor	7.6.6	13
fatigue and	13.3.3	19
periodic oscillation	5.1.1	10
Tridimensionality, perception of	3.15.10	7
Trigger for rifle, design for winter use	8.3.2	13
Trigger rule system	2.2.1	2
Tritanopia	3.15.1	6
Tropics, effects of	12.2.0	17
Trouble shooting	2.3.5	3
Trucks, evaluation of	10.10.3	16
Tufts-Navy Alertness Indicator	3.16.2	7
	13.2.4	18
Tukey's process	1.2.1	1
Tulane lateral tilt chair	12.9.0	18
Tuning (controls)	8.7.1	14
Turbulence and air safety	10.9.2	16
Twenty Plate Tests	3.16.1	7
Twilight bandwidth	3.2.2	3
Twilight lighting	3.2.2	3
Two-channel		
earpiece oximeter	12.9.0	18
ferrograph	4.9.12	10
listening	2.2.3	2
Two-hand coordination	7.7.0	13
Type, dimensions of	3.9.1	5
Type of controls and displays, standardization	8.2.0	13

Search Term	Code Category	Page
Typewriter keyboard, spatial dynamics	9.4.2	15
Typography	3.9.1	5
Ultrasonic		
noise	4.2.0	7
vibrations, effect on man	12.4.2	17
Ultraviolet light	3.4.3	4
Underground, mine lighting	3.3.3	3
Underwater		
breathing apparatus	11.2.2	16
	11.3.3	16
egress from aircraft	10.4.0	15
hearing	4.7.0	9
oxygen requirements	12.5.2	18
sound systems	4.5.3	9
Underwear	11.2.0	16
Uniform illumination	3.3.1	3
Unique pattern technique	1.2.1	1
Unit effectiveness tests	1.2.2	1
Universal Radar Simulator	3.16.4	7
University of Michigan Research Center for Group Dynamics	1.4.0	2
Upper arm measures	7.2.1	12
Upper case letters	3.9.1	5
Upright, perception of	6.3.2	12
USAF Anoxia Demonstration Chart	12.9.0	18
User opinion, grouping of display-control components	9.4.0	14
USN Electronics Laboratory	1.4.0	2
Utilization studies	1.2.2	1
Validity coefficients	1.2.1	1
Value orientation	13.2.1	18
Van Allen radiation belt	12.6.0	18
Vapor-barrier suits	11.2.1	16
Vapor pressures, levels of	12.2.0	17
	12.2.1	17
Variable errors	1.2.1	1
Veg scale	5.5.1	11
	5.5.3	11
Vehicles, evaluation of	10.10.3	16
Vehicular traffic flow analysis	2.3.0	2
	2.3.4	3
Velocity development, hand movements	7.3.3	12
Velocity discrimination	3.15.6	7
	3.15.12	7
Velocity tracking	7.7.2	13
Ventilation	12.2.1	17
of cushions	10.3.1	15
shipboard	12.2.0	17
	12.2.1	17
Ventillating garments	11.2.1	16
	11.2.3	16
Verbal-motor patterns, preferred	13.3.1	19
Verhoeff Stereopter	3.16.2	7
Vernier Acuity	3.15.6	7
Vertical accelerators	12.4.1	17
	12.9.0	18
Verticality, perception of	6.3.2	12
Vertical take-off and landing aircraft (VTOL)	10.10.2	16
Vertical trunk girth	7.2.1	12
Vertigo in jet pilots	6.3.2	12
Vestibular functions	5.6.0	11
	5.6.1	11
Vestibular tests	5.5.3	11
Vests		
ballistic	11.3.2	16
life	11.5.4	17
Vibration (see also Touch and vibration)		
Vibration tolerance	12.4.2	17
Vibration on whole body		
effect on performance	12.4.2	17
effect on sensory functions	12.4.2	17
Vibratory communication system	5.1.3	10
Vibrotactile displays	5.1.3	10
Viewing angles	3.14.0	6
television	3.6.0	4
Vigilance	13.2.4	18
Vigilance decrement	13.2.4	18
Visibility		
motor vehicle	10.9.1	16
moving objects	3.15.12	7
range, determination of	3.2.0	3
	3.2.1	3
special conditions affecting	3.2.3	3
work space	10.2.1	15
Visible speech	4.2.2	8
Vision		
binocular	3.15.9	7
Vision, basic data		
accommodation	3.15.9	7
acuity	3.15.6	7
adaptation	3.15.3	6
angle, perception of	3.15.11	7
anomalies	3.15.1	6
brightness discrimination	3.15.5	7
color perception	3.15.4	6
contour, perception of	3.15.10	7
convergence	3.15.9	7
depth, perception of	3.15.9	7
deviations	3.15.1	6
direction, perception of	3.15.11	7
distance, perception of	3.15.9	7
effects of aging	13.5.4	19
exposure time, effects of	3.15.7	7
eye movements	3.15.8	7
field of vision	3.15.0	6
fixation, effects of	3.15.7	7
form, perception of	3.15.10	7
general and theoretical	3.15.0	6
individual differences	3.15.1	6
movement, perception of	3.15.12	7
number, perception of	3.15.11	7
pattern, perception of	3.15.10	7
size, perception of	3.15.9	7
space perception	3.15.9	7
threshold visibility	3.15.2	6

Search Term	Code Category	Page
Vision, equipment and methods		
basic research problems	3.16.3	7
color vision tests	3.16.1	7
general	3.16.0	7
heterogeneous tests	3.16.2	7
simulators	3.16.4	7
Vision, measurement of, from cockpits	3.16.0	7
Visors	3.13.2	6
Visual accommodation, tests	3.16.2	7
Visual acuity and motor vehicle accidents	10.9.1	16
Visual aids	3.13.0	6
for the blind and partially blind	3.13.1	6
Visual coding	3.12.0	6
light coding	3.12.2	6
object characteristics	3.12.1	6
Visual detection	3.2.0	3
	3.12.0	6
	3.14.0	6
Visual displays	3.7.0	4
types of	3.7.3	4
Visual enhancement	3.13.1	6
Visual fatigue	3.3.1	3
	3.14.0	6
	13.3.3	19
Visual field	3.15.0	6
empty	3.15.9	7
restriction of	3.14.0	6
Visual form field, mapping of	3.16.3	7
Visual illusions	3.15.7	7
Visual masking	3.14.0	6
Visual noise	3.14.0	6
technique for simulation	3.16.3	7
tracking proficiency	7.7.2	13
Visual number, discrimination of	3.12.1	6
	3.15.11	7
Visual perception	3.15.0	6
position of viewer	3.14.0	6
Visual performance, tests of	3.16.1	7
	3.16.2	7
Visual Protective Devices	3.13.2	6
Visual pursuit, eye movements	3.15.8	7
Visual range	3.15.0	6
	3.15.1	6
Visual search	3.2.0	3
	3.5.0	4
	3.12.0	6
	3.14.0	6
eye movement patterns	3.15.8	7
outdoor	3.2.0	3
radar	3.5.0	4
Visual sensitometer	3.16.2	7
Visual standards	3.15.0	6
Visual stimulation, kinesthetic after-effects	5.5.1	11
Vital capacity	7.5.0	12
Vocality	4.9.3	10
Vocal tract analogs, electronic	4.8.7	9
Vocoder	4.9.12	10
Voice communication, intelligibility testing	4.8.2	9
Voice communication training	14.1.0	20
equipment	4.9.12	10
	14.1.0	20
on Navy ships, message analysis	4.4.1	8
	4.4.2	8
Voice quality	3.13.1	6
	4.8.5	9
Voice recorders, evaluation of	4.3.0	8
Voice transmission	4.8.3	9
	4.8.4	9
VOLSCAN - Air Traffic Control Center	2.3.6	3
Volume, tonal	4.9.3	10
Von Bekesy audiometer	4.9.12	10
Vortex wakes	10.9.2	16
Waist measures	7.2.1	12
Waiting line theory (see Queueing)		
War games	2.2.2	2
	2.2.3	2
War gases	12.3.0	17
Warm - mapping	5.2.1	11
	5.2.2	11
Warmth discrimination.	5.2.1	11
Warning devices	4.5.1	8
visual	3.12.2	6
Warning lights	3.12.2	6
Watchkeeping	7.7.1	13
	13.2.4	18
	13.3.3	19
Water immersion	11.2.1	16
Weapon cost methodology	2.2.0	2
Weapon systems, evaluation of	2.3.4	3
	10.10.0	16
Weight, body	7.2.1	12
Weightlessness	12.7.0	18
spatial orientation	6.3.2	12
Weight-lifting capacity, males	7.3.3	12
Wheel controls, design of	8.3.1	13
Whiteness constancy	3.15.4	6
White noise	4.2.1	8
Whiteout	3.15.1	6
Whole body vibration	12.4.2	17
Windblast	12.2.1	17
Windchill	12.2.1	17
Windscreen for ear	11.5.1	16
Windscreens, evaluation of	3.13.0	6
	10.10.0	16
Windshield		
aircraft	3.13.2	6
	10.9.2	16
motor vehicle	3.13.2	6
	10.9.1	16
motor vehicle, glazed area standards	10.9.1	16
Word recognition	3.9.0	5
Work (see also Task)		
capacity	7.3.3	12

Search Term	Code Category	Page
Work (see also Task), cont.		
cycle	1.2.2	1
	7.7.3	13
	13.4.1	19
decrement	13.3.3	19
effects of aging	13.5.4	19
effects of attitude upon	13.3.2	19
layout	1.2.2	1
	2.3.1	2
	10.2.0	15
levels of complexity	13.4.3	19
models, systems	2.2.0	2
	2.2.2	2
	2.3.0	2
organization	2.3.1	2
performance, assessment	1.2.2	1
productivity, group	2.3.2	2
	13.4.0	19
rationalization	2.3.1	2
sampling techniques	1.2.2	1
self-pacing vs. forced-pacing	13.4.2	19
shelters	1.2.2	1
study (see Work performance, assessment)		
surfaces	10.3.3	15
Work center arrangements (see Work space)		
Work conditions	13.4.1	19
Work efficiency	13.4.0	19
Working area limits, panels and consoles	9.3.0	14
Work measurement, techniques	2.2.4	2
Work-Measurement System	2.2.0	2
Workplace (see Work space)		
Work space		
design requirements	10.2.0	15
	10.6.0	15
lighting	3.3.3	3
morphological criteria	10.2.0	15
techniques of assessment	10.1.0	15
Work space dimensions	10.2.0	15
Work space measuring device	10.1.0	15
Wrapping materials, evaluation of	10.10.0	16
Wright Air Development Center	1.4.0	2
Wrist girth	7.2.1	12
X-ray	12.6.0	18
X-ray anthropometry	7.4.0	12
X-ray pictures	3.10.5	6
X-ray radiation	12.6.0	18
Zeiss-Nordinson retinal cameras	3.16.3	7
Zero-g (see Weightlessness)		
Zodiacal light	3.2.0	3
Zone markings, instrument	3.12.1	6
	9.4.1	14

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 used 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.

Key to Abbreviations found in Abstracts

a.c.	alternating current
APA	American Psychological Association
C	Centigrade
CAA	Civil Aeronautics Administration
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)
e.g.	for example
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.-lbs.	foot-pounds
ft.-L	foot-Lambert (s)
ft./sec.	feet per second (s)
g	gravity
GCA	Ground Control Approach
GSR	Galvanic Skin Response (s)
SAM	Steadiness Aiming Test
SPL	Sound Pressure Level
USA	United States Army
USAF	United States Air Force
USCG	United States Coast Guard
IBM	International Business Machine
ICI	International Commission on Illumination
i.e.	that is
IFR	Instrumental Flight Rules
j.n.d.	just noticeable difference
kc	kilocycle (s)
kg	kilogram (s)
L	Lambert
lb. (s)	pound (s)
mc	megacycle (s)
mg	milligram (s)
mL	millilambert (s)
mm	millimeter (s)
MMPI	Minnesota Multiphasic Personality Inventory
mph	miles per hour
mu	millimicron (s)
musec.	microsecond (s)
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
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.
ARCD	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
CONRAC	Continental Army Command, Fort Monroe, Va.
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.
NATO	North Atlantic Treaty Organization, Paris, France
NDRC	National Defense Research Council, Washington, D. C.
NRL	Naval Research Laboratory, Washington, D. C.
ONR	Office of Naval Research, Washington, D. C.
OSU	Ohio State University Research Foundation, Columbus, Ohio
RNPRC	Royal Naval Personnel Research Committee, London, England

CITATIONS AND ABSTRACTS

50
Fitts, P.M., Stevens, S.S., Brogden, W.J. & Imus, H. HUMAN ENGINEERING IN THE NATIONAL DEFENSE. June 1953, 12pp. Panel on Human Engineering and Psychophysiology, US Research and Development Board, Department of Defense, Washington, D.C.

50
This paper discusses the role of human engineering in the national defense and provides a philosophy for weapon systems development that attempts to maximize the use of human and machine components by recognizing the unique potential contributions and limitations of each. The major topics are: 1) definition of human engineering, 2) military goals of human engineering, 3) military fields of applicatoin of human engineering, 4) optimum employment of men as components of future weapons systems, and 5) basic and supporting research.
R 11

81
Kruglak, H. PAPER-PENCIL LABORATORY TESTS AND THEIR RELATIONSHIP TO VARIOUS ACHIEVEMENT MEASURES IN PHYSICS. Contract N8ONR 66213, Proj. NR 153 148, Tech. Rep. 7, Dec. 1953, 32pp. Department of Physics, University of Minnesota, Minneapolis, Minn.

81
This report deals with the analysis of paper-pencil laboratory test scores in general physics constructed and administered at the University of Minnesota, 1952-1953. The normalities of the score distributions were tested and reliability coefficients were computed. Validity was assayed by the Davis technique, point biserial correlations, and expert ratings. Intercorrelations were computed between the paper-pencil tests as well as between them and other measures of achievement in physics.
T. R 4

108
Calvert, J.F., Hartenberg, R.S., Kliphardt, R.A., Shelley, H.P., et al. DEVELOPING PROBLEM-SOLVING SKILLS IN ENGINEERING. Contract N7 ONR 45012, Proj. NR 151 144, 1953, 258pp. Northwestern University, Evanston, Ill.

108
A cooperative study was undertaken between engineers and psychologists: 1) to determine how problem-solving ability might be enhanced through undergraduate training; and 2) to assemble suitable educa ional methods, proposals for their use, and methods for testing their effectiveness. A study of specific abilities and work-methods was augmented by a literature review of problem-solving. Upon this basis, methods were devised for enhancing problem-solving abilities in a course in engineering drawing and descriptive geometry. Four sections of freshman drawing classes were used in an experiment designed to study the effectiveness of the methods. A manipulative symbolic notation for the description and synthesis of kinematic mechanisms was also developed.
T. G. I. R 34

250
Denenberg, V.H. THE TRAINING EFFECTIVENESS OF A TANK HULL TRAINER. HUMRRO TR 3, Feb. 1954, 28pp. Human Resources Research Office, George Washington University, Washington, D.C.

250
To determine the effectiveness of the Tank Hull Trainer 3-T-3 as a training aid in teaching 1) starting and stopping procedures, 2) driver's instruments and controls, and 3) track and suspension system, four companies of basic trainees receiving tank training were used as Ss. A performance test and two paper-and-pencil tests were used to measure the effectiveness of training received by three methods: Army Training Program (utilized M47 tanks for practical work), the trainer, and an inexpensive mock-up of the instrument panel and driver's controls of the M47 tank. Evaluation of training effectiveness was made on the basis of test scores and in terms of man hours, tank hours, and expense of method used.
T. G. I.

281
Hirsch, R.S. THE EFFECTS OF KNOWLEDGE OF TEST RESULTS ON LEARNING OF MEANINGFUL MATERIAL. Contract N6ONR 269, Human Engng. Rep. SDC 269 7 30, Sept. 1952, 27pp. USN Special Devices Center, Port Washington, N.Y. (Pennsylvania State College, State College, Penn.).

281
To determine whether knowledge of results (KR), provided by means of the Classroom Communicator, would affect the learning of material from tests based on the contents of selected sound films, an experiment was conducted. Learning was defined as retention of specific material. It was measured as a difference between two tests, the first accompanied by KR and the second three weeks later without specific awareness of results. Following the showing of a film, a pencil-and-paper test was given and KR was presented in one of four ways to separate groups of subjects; two control groups had no KR. Differences between the groups on a final post-test and also between immediate and delayed post-test were analyzed. Effectiveness of the various methods for presenting KR are discussed. T. G. I.

339
Byrne, M.J., Willey, C.L., Weigle, Joyce M. & Luff, Ruth K. THE DEVELOPMENT OF QUALIFICATIONS STANDARDS FOR THE UTILIZATION OF CIVILIAN SKILLS IN THE NAVAL RESERVE. Contract NONR 883(00), June 1953, 27pp. Clifton Corporation, Washington, D.C.

339
The need for the establishment of standards for the enlistment of qualified civilians in the US Naval Reserve in advanced pay grades in various emergency service and exclusive emergency service ratings was the basis for the initiation of this research. An analysis of the enlisted rate and rating structure of the Navy was made to determine the possibility of preparing rating guides in terms of civilian qualifications. Such rating guides were then prepared for about 60 percent of the ratings. The methodology used for rating guide preparation was outlined. Experience and skill requirements, the most appropriate occupational and recruitment sources for ratings, and other relevant data of assistance to field recruits were included.
R 67

364
Miller, R.B. ANTICIPATING TOMORROW'S MAINTENANCE JOB. Contract AF 33(038) 12921, Proj. 507 003 0001, Res. Rev. 53 1, March 1953, 21pp. USAF Human Resources Research Center, Lackland AFB, Tex. (American Institute for Research, Pittsburgh, Penn.).

364
This report covers research directed towards the development of a method for anticipating maintenance job requirements prior to the introduction of new equipment into the field. Procedures were developed for making complete concrete statements of the maintenance job. The methods rely on an analysis of what the man must do and are based on construction of the equipment plus data on malfunctions and corrective actions taken from maintenance activities. The technique was applied to Q-24 prototype data and compared with a similar analysis of the Q-24 production models used in the Strategic Air Command. Implications for training were discussed.
T. I. R 3

370
Noble, C.E. SOME PHYSICAL SOURCES OF DIFFICULTY IN THE COMPLEX COORDINATION TEST CM701E. Proj. 509 020 0003, Res. Bull. 53 7, April 1953, 29pp. USAF Air Research and Development Command, Lackland AFB, Tex.

370

The research reported here was part of a large project directed towards improving tests of motor skills. This particular study represented a follow-up of previous research which established the difficulty of various parts of the Complex Coordination Test CM701E. In this test, the S was required to match the red light in a top row of lights with a green light in the bottom row by appropriate movements of stick and rudder controls. Certain physical sources of difficulty in performance were identified by investigating three apparatus variables, amplitude of response in ft., mechanical work in ft.-lbs., and degree of crossing of the aileron and rudder controls. A graphic technique was used to weight the importance of aileron, elevator, and rudder movements in each match.
T. G. R 7

382

Givens, M.B. (Chm.). SYMPOSIUM ON SCIENTIFIC AND SPECIALIZED MANPOWER. HR-HMP 200/1, June 1953, 135pp. Panel on Manpower, Committee on Human Resources, US Research & Development Board, Department of Defense, Washington, D.C.

382

This report includes 11 papers and a panel discussion given at the second symposium held by the Panel on Manpower of the Committee on Human Resources. The need for scientific and specialized (technical) manpower, in an environment of continuing partial mobilization and stepped-up defense research and production, have created a number of problems for industry, government, the armed forces, and educational institutions. The special need for scientific and engineering manpower is dealt with here by representatives of the various government agencies involved. The panel discussion evaluates the current situation and attempts to look ahead through the eyes of the US Department of Defense.
T. G. I. R 39

452

Grings, W.W. (Princ. Investigator). SHIPBOARD OBSERVATION OF ELECTRONICS PERSONNEL: IMPLICATIONS FOR THE TRAINING OF ELECTRONICS PERSONNEL. Contract NONR 228(02), Proj. NR 153 093, Tech. Rep. 3, Feb. 1953, 65pp. Dept. of Psychology, University of Southern California, Los Angeles, Calif.

452

The data obtained in the course of an extensive series of observations aboard ships of the destroyer class are examined from the standpoint of the technical training of electronics personnel within the Navy. Descriptions of the kinds and amounts of training in electronics maintenance are presented with discussion of attendant problems. Judgments of the electronics technicians regarding the relevance of their training are presented and discussed. Evidences of specialization and its effects are treated. Attitudinal and other nontechnical aspects of training are discussed. Electronic training levels of the enlisted men who start electronics maintenance training are indicated along with attendant problems.
T.

484

Winder, C.L. DECISION MAKING. Contract NONR 225(01), Proj. NR 150 087, Tech. Rep. 1, March 1953, 36pp. Department of Psychology, Stanford University, Stanford, Calif.

484

This report described and summarized studies undertaken for an exploratory project which had as an over-all goal the fuller understanding of decision-making. The studies were concerned with the development of measures of decision-making and the clarification and development of pertinent personality measures. The basic measures of decision-making used in the studies were from the psychophysical type situations involving matching of graded series of stimuli to a standard stimulus of a different modality. Individual differences for decisions of this type were studied. Various personality measures were investigated for their relations to the various decision-making characteristics.
G. I. R 5

498

Miller, R.B., Folley, J.D., Jr. & Smith, P.R. SYSTEMATIC TROUBLE SHOOTING AND THE HALF-SPLIT TECHNIQUE. Contract AF 33(038) 12921, Proj. 507 008 0001, Tech. Rep. 53 21, July 1953, 16pp. USAF Technical Training Research Lab., Chanute AFB, Ill. (American Institute for Research, Pittsburgh, Penn.).

498

A description of procedures for trouble shooting of electronics equipment which are based upon rational and logical considerations is presented. Two alternative methods are compared: trouble shooting from probability data and trouble shooting by logical elimination of malfunction sources. The latter method is the one developed in this report as being the most feasible. Two phases of the procedure for line trouble shooting are discussed step by step. The half-split technique (a specified check-sequence based on mathematical considerations of efficiency) is of special relevance. A mathematical proof of the technique is presented in the Appendix. (See 3389).
T. I. R 5

502

Tucker, J.A., Jr. RELATIVE PREDICTIVE EFFICIENCY OF MULTIPLE REGRESSION AND UNIQUE PATTERN TECHNIQUES. Proj. 503 001 0015, Res. Bull. 53 2, Feb. 1953, 25pp. USAF Personnel Research Lab., Lackland AFB, Tex.

502

This is an empirical investigation of the feasibility of using the unique pattern technique in personnel selection and classification. The chief emphasis is on methodology with major attention given to the relative effectiveness of multiple regression versus unique pattern techniques. Two types of Ss, pilot trainees and clerk-typists, are studied; the criteria are pass/fail in pilot training and final grade in technical training school. Using carefully selected predictor variables the two methods are compared for their success in predicting the criterion.
T. R 9

503

French, R.S. THE ACCURACY OF DISCRIMINATION OF DOT PATTERNS AS A FUNCTION OF ANGULAR ORIENTATION OF THE STIMULI. Proj. 509 019 0001, Res. Bull. 53 3, March 1953, 17pp. USAF Perceptual & Motor Skills Research Lab., Lackland AFB, Tex.

503

The accuracy of pattern discrimination was studied as a function of the relative angular orientation of the patterns compared. A total of 120 patterns from each of a two-, three-, and five-dot series was employed. The Ss' task was to indicate whether two patterns presented successively were either identical or different in terms of distance relations and spatial positions of the dots. Judgments were made on this basis while at the same time the second pattern of the pair was at any of ten angular orientations relative to the first. Error data were studied by analysis of variance for differences attributable to angular orientation, number of dots, and their interactions. Implications for radar scope interpretation were discussed.
T. G. R 3

505

Lewis, D., Adams, J.A. & Spieth, W. AN ANALYSIS OF PERFORMANCE ON THE IOWA PURSUIT APPARATUS. Contract AF 33(038) 13214, Proj. 509 020 0006, Res. Bull. 53 5, March 1953, 30pp. USAF Perceptual & Motor Skills Research Lab., Lackland AFB, Tex.

505

An attempt was made to find a short-cut method of measuring individual susceptibility to interference in the performance of motor tasks. A total of 132 airmen at Lackland Air Force Base were given four phases of practice on the pursuit apparatus: preliminary phase followed by original learning, interpolated learning, and relearning phases. Stanine scores for eight different aptitude indexes and preliminary trial scores were correlated with performance scores at the outset of the relearning phase when interference was at a maximum. Prediction of interference based on these two scores was discussed.
T. G. I. R 10

546

Northrop, D.S. EFFECTS ON LEARNING OF THE PROMINENCE OF ORGANIZATIONAL OUTLINES IN INSTRUCTIONAL FILMS. Contract N6ONR 269, Human Engng. Rep. SDC 269 7 33, Oct. 1952, 24pp. USN Special Devices Center, Port Washington, N.Y.

546

To investigate the effects on learning of adding organizational titles and commentary at appropriate points in existing instructional films, three types of films were selected: "discrete item" (relatively unorganized); "logically developed" (content dictates the organization); and "chronologically developed" (dramatic or story organization). Three versions of each film were developed with different amounts of added titles and commentary and each version was viewed by two companies of Naval recruits. Informational tests were then administered to these recruits plus control groups who did not view the films. An analysis of covariance was made for each film type. The differential effects of intelligence were also studied since intelligence test scores were available.
T.

661

Saltz, E. & Moore, J.V. A PRELIMINARY INVESTIGATION OF TROUBLE SHOOTING. Proj. 507 007 0001, Tech. Rep. 53 2, Feb. 1953, 10pp. USAF Human Resources Research Center, Lackland AFB, Tex.

661

This report described a preliminary exploration directed towards determining characteristics of good and poor trouble-shooters. Malfunctions were inserted into each of three equipments (radar, reciprocating engines, and remote control turrets) and observations were made of maintenance men who attempted to locate the malfunctions. Ten men worked on each equipment, the five best and the five poorest trouble-shooters as rated by their supervisors. Other tests given the men included a "symptoms-causes" test, biographical inventory, intelligence test, and concept formation test. Interviews were also conducted. On the basis of the results a number of hypotheses for further research were suggested.
T. I. R 4

732

Harris, J.D. NOTES ON GROUP PURE TONE AUDIOMETRIC TECHNIQUES. Proj. NM 003 141.21, Memo. Rep. 53 6, April 1953, 15pp. USN Medical Research Lab., New London Submarine Base, Conn.

732

This manual in group audiometry provides practical instruction for those who have the responsibility of testing large numbers of individuals, some of whom may be hard of hearing. A brief review of the development of group testing methods is given; the type of situations where such methods are called for is indicated; the type of audiometry which is most suited to particular situations is discussed; and the particular equipment which will best suit any especial installation is indicated.
T. R 19

741

Kelsey, Patricia A. & Rawnsley, Anita I. ADAPTATION OF THE EAR TO SOUND STIMULI: THE INTENSITY-TIME RELATIONSHIP. Proj. NM 003 041.34.06, Rep. 224, May 1953, 9pp. USN Medical Research Lab., New London Submarine Base, Conn.

741

A study was made of the extent to which stimulus intensity and stimulus duration were interchangeable in producing subsequent shifts in auditory threshold. In the first part of the experiment, two successive 1000 cps tones were used; durations of the first tone were varied from 10 to 100 msec.; intensities were 30, 50, 70, or 90 db sensation level. Threshold shifts were calculated by subtracting threshold of the second tone alone from its threshold when preceded by the first. The second part dealt with longer duration auditory fatigue up to five minutes. Recovery thresholds were obtained. The intensity-time relationship was analyzed for these conditions.
G. I. R 5

1140

Channell, R.C. & Tolcott, M.A. THE USE OF HUMAN ENGINEERING DATA IN EQUIPMENT DESIGN PROBLEMS. Contract N6 ORI 151, Proj. 20 F 2, May 1948, 31pp. Division of Bio-Mechanics, Psychological Corporation, New York, N.Y.

1140

This report discusses and illustrates typical problems encountered in applying human engineering principles to the design of equipment. The manner in which recommendations are derived by reconciling pertinent experimental data with the specific requirements of the equipment are discussed and cases are cited to illustrate the various degrees of confidence with which recommendations are made. Areas in which data are scarce or lacking and in which further research is needed are indicated. Major divisions of the report are devoted to design and location of controls and design of visual indicators.
I. R 31

1820

Black, J.W. THE EFFECT OF ROOM CHARACTERISTICS UPON VOCAL INTENSITY AND RATE. J. acous. Soc. Amer., March 1950, 22(2), 174-176. (Department of Speech, Ohio State University, Columbus, Ohio).

1820

To determine the effect of room characteristics upon a speaker's rate and intensity of reading, groups of 23 males read 12 test phrases in each of eight rooms. The rooms represented two shapes (drum and rectangular), two sizes (150 and 1600 cu. ft.), and two reverberation times (0.8 to 1.0 and 0.2 to 0.3 sec.). Microphones led to two meters that registered vocal intensity and, in one instance, duration of the phrases. Each set of measurements was treated by analysis of variance.
T.

1857

Christie, L.S. & Luce, R.D. SUGGESTIONS FOR THE ANALYSIS OF REACTION TIMES AND SIMPLE CHOICE BEHAVIOR. Contract DA 36 039 SC 56695, DA Proj. 3 99 10 101 & Proj. 8 103A, Rep. R 53, April 1954, 39pp. Control Systems Lab., University of Illinois, Urbana, Ill.

1857

A model is proposed for the way human beings organize the decisions required by simple choice situations into a series of component decisions. The thesis of the authors is that such an organization of decisions must be reflected in the distribution of reaction times and that, therefore, it may be possible to infer the organization from empirical studies. The model is not firmly based on empirical studies, however, and thus the proposal is described as speculative. Two experiments are suggested that may help determine the value of the model.
G. R 15

2029

Licklider, J.C.R. & Webster, J.C. THE DISCRIMINABILITY OF INTERAURAL PHASE RELATIONS IN TWO-COMPONENT TONES. J. acoust. Soc. Amer., March 1950, 22(2), 191-195. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass. & USN Electronics Lab., San Diego, Calif.).

2029

The effect of varying the interaural phase relations in the simplest of complex waves (two superposed sinusoids of equal amplitudes) on binaural hearing was investigated. A two-component tone was presented binarually and the interaural phase difference of one of the components was switched alternately from 0 to 180 degrees. The effect of the phase reversal upon the listener's subjective experience and the frequency dependence of the effect were described.
T. G. I. R 14

2159

Brokaw, L.D. & Christal, R.E. AN ITERATIVE METHOD FOR ADJUSTMENT OF ERRONEOUS FACTOR LOADINGS. Proj. 503 001 0016, Res. Bull. 53 46; Dec. 1953, 31pp. USAF Human Resources Research Center, Lackland AFB, Tex.

2159

The development of a procedural modification of Wherry's technique for adjusting erroneous factor loadings is presented in this report. Application of this process to the rotated factors derived from a centroid solution adjusts the rotated loadings by maximizing the variance properly attributable to each factor for each test. It tends to eliminate errors originating in misestimation of communalities or occasioned by mechanical errors of graphic rotation. The type of study that would demand this procedure is discussed.
T. R 1

2161

Adams, J.A. THE PREDICTION OF PERFORMANCE AT ADVANCED STAGES OF TRAINING ON A COMPLEX PSYCHOMOTOR TASK. Proj. 509 020 0003, Res. Bull. 53 49, Dec. 1953, 44pp. USAF Human Resources Research Center, Lackland AFB, Tex.

2161

To determine classes of measures that best predict performance at advanced stages of training on a complex psychomotor criterion task, 197 basic airmen, in subgroups of 12, were given extensive training on a complex psychomotor test which served as the criterion task. Fifty-five other tests, consisting of three batteries of 1) printed tests, 2) simple psychomotor tests, and 3) complex psychomotor tests, were administered. Considerable practice was given on each of the tests in the latter group in order to obtain both early and late training scores. The relationships between the criterion scores (both initial and final) and each of the classes of tests were determined.
T. R 7

2162

Adelson, M. A METHOD FOR STUDYING HUMAN TRACKING BEHAVIOR. Contract AF 33(038) 25726, Proj. 508 017 0001, Res. Bull. 53 50, Dec. 1953, 7pp. USAF Human Resources Research Center, Lackland AFB, Tex.

2162

An apparatus is described which may be used to study several large classes of problems related to tracking performance--predictability, making the actual predictions, learning, and transfer effect. Brief descriptions of experimental procedure are given to indicate how application of the apparatus may be made to the problems in question.
R 1

2178

Nystrom, C.O., Morin, R.E. & Grant, D.A. TRANSFER EFFECTS BETWEEN AUTOMATICALLY PACED AND SELF-PACED TRAINING SCHEDULES IN A PERCEPTUAL-MOTOR TASK. Contract AF 33(038) 23294, Proj. 512 024 0001, Res. Bull. 53 66, Dec. 1953, 18pp. USAF Human Resources Research Center, Lackland AFB, Tex. (University of Wisconsin, Madison, Wisc.).

2178

To investigate the relative value of self-paced versus automatically paced training in a perceptual-motor task, transfer effects between the two types of training schedules were studied. Subjects were given four 25-trial blocks of automatically paced or self-paced training on a task that called for a rapid succession of responses to temporally discrete visual stimulus patterns, then they were transferred to the opposite kind of pacing and given four more blocks of trials. Two control groups were used which continued for eight blocks of trials on one type of pacing. Transfer data were analyzed both graphically and by analysis of variance.
T. G. I. R 5

2182

Nyrop, D.W. (Chm.). A STATISTICAL ANALYSIS OF NON-COMMERCIAL NON-AIR CARRIER ACCIDENTS - 1951. PART II OF IV PARTS. June 1952, 25pp. US Civil Aeronautics Board, Washington, D.C.

2182

Noncommercial flying (involves the personal use of an airplane either for pleasure or as a means of transportation in connection with a business) accident statistics for the year 1951 are presented. The analysis includes number of accidents and degree of injury, cause, operational phase in which accident occurred, emergency conditions, pilot hours and age, type of aircraft, and violations of the Civil Air Regulations. Separate tables are given for each of the following: 1) pleasure flying, 2) personal transportation, 3) executive flying, and 4) others.
T.

2183

Guilford, J.P., Christensen, P.R., Bond, N.A., Jr. & Sutton, Marcella A. A FACTOR ANALYSIS STUDY OF HUMAN INTERESTS. Contract AF 33(038) 18408, Proj. 503 001 0007, Res. Bull. 53 11, May 1953, 83pp. USAF Human Resources Research Center, Lackland AFB, Tex. (University of Southern California, Los Angeles, Calif.).

2183

This study attempted to derive by means of a comprehensive factor-analytic investigation a knowledge of basic interest dimensions: dimensions representing sources of satisfaction. A total of 33 primary hypotheses were developed regarding the nature of primary interests with 100 subsidiary hypotheses formulated on which to build tests. Representative homogeneous ten-item tests were prepared for each of the hypotheses. The resulting inventory was administered to four samples of Air Force personnel: 600 airmen, 276 officer candidates, 257 AFROTC and 187 air cadets. Scores for the three latter samples were combined and intercorrelated for an "officer-level" factor analysis; scores for the airman sample were used in an "airman" factor analysis. Resultant factors were described. R 39

2186
Jones, E.I. & Bilodeau, E.A. RETENTION AND RELEARNING OF A COMPLEX PERCEPTUAL-MOTOR SKILL AFTER TEN MONTHS OF NO PRACTICE. Proj. 509 020 0007, Res. Bull. 53 17, June 1953, 14pp. USAF Human Resources Research Center, Lackland AFB, Tex.

2186
As an indirect attack on the problem of retention of sight manipulation skills of the flexible gunner over a long interval of no practice, Ss had been given extensive training on the Pedestal Sight Manipulation Test ten months prior to the experiment reported here. Eight of the original Ss, none of whom had practiced on the test during the interim, were tested along with eight other Ss who had never practiced the test. Testing procedures and standards were duplicated from the original learning test Five consecutive days of training were given with 40 minute periods each day. Original learning, relearning, and control (the eight new Ss) conditions were compared on al components of the task. Implications of the results for military planning were discussed.
T. G. R 8

2190
Nyrop, D.W. (Chm.). A STATISTICAL ANALYSIS OF ACCIDENTS IN INSTRUCTIONAL NON-AIR CARRIER OPERATIONS - 1951. PART I OF IV PARTS. June 1952, 21pp. US Civil Aeronautics Board, Washington, D.C.

2190
Instructional flying operations (that accomplished in supervised training, including primary and advanced dual and solo) accident statistics for the year 1951 are presented. The number of accidents, number of fatalities, primary causes, operation phase in which accident occurred, type of accident, emergency conditions, pilot experience and age, and violations of the Civil Air Regulations in Instructional Operations are given for each class of instruction.
T.

2199
McReynolds, Jane & Nichols, I.A. COMPARISON OF PERFORMANCE OF NEW AIRMEN ON THE AIRMAN CLASSIFICATION BATTERY AC-1B BY ARMY ENLISTMENT AREA. Proj. 503 001 0009, Res. Bull. 53 31, Aug. 1953, 30pp. USAF Human Resources Research Center, Lackland AFB, Tex.

2199
To determine the existence of significant regional differences in new airmen population as measured by the variables of the Airman Classification Battery AC-1B, a continuous sample of all new airmen tested at Lackland Air Force Base between 1 July and 15 September 1950 was selected for study; the number of men tested was not less than 600 for each of six army enlistment areas (New England, Middle Atlantic, South Atlantic, Southwest, Middle West, Northwest and Pacific); all variables from the AC-1B, age, and education were included in the analysis. Mean performance for each area was compared with that of every other area and the differences between the means were tested for significance.
T. G. I. R 3

2220
Matheny, W.G., Williams, A.C., Jr., Dougherty, Dora & Hasler, S.G. THE EFFECT OF VARYING CONTROL FORCES IN THE P-1 TRAINER UPON TRANSFER OF TRAINING TO THE T-6 AIRCRAFT. Contract AF 33(038) 25726, Proj. 508 017 0001, Task D, Tech. Rep. 53 31, Sept. 1953, 8pp. USAF Human Resources Research Center, Lackland AFB, Tex. (University of Illinois, Urbana, Ill.).

2220
To test the hypothesis that the amount of transfer of training from trainer to aircraft is affected by the fidelity with which control pressures are simulated, two groups of Ss were trained to criterion in the P-1 Link trainer and transferred to the T-6 aircraft. One group learned the maneuver of climbing and gliding in the trainer with the elevator control stick pressure close to that of the aircraft; the second group learned the same maneuver with pressures near zero. A third or control group practiced the maneuver only in the aircraft. The number of trials in the T-6 to achieve a specified standard of performance was analyzed for differences among the groups. Implications for flight trainers were indicated.
T. R 1

2225
Swanson, R.A. THE RELATIVE EFFECTIVENESS OF TRAINING AIDS DESIGNED FOR USE IN MOBILE TRAINING DETACHMENTS. Proj. 7714, Task 77241, AFPTRC TR 54 1, Feb. 1954, 14pp. USAF Personnel and Training Research Center, Lackland AFB, Tex.

2225
To investigate the relative effectiveness of several types of training devices when used in conjunction with a lecture presentation in the transitional training of skilled mechanics, six devices were selected for study: three types of mock-ups (operating, nonoperating, and cutaway), animated panels, charts, and symbolic diagrams. Different groups of skilled mechanics were given instruction on maintenance of three different systems of the B-47 aircraft. Each group was further divided into six subgroups, one for each type of training aid; the subgroups all heard the same lecture. The effectiveness of the training aids was evaluated on the basis of results from a test given immediately after instruction.
G. 1. R 1

2226
Herman, I.L. & Church, S.A. ANALYSIS OF RADAR AIMING POINT IDENTIFICATION MOTION PICTURE GROUP TESTS. Proj. 7711, Task 77194, AFPTRC TR 54 2, April 1954, 21pp. USAF Personnel and Training Research Center, Lackland AFB, Tex.

2226
A description and evaluation of motion picture radar aiming point tests are presented. Radar aiming point identification is an important component of the task of th aircraft observer bombardment. The present study is primarily concerned with 1) test reliability, item difficulty, and item discriminating power; 2) identification of test variance in terms of selected printed test variables in the Airman Classification Battery; 3) technical aspect of the test such as scoring and administration; and 4) discrimination between experienced and naive observers. The practical uses of the test are discussed.
T. I. R 8

2228
Gagne, R.M. & Bilodeau, E.A. THE EFFECT OF TARGET SIZE VARIATION ON SKILL ACQUISITION. Proj. 7707, Task 77130, AFPTRC TR 54 5, April 1954, 16pp. USAF Personnel and Training Research Center, Lackland AFB, Tex.

2228
Two studies concerned with the effect of varying the limits of accuracy required in learning a motor skill were described. The device used was a modified standard rudder control test whose operation resembles that of certain airplane rudders. A signal light informed the S when he was "on target." Critical comparisons were made of performance scores accompanying shifts in both directions between the limits defined as wide and narrow targets.
T. G. R 5

2234
Nyrop, D.W. (Chm.). A STATISTICAL ANALYSIS OF COMMERCIAL NON-AIR CARRIER ACCIDENTS - 1951. PART III OF IV PARTS. June 1952, 23pp. US Civil Aeronautics Board, Washington, D.C.

2234
A statistical analysis of one category of non-air-carrier accidents (commercial) for the year 1951 is presented. Nonair carrier flying is defined as those operations in which the principal business is other than the carriage of persons or property from one place to another for hire. Commercial flying is that done for direct financial return. Accident statistics on primary causes, operational phase, type, pilot age and experience, emergency conditions, and violations are given for various classes of commercial flying.
T.

2236
Roby, T.B. PREREQUISITES FOR PAIR-SCORES TO BE USED FOR ASSEMBLING SMALL WORK GROUPS. Proj. 7713, Task 77231, AFPTRC TR 54 13, Dec. 1953, 17pp. USAF Crew Research Lab., Randolph AFB, Tex.

2236
It is shown that scores which express predicted compatibility between pairs of persons in small work groups, such as bomber crews, may have general usefulness for rational group assembly. The statistical prerequisites for such scores to be maximally useful for differential assignment to groups are stated. The dimensions along which persons in each of the separate classes should be ordered in order to meet these prerequisites are demonstrated.
T. R 6

2243
Ludvigh, E. PERCEPTION OF CONTOUR: II. EFFECT OF RATE OF CHANGE OF RETINAL INTENSITY GRADIENT. Contract NONR 586(00), Proj. NR 142 023 & Proj. NM 001 075.01.05, Rep. 5, Aug. 1953, 9pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

2243
This is one of a series of investigations into the nature of the retinal stimulus effective in producing the perception of an edge under certain simple conditions of photopic vision. A method is briefly described by means of which a distal stimulus is computed which, under the conditions of observation, will result in the desired or retinal stimulus. The observer can project a small fiducial dot of light onto the distal stimulus to indicate where an edge, break, contour, or discontinuity appears. Data from two observers are presented on the effect of rate of change of the retinal intensity gradient on contour perception.
G. R 11

2251
Nyrop, D.W. (Chm.). A STATISTICAL ANALYSIS OF PUBLIC FLYING AND MISCELLANEOUS NON-AIR CARRIER ACCIDENTS - 1951. PART IV OF IV PARTS. June 1952, 9pp. US Civil Aeronautics Board, Washington, D.C.

2251
A statistical analysis of one category on nonair-carrier accidents (public and miscellaneous) for the year 1951 is presented. Public flying is defined as that conducted by federal, state, and municipal agencies; miscellaneous operations include such things as search and rescue, civil air patrol, hunting-trapping, fire-fighting, stolen aircraft, and suicides. Statistics concerning primary causes, operational phase, type, pilot age and experience, and emergency conditions are presented.
T.

2418
Miller, R.B. A METHOD FOR DETERMINING HUMAN ENGINEERING DESIGN REQUIREMENTS FOR TRAINING EQUIPMENT. Contract AF 33(038) 22638, WADC TR 53 135, June 1953, 17pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (American Institute for Research, Pittsburgh, Penn.).

2418
This report describes a procedure developed to determine the psychological requirements of training and training devices. It summarizes and integrates three earlier reports: Handbook on Training and Training Equipment Design, A Method for Man-Machine Task Analysis, and Human Engineering Design Schedule for Training Equipment. Two phases of the procedure are summarized: 1) a method for performing a behavioral analysis of man-machine tasks, and 2) the application of a human engineering design schedule to the planning or improvement of a training device.
R 5

2452
Deuth, A.F. FINAL ENGINEERING REPORT ON INFOMAX. Contract AF33(038)17923, Proj. 1176, Rep. 1176 FR 10, Nov. 1953, 76pp. Hogan Laboratories, Inc., New York, N.Y.

2452
This final report summarizes work accomplished in a study of communication and typographical parameters of an Informax communication system. The concept of Informax is defined as "the process of maximizing the comprehension of received intelligence per unit of information transmitted through a noise-degraded electrical communications channel." Both parameters are studied in relation to their effect on the system perturbed by Gaussian noise in an attempt to determine an optimum set of parameters.
G. I. R 6

2747
Cogswell, J.F. EFFECTS OF A STEREOSCOPIC SOUND MOTION PICTURE ON THE LEARNING OF A PERCEPTUAL-MOTOR TASK. Contract N6ONR 269, Rep. 269 7 3 2, Sept. 1952, 13pp. USN Special Devices Center, Port Washington, N.Y. (Pennsylvania State College, State College, Penn.).

2747
To ascertain whether the stereoscopic sound motion picture contributes significantly to the learning of a perceptual-motor task as compared to the conventional sound motion picture, three different experimental treatments were given to three equated groups. One group saw a stereoscopic film (wearing polaroid viewing spectacles). The other two groups saw the same film except that it was not stereoscopic; one of these groups wore the polaroid viewing spectacles. A performance test was given immediately following the film showing. Speed scores and percentage of subjects completing task successfully in a ten-minute period were analyzed for differences due to experimental treatment. Implications for use of training films are indicated.
T, G. I. R 1

2748
Stein, J.J. THE EFFECT OF A PRE-FILM TEST ON LEARNING FROM AN EDUCATIONAL SOUND MOTION PICTURE. Contract N6ONR 269, Rep. SDC 269 7 35, Nov. 1952, 15pp. USN Special Devices Center, Port Washington, N.Y. (Pennsylvania State College, State College, Penn.).

2748

To ascertain the effect of a pre-film test on learning from an educational sound motion picture, approximately 3500 United States Navy seamen recruits were tested. Pre-film tests were constructed to cover film content and were given to three different groups with no knowledge of results, with partial, and with complete knowledge of results. Following the film showing, an immediate and a delayed (one week) retention test were given. Several control groups were used: 1) took post tests only, 2) saw film once and took post tests, and 3) saw film twice and took post tests. The test data from two different films were analyzed for effect of pre-film test, knowledge of results, and content of pre-film test.
T. G. R 4

3148

Ades, H.W., Davis, H., Miles, W.R., Neff, W.D., et al. AN EXPLORATORY STUDY OF THE BIOLOGICAL EFFECTS OF NOISE. Contract N6ORI 020, Proj. NR 144079, Task 44, Dec. 1953, 116pp. University of Chicago, Chicago, Ill.

3148

In response to the problems produced by noise from jet aircraft, this report concerns interference by intense noise with functions other than hearing and the possibility of injuries caused by noise. This study assesses known limits of human tolerance and protective possibilities, discusses biological effects of noise medically and operationally, and includes recommendations for future research.
T. G. I. R 72

3253

Furer, M. & Hardy, J.D. THE REACTION TO PAIN AS DETERMINED BY THE GALVANIC SKIN RESPONSE. CHAPTER V. Reprinted from: Life Stress and Bodily Disease, 1950, XXIX, Proceedings Association for Research in Nervous & Mental Disease, 1949, 18pp. Russell Sage Institute of Pathology, Cornell University Medical College, New York, N.Y.

3253

A study of the GSR as a reaction to graded, standard intensities of pain were carried out on four normal Ss. The pains were induced by intense thermal radiation and were graded from threshold to eight dols in steps of two dols. Three series of experiments were performed. 1) The Ss, in a relaxed state, were exposed daily over a six-month period to pains presented in a fixed order from zero, threshold, two, four, six, and eight dols; the GSR to each pain was recorded. 2) The Ss were similarly studied in hot and cold environments. 3) Studies were made before, during, and after events calculated to induce anxiety. Differences between pain sensations and pain reactions were discussed.
G. I. R 35

3338

Miller, R.B. HUMAN ENGINEERING DESIGN SCHEDULE FOR TRAINING EQUIPMENT. Contract AF 33(038) 22638, WADC TR 53 138, June 1953, 34pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (American Institute for Research, Pittsburgh, Penn.).

3338

This report is an organization of several hundred considerations which, from the human engineering standpoint, are important to the relevance and efficiency of training equipment. These considerations are applicable to a training device during initial planning, specification, prototype, or production model stages of trainer development. The items of the Design Schedule are grouped as follows: 1) designing a trainer to use as a demonstrator of principles, 2) controls, 3) displays, 4) control-display interaction, 5) programs, 6) scoring and error analysis, 7) motivation of the student, 8) conditions of practice and learning, 9) facilities for the instructor, and 10) research data on the task.

3348

Prakash, A. BAYES, AND MINIMAX PROCEDURES IN SAMPLING FROM FINITE POPULATIONS. Contract N6ONR 251, Task III (NR 042 993), Tech. Rep. 15, Feb. 1953, 10pp. Department of Statistics, Stanford University, Stanford, Calif.

3348

The primary aim of this paper is to investigate the assumptions in modern decision theory needed to yield the classical results in estimation and design in sampling from finite populations. The finite population is regarded as the outcome of a fixed sample size experiment performed by nature or some conscious being, using some probability distribution unknown to the statistician. The loss function, however, does not depend upon the form of the probability distribution but only upon the outcome of this large experiment. Use has been made of the fact that optimum strategy is to choose a sample of fixed size by the method of simple random sampling. The Bayes and minimax estimates and sampling procedures are obtained for various populations.
R 11

3353

Miller, J.G. THE DEVELOPMENT OF EXPERIMENTAL STRESS-SENSITIVE TESTS FOR PREDICTING PERFORMANCE IN MILITARY TASKS. Contract DA 49 083 OSA 611 B 8 154, Proj. 29562000, PRB Tech. Res. Rep. 1079, Oct. 1953, 57pp. Psychological Research Associates, Washington, D.C.

3353

To find out if certain available tests were able to distinguish a man's reactions under stress conditions as opposed to his reactions in a normal situation, a number of potentially stress-sensitive tests were selected on the basis of a review of the literature and pretested on 48 paratroopers making their first jump from the 34-ft. mock tower. Four tests (critical flicker fusion at dim intensity, the trembleometer, cancellation of C's, and the Primary Mental Abilities Word Fluency) were then administered to 500 pre-inductees under ordinary testing conditions and under stress induced by a continuous 8000-cycle, 90 db noise. The findings were interpreted in terms of a general theory of stress.
I.

3356

Grings, W.W., Rigney, J.W., Bond, N.A. & Summers, S.A. A METHODOLOGICAL STUDY OF ELECTRONICS TROUBLE SHOOTING SKILL: I. RATIONALE FOR AND DESCRIPTION OF THE MULTIPLE-ALTERNATIVE SYMBOLIC TROUBLE SHOOTING TEST. Contract NONR 228(02), Proj. NR 153 093, Tech. Rep. 9, Aug. 1953, 46pp. Department of Psychology, University of Southern California, Los Angeles, Calif.

3356

This report is one of two concerning a new type of test format which was a product of a methodological study of electronics trouble shooting. A conception of trouble shooting is set forth as it is related to problem-solving in general and as it is exemplified in electronics situations. The test format is described in detail. The pertinent aspects of its subject matter, relation to other trouble shooting tests, and alternative scoring parameters are discussed.
I.

3367

Grings, W.W. (Princ. Investigator). SHIPBOARD OBSERVATION OF ELECTRONICS PERSONNEL: GENERAL CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH. Contract NONR 228 (02), Proj. NR 153 093, Tech. Rep. 7, July 1953, 30pp. Dept. of Psychology, University of Southern California, Los Angeles, Cal.

3367

This report is the last of a series of technical reports based on shipboard observations of electronics personnel on destroyer-type ships. Objectives of the research are re-examined and degrees of their attainment are evaluated. General conclusions derived from the research, suggestions for improvement in the electronics maintenance situation, and recommendations for future research within the electronics area are included.

3371

Grings, W.W. (Princ. Investigator). SHIPBOARD OBSERVATION OF ELECTRONICS PERSONNEL: A DESCRIPTION OF THE RESEARCH. Tech. Rep. 1, Jan. 1953, 11pp. Dept. of Psychology, University of Southern California, Los Angeles, Calif.

3371

A nontechnical account is presented of a research program designed to investigate personnel problems associated with electronic maintenance and operation. The procedures used to obtain objective descriptions aboard ships operating in the Pacific area are given along with a description of the groups observed. The rationale underlying the development of a battery of observational techniques is discussed with each technique described in general terms. The treatment of data is discussed briefly and the methods used are evaluated. The paper concludes with some general evaluative comments on the use of a multi-method approach.

3389

Miller, R.B., Folley, J.D., Jr. & Smith, P.R. TROUBLE-SHOOTING IN ELECTRONICS EQUIPMENT. A PROPOSED METHOD. Contract AF 33(038) 12921, Proj. 507 008 0001, March 1953, 93pp. American Institute for Research, Pittsburgh, Penn.

3389

Detailed step-by-step procedures based upon rational and logical considerations are presented for trouble-shooting of electronics equipment. This logical method (trouble-shooting by logical elimination of malfunction sources) is compared with a second general method (trouble-shooting from probability data) which is based upon records of previous malfunctions. Part I contains a discussion of levels and kinds of trouble-shooting in electronics equipment; Part II details the specific check sequence for efficient malfunction isolation; and the appendix presents mathematical proof of efficiency of the half-split technique. (See 498.)
T. I. R 3

3393

Stange, F. REPORT ON REAR SCREEN SLIDE PROJECTION. NAVEXOS P-991, June 1953, 40pp. USN Special Devices Center, Port Washington, N.Y.

3393

As part of a large research project on the use of television as a medium for rapid mass training, evaluations of all available types of rear screen slide projectors designed for television are made. This report discusses the purpose and value of rear screen slide projection for increasing the scope and flexibility of the television studio. The limitations of the technique are set forth. Both production and technical aspects of the technique are given in detail.
I.

3400

Senders, J.W. THE INFLUENCE OF SURROUND ON TRACKING PERFORMANCE. PART I. TRACKING ON COMBINED PURSUIT AND COMPENSATORY ONE-DIMENSIONAL TASKS WITH AND WITHOUT A STRUCTURED SURROUND. Contract AF 18(600) 50, WADC TR 52 229, Part I, Feb. 1953, 13pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3400

To test the hypothesis that increasing the availability of information about the direction, rate, and acceleration of target motion will improve tracking performance, four groups of five Ss each performed a series of tracking tasks on two different target rates and under two conditions of surround illumination. The tasks were varied in five steps from pure compensatory to pure pursuit (following) tracking. Time-on-target scores were analyzed for effect of target course rates, surround illumination, and percent pursuit component. This was the first of a series of studies on the same subject.
T. G. R 5

3404

Eckstrand, G.A. & Morgan, R.L. A STUDY OF VERBAL MEDIATION AS A FACTOR IN TRANSFER OF TRAINING. WADC TR 53 34, Feb. 1953, 28pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3404

To determine whether the same verbal responses to a set of color stimuli and a set of response forms will result in these stimuli becoming functionally similar, 62 Ss divided into three groups learned three tasks using a modified Hull-type memory drum. Task 1 consisted of learning to push one of six switches for each of six colors presented on the drum. Task 2 differed for each group: 1) learned to associate one of the six colors with each of the six forms used; 2) learned to associate written names of the colors with the forms; and 3) learned to associate names of house parts with the forms (control group). Task 3 consisted of learning to push one of the six switches for each form. Errors on trial 1, errors to one perfect trial, and average number of correct responses per trial were analyzed for task 3 performance. T. R 14

3409

Fraser, D.C. A STUDY OF FATIGUE IN AIRCREW. INTERIM REPORT. I. VALIDATION OF TECHNIQUES. APU 185/52, Dec. 1952 10pp. Psychological Lab., Applied Psychology Research Unit, MRC, Cambridge, England.

3409

This paper reports the results of giving a laboratory vigilance task to groups of navigators at different airfields. The main feature of the task is that the operator has to detect the significant stimuli (large hole) that are interspersed randomly throughout a long series of neutral stimuli (smaller holes) as they move across a horizontal display; he then has to photograph the significant stimulus when it is exactly half-way through its travel by pressing a camera button. The score is the variance of the subject's estimates about his own mean estimates. Results are given comparing navigator and naval ratings performance for performance after short and long sorties and for performance under stress conditions.
T. G. R 8

3410

Stump, N.E. TOGGLE SWITCHES - ACTIVATION TIME AS A FUNCTION OF THE PLANE OF ORIENTATION AND THE DIRECTION OF MOVEMENT. WCRD TN 52 51, Sept. 1952, 10pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3410

To determine, in various combinations of plane and direction of movement, the time required to throw a conventional toggle switch to the on position and then off, 12 Ss were required to perform this operation in each of six directions of throw variously assigned to three planes of motion (frontal, parallel, and flat). A spring-loaded toggle switch was used and the times required to perform the on-off throw were recorded. Practical implications of the data for operation of an indicator such as a Veeder-type counter were discussed.
T. G. I.

3413
Folger, J. CONFIDENCE LIMITS TABLES FOR SMALL SAMPLES OF BINOMIALLY DISTRIBUTED DATA. Res. Memo. 6, May 1953, 12pp. USAF Human Resources Research Institute, Maxwell AFB, Ala.

3413
Tables are presented indicating the 95 per cent confidence limits for binomially distributed data. They are tabulated by n, the total number in the sample, and by r, the number of successes in the sample. The fraction r/n gives the percentage of success in the sample; the confidence limits are tabulated in percentage terms.
T. R 4

3415
Luft, U.C., Bancroft, R.W. & Carter, E.T. RAPID DECOMPRESSION WITH PRESSURE-DEMAND OXYGEN EQUIPMENT. Proj. 21 1201 0008, Rep. 2, April 1953, 5pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

3415
To measure pressures imposed upon the lungs and other organs of the chest in the event of sudden loss of cabin pressure at high altitudes while using pressure-demand oxygen equipment, 35 rapid decompressions were made from a simulated cabin altitude of 20,000 to 25,000 ft. to a simulated flight altitude of 47,000 to 50,000 ft. in 0.3 to 0.5 seconds during normal respiratory activity with the pressure-demand oxygen equipment. Barometric and gas pressures were recorded directly and intra-thoracic pressures indirectly. Changes in blood oxygen saturation were recorded on a number of Ss. Subjective impressions were obtained after testing. A control test without positive mask pressure was run.
T. G. R 8

3420
Gordon, D.A., Zagorski, H.J. & Zeidner, J. A COMPARISON OF ORTHO-RATER AND WALL CHART VISUAL ACUITY MEASUREMENTS. Proj. 29535100, PJ 3513 01, PRB Res. Note 10, Feb. 1953, 11pp. USA Personnel Research Branch, Adjutant General's Office, Washington, D.C.

3420
To compare the relative difficulty, the test-retest reliabilities, and the correspondence of visual acuity scores obtained on Ortho-Rater and wall chart tests, letter and modified Landolt ring tests were administered to 117 soldiers by both methods. Light levels were the same for both tests. A retest was given to the same subjects two weeks later. Recommendations are made on the basis of the findings as to the suitability of using the more convenient instrument method.
R 8

3425
Crumley, L.M. A STUDY OF THE REQUIREMENTS FOR LETTERS, NUMBERS AND MARKINGS TO BE USED ON TRANSILLUMINATED AIRCRAFT CONTROL PANELS. PART 8, A PROPOSAL FOR THE STANDARDIZATION OF AIRCRAFT ELECTRICAL AND ELECTRONIC CONTROL KNOBS. Rep. TED NAM EL 609, Rep. XG T 192, Dec. 1948, 13pp. USN Aeronautical Medical Equipment Lab., NAMC, Philadelphia, Penn.

3425
Present electrical and electronic control knobs (rotary controls) requirements for naval aircraft are reviewed and analyzed. The current methods of fulfilling these requirements are evaluated. Suggested proposals for standardizing knob characteristics by either color or shape coding are reviewed critically. Recommendations are made concerning improved methods for meeting the current control knob requirements.
T. I. R 6

3436
Morin, R.E. & Grant, D.A. SPATIAL STIMULUS-RESPONSE CORRESPONDENCE. PERFORMANCE ON A KEY-PRESSING TASK AS A FUNCTION OF THE DEGREE OF SPATIAL STIMULUS-RESPONSE CORRESPONDENCE. Contract AF 18(600) 54, WADC TR 53 292, Oct. 1953, 22pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (University of Wisconsin, Madison, Wisc.).

3436
To determine how performance is influenced by changes in the degree of spatial correspondence between the stimulus elements and the response elements in a task, an experiment was conducted with systematic variations in indicator-control arrangements. The indicators were eight red lights in a row with a corresponding row of controls (response keys) on a key board. Any light could be made a stimulus for any response key and it was through this mechanism that spatial stimulus-response correspondence was varied. Kendall's tau, a measure of rank correlation, was used to measure the degree of correspondence. Speed and accuracy scores were analyzed and the findings related to design problems of complex indicator-control systems.
T. G. I. R 8

3438
Gordon, N.B. (Proj. Engineer). HUMAN ENGINEERING STUDY OF NAVAL AIR RESERVE TRAINING. PHASE I: SURVEY OF PROBLEMS. Contract NONR 895(00), SDC Rep. 895 001, March 1953, 44pp. USN Special Devices Center, Port Washington, N.Y. (International Public Opinion Research Corp., New York, N.Y.).

3438
This report presents and analyzes problem areas that were deemed to be of major importance in the Naval Air Reserve Training Program. The problems are ranked in order of their importance to the training program and each is accompanied by a recommendation for alleviating the problem and improving the program. The findings presented here are based on interviews with Naval personnel at six bases, at four additional commands, and on observations of the operations of the bases.

3442
Gibson, J.J. PROPOSALS FOR A THEORY OF PICTORIAL PERCEPTION. Contract AF 33(038) 22804, HFORL Memo Rep. 35, May 1953, 18pp. USAF Human Factors Operations Research Labs., Bolling AFB, Washington, D.C. (Cornell University, Ithaca, N.Y.).

3442
This report presents a first attempt to develop a systematic theory of pictorial perception undertaken on the basis that such a theory is a prerequisite to effective long-range progress in research on audio-visual training material. The following major items are dealt with successively in this attempt to analyze how a picture conveys information: 1) words, pictures, and models as substitutes for realities; 2) definition of "surrogate"; 3) production of surrogates; 4) consequences of surrogate-making for perceiver and producer; 5) conventional and nonconventional surrogates; 6) fidelity of a model; 7) fidelity and scope of a picture; 8) space in pictures; 9) unique viewing-point for a picture; 10) approximation of pictorial to direct perception; 11) fidelity of chirographic pictures; and 12) advantages and disadvantages of realism. R 12

3443
Peterson, L.V. USE OF GRAPHS IN AIR FORCE TEACHING MATERIALS. Contracts AF 18 600 321 & AF 18 600 335, Res. Memo. 14, Aug. 1953, 47pp. USAF Human Resources Research Institute, Maxwell AFB, Ala. (University of Illinois, Urbana, Ill.).

3443

This monograph summarizes the best knowledge about the use of graphs in instructional materials. Three major divisions of the subject are treated as follows: 1) What makes a graph effective? 2) Solutions to common graph problems--simple comparisons, a whole and its parts, multiple comparisons, lose and gain comparisons, frequency, and narrative charts. 3) Suggestions to the editor and designer.
T. G. I.

3445

Kimble, G.A. & Wulff, J.J. "RESPONSE GUIDANCE" AS A FACTOR IN THE VALUE OF AUDIENCE PARTICIPATION IN TRAINING FILM INSTRUCTION. Contract AF 33(038) 13678, HFORL Memo. 36, March 1953, 18pp. USAF Human Factors Operations Research Labs., Bolling AFB, Washington, D.C. (Yale University, New Haven, Conn.).

3445

In this experiment, two alternative "participation" procedures were tested as adjuncts to film instruction. In one procedure, the "participation" (practice) materials included hints or guidance clues to assist trainees in obtaining the correct answer. The other procedure was identical except for the absence of these clues. Approximately 660 men were shown a film on the use of the slide-rule--half used the guided practice and half the unguided practice method. A test of 25 items was given to all men immediately following the film. Test data were analyzed for effect of the two practice procedures. The effect of difficulty of material and level of intelligence on the results was also studied.
T. G. I.

3446

Goodman, S.L. WHAT MAKES FOR READABLE WRITING AND READING SUCCESS. Contract AF 18(600) 335, Res. Memo. 10, July 1953, 35pp. USAF Human Resources Research Institute, Maxwell AFB, Ala. (Division of Communications, University of Illinois, Urbana, Ill.).

3446

This report is concerned with two questions: what printed material best succeeds in carrying knowledge to man? and, what abilities, traits, etc., does man need to succeed in reading various materials? Research evidence is presented on one facet of these two problems: how readable writing relates to reading success. The various sections, each accompanied by a bibliography, are: 1) How can we measure reading success? 2) What do we know about reading success in adults? 3) What makes for readable writing? 4) How does readable writing relate to reading success? and 5) How can writing be evaluated so as to improve reading success?
R 6

3453

Brown, F.R. A STUDY OF THE REQUIREMENTS FOR LETTERS, NUMBERS, AND MARKINGS TO BE USED ON TRANS-ILLUMINATED AIRCRAFT CONTROL PANELS. PART 4. LEGIBILITY OF UNIFORM STROKE CAPITAL LETTERS AS DETERMINED BY SIZE AND HEIGHT TO WIDTH RATIO AND AS COMPARED TO GARAMOND BOLD. Rep. TED NAM EL 609, March 1953, 28pp. USN Aeronautical Medical Equipment Lab., NAMC, Philadelphia, Penn.

3453

To determine the effect of variations in size and in height-to-width ratio upon the legibility of capital block letters as they would be used on aircraft cockpit plastic lighting plates, a series of experiments was performed. In addition, a font of Garamond Bold capital letters characterized by variable height-to-width ratios, serifs, and nonuniform stroke-widths was used. Tests with letters differing in these form characteristics were conducted using two exposure durations and five levels of red transillumination which simulated the conditions of night viewing of the plastic lighting plates. Daylight illumination and one exposure duration were used for the same letter variables. Recommendations were made on the basis of the data analysis for letters to be used on plastic lighting plates. T. G. I. R 5

3459

Carroll, J.B. & Schohan, B. CONSTRUCTION OF COMPREHENSIVE ACHIEVEMENT EXAMINATIONS FOR NAVY OFFICER CANDIDATE PROGRAMS. Proj. NR 154 138, Nov. 1953, 129pp. American Institute for Research, Pittsburgh, Penn.

3459

The purpose of the project reported here was to construct a new series of examination materials for measuring end-of-course achievement of students in naval officer candidate programs. Rather than mere factual information, test items were to measure "integrated knowledge" (problem-solving and decision-making ability). The examinations were administered as year-end tests to NROTC students in May 1953 and to various classes of officer candidates at the U.S. Naval School (Officer Candidate), Newport, Rhode Island. Statistical analyses, designed to evaluate the examinations given to the latter group are presented and discussed in detail.
T. G.

3460

Nadel, A.B. (Dir.). SYMPOSIUM ON MOTIVATION. HR HML 201/1, March 1953, 114pp. Committee on Human Resources, Research & Development Board, Washington, D.C.

3460

Some titles presented at this Symposium were: "Research in Combat Areas"; "Problem of Motivation at the Recruit Level"; "Motivational Problems in Air Force Flight Training"; "Preliminary Investigation of Delinquency in the Army"; "Development of a Standardized Projective Test of Achievement Motivation"; "Problems and Techniques in the Evaluation of Motivation Among Naval Aviation Cadets"; "Contributions of Studies with Paratroopers to Theoretical Formulations of Fear and Stress"; "Motivational Factors in the Job Performance of Aviation Mechanics"; "Motivation, Perception, and Action"; "Theoretical Basis of Projective Measures of Fear"; "The Active Duty Intentions of Some ARDC Lieutenants (AFROTC) Related to Several Service-Associated Variables"; and "The Sources of Worker Motivation." T. G. R 15

3462

Fritz, M.F., Humphrey, J.E., Greenlee, J.A. & Madison, R.L. SURVEY OF TELEVISION UTILIZATION IN ARMY TRAINING. FINAL REPORT. Contract 530(01), SDC Rep. 530 01 1, Dec. 1952, 148pp. USN Special Devices Center, Port Washington, N.Y. (Iowa State College, Ames, Iowa).

3462

To explore the question of whether television could be advantageously integrated with Army training programs, an extensive survey of existing television potentialities was made. Observations of existing procedures at Army television stations and at educational stations were made. Experimental literature and television literature were examined. A criteria check list was devised to determine what Army subjects could be televised and validation thereof accomplished. Other areas studied included television training aids, equipment, operational techniques, selection and training of instructors, and kinescope recordings. Recommendations were included.
I. R 98

3467

Bolt, R.H., Beranek, L.L. & Newman, R.B. HANDBOOK OF ACOUSTIC NOISE CONTROL VOLUME I. PHYSICAL ACOUSTICS. Contract AF 33(038) 20572, Phase II, Suppl. Agree. 1, CO 2, WADC TR 52 204, Dec. 1952, 397pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

3467

This handbook, comprising two volumes, is intended to provide an overall view of the noise control problem. Noise is here taken to mean only acoustic noise. This first volume is concerned with noise stimuli, their generation and control. The introductory chapter is concerned with general aspects of noise control, terminology, and measurements. Major sections are devoted to 1) noise source characteristics--specification of, aircraft engine noise, fluid flow devices, industrial machine noise, and miscellaneous environmental noise; and 2) methods of noise control.
T. G. I. R 22

3468
Hertzman, A.B., Randall, W.C. & Peiss, C.N. THE EFFECTS OF AMBIENT TEMPERATURE AND AIR HUMIDITY ON THE REGIONAL RATES OF SWEATING. THE ELEVENTH OF A SERIES OF REPORTS ON STUDIES ON CUTANEOUS HEAT LOSSES. Contract AF 18(600) 96, Tech. Rep. 6680, Part 11, Jan. 1953, 69pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (St. Louis University, St. Louis, Mo.).

3468

To determine the effects of ambient temperature and air humidity (Pa) on sweating responses, evaporation from skin surface and thermal balance, four resting, nude, male Ss were exposed to the following environmental conditions: 1) "varied stress" in which operative temperature (Ta) rose at a rate of 0.1 degree C per minute from an initial level of 26-33 degrees C to 41 degrees C and Pa rose to high or moderate levels; and 2) "constant stress" in which Ta (39-42 degrees C) and Pa (high or low) were pre-set to cause heavy sweating. During experimental periods of 2 to 3 hours, Ss rested in a chamber on screen cots allowing free circulation of air and evaporation. Regional sweating rates were obtained from 20 body surface areas and total sweat output was estimated. Recommendations for future research were made. T. G. I. R 13

3629
Fry, G.A. & Alpern, M. EFFECT OF FLASHES OF LIGHT ON NIGHT VISUAL ACUITY. PART I. Jan. 1953, 26pp. Vision Committee Secretariat, Armed-Forces-National Research Council, University of Michigan, Ann Arbor, Mich. (Ohio State University Research Foundation, Columbus, Ohio).

3629

To determine the ability of the eye exposed to light flashes to see a dark object against the nocturnal sky, three Ss fixated on a red point. Fixation brought the test object, a disc of brightness equal to a moonlit sky, five degrees to the right of the principal sight line. A black bar, variable in width to measure the threshold of visibility, extended vertically across the center of the disc. A patch of brightness was superimposed upon the disc-shaped area. The following were investigated: varying brightness and duration of flash patch when coextensive with test patch, repetitive exposures of flash source, varying distance between flash and test patches, varying area of displaced flash patch, flash patch falling in blind spot, etc. Theoretical considerations were included. T. G. R 7

3631
Ammons, R.B., Ammons, Carol H. & Morgan, R.L. TRANSFER OF TRAINING IN A SIMPLE MOTOR SKILL ALONG THE SPEED DIMENSION. Contract AF 33(038) 10 196, WADC TR 53 498, March 1954, 22pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Louisville, Louisville, Ky.).

3631

This study was conducted to obtain information on the general problem of the influence of the speed of a training task upon the performance of a following task. The task used was rotary pursuit at four different speeds. The speeds were assigned to the training and transfer periods in a way that resulted in all 16 possible combinations of speeds in the two periods and were presented under three different conditions of distribution of practice. A total of 48 subgroups were used forming a total of 193 Ss. The performance data were analyzed for transfer effects between tasks of different speed requirements.
T. G. R 20

3632
Ammons, R.B. KNOWLEDGE OF PERFORMANCE SURVEY OF LITERATURE, SOME POSSIBLE APPLICATIONS, AND SUGGESTED EXPERIMENTATION. Contract AF 33(616) 95, WADC TR 54 14, Feb. 1954, 31pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Louisville, Louisville, Ky.).

3632

This report represents a systematization of much of the currently available information concerning the influence of knowledge of performance on learning, performance, and transfer of training. The results of a large number of studies are organized into 11 "empirical generalizations." Some possible applications of the generalizations to the design of training equipment are discussed and needed research studies, ranging from specific experiments to needed area programs, are indicated.
R 58

3635
Brown, K.T. FACTORS AFFECTING RATE OF APPARENT CHANGE IN A DYNAMIC AMBIGUOUS FIGURE AS A FUNCTION OF OBSERVATION TIME. WADC TR 53 482, Dec. 1953, 32pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3635

To investigate the rate of apparent change of an ambiguous figure (RAC) as a measure of certain physiological processes which contribute to visual fatigue, a method of determining curves showing RAC as a function of observation time was developed. A series of experiments were conducted to determine: 1) the general shape of the curve, 2) the relation between curves for right and left eyes of a given subject, 3) subject differences, 4) reliability of method, 5) differences in binocular and monocular curves, and 6) interocular transfer of increase in RAC.
T. G. I. R 31

3645
Teichner, W.H., Kobrick, J.L. & Wehrkamp, R.F. EFFECTS OF TERRAIN AND OBSERVATION DISTANCE ON DEPTH DISCRIMINATION. Rep. 228, May 1954, 23pp. USA Quartermaster Research & Development Center, Natick, Mass.

3645

To determine the effects of observation distance, type of terrain, and time of day on monocular and binocular depth discrimination, an experimental study was conducted in the desert. Three types of terrain (sand, silt, and desert pavement) and a macadamized airstrip were the physical areas studied; distances of observation varied from 200 to 3000 ft.; and both mid morning and mid afternoon tests were made. Four Ss were used to obtain discriminations of the equality of spatial positioning of two homogeneous, smooth-textured, rectangular targets. The data were analyzed for the effect of these environmental factors on the precision of this visual function.
T. G. I. R 31

3646
White, W.J. & Sauer, Shirley C. SCALE DESIGN FOR READING AT LOW BRIGHTNESS. Contract AF 18(600) 25, WADC TR 53 464, March 1954, 16pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3646
This study concerned the manner in which speed and accuracy of quantitative scale reading vary as a function of graduation mark width and interval size under three intensities of red illumination such as are encountered in cockpits at night. The data consisted of time and error scores obtained by 18 Ss, each serving under all conditions. Graduation mark width varied from 0.008 to 0.063 inch; graduation intervals varied from 0.05 to 0.25 inch; and illumination levels were 0.002, 0.01, and 0.10 ft.-L. Conclusions were drawn concerning dimensions of scales for visual presentation of quantitative information in aircraft cockpits.
T. G. I. R 13

3857
Bitterman, M.E. & Krauskopf, J. SOME DETERMINANTS OF THE THRESHOLD FOR VISUAL FORM. Contract AF 33(616) 63, WADC TR 53 331, Sept. 1953, 34pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3857
Five experiments concerning visual discrimination of geometric form are reported. Purpose of the experiments was to test a diffusion model for visual form perception derived from the Kohler-Wallach theory of figural after-effects. The experiments measured foveal form and brightness thresholds for luminous figures which were briefly exposed in a dark room. Measurements were in terms of intensity of illumination. Results were discussed as they related to other models (e.g., a physical diffusion model, and the Osgood-Heyer Model). Methodology of the present as well as of previous studies was scrutinized.
T. G. I. R 21

3883
Richards, W.J., Shuford, E.H. & Bickle, A.J. PART I - REACTION TIME; PART II - INTENSITY; PART III - VISUAL REACTION; PART IV - PROPOSED FUTURE WORK. Contract DA 23 072 ORD 472, TAI 59901 04, Tech. Rep. 22, 1951, 27pp. Ordark Research Project, University of Arkansas, Fayetteville, Ark.

3883
Three studies are reported. 1) The relationship between the intensity of white stimulus light and the reaction time of human Ss under two conditions of adaptation was determined. A total of 400 trials was given to each of four Ss, using ten intensities of the stimulus under conditions of both light and dark adaptation. 2) The relationship between the intensity of chromatic stimuli and reaction time was studied. A total of 1200 trials was given to each of four light-adapted Ss, using ten intensities of stimulus for each of five chromatic stimuli and one white stimulus. 3) The effect of variations in size of a white stimulus (diameter varied from 1 degree, 12 minutes to 45 degrees, 14 minutes) was studied.
G. R 22

3884
Rosenblith, W.A., Stevens, K.N. & Bolt Beranek and Newman Inc. HANDBOOK OF ACOUSTIC NOISE CONTROL VOLUME II. NOISE AND MAN. Contract AF 33(038) 20572, Phase II, Suppl. Agree. 1, CO 2, WADC TR 52 204, June 1953, 262pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3884
The Handbook of Acoustic Noise Control comprises two volumes and intends to provide an overall view of the noise control problem. Volume II includes as its subject matter several ways in which acoustic noise can be undesirable: producing pain and personnel damage, interfering with speech communication, and causing annoyance and general degradation of work and relaxation environments. The subjective responses are analyzed and correlated with properties of the physical stimuli.
T. G. I. R 240

3894
Carhart, R. & Lightfoot, C. EFFICIENCY OF IMPAIRED EARS IN NOISE. B. THE DISCRIMINATION OF CHANGES IN INTENSITY. Contract AF 33(038) 22645, Proj. 21 1203 0001, Rep. 5, Sept. 1953, 9pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Northwestern University, Evanston, Ill.).

3894
The effect of noise on the ability to perceive changes in sound intensity was investigated as part of a general study of auditory efficiency in noise. Subjects were 31 normal listeners and 77 cases of hearing losses representing a range of etiologic types. Difference limens were measured for intensity change in quiet and in two levels of "white" noise for five different frequencies (250, 500, 1000, 2000, and 4000 cps). The over-all noise levels for normal and half of the hard-of-hearing Ss was 60 and 80 db; 80 and 95 db were used for the remaining Ss.
T. G. I. R 8

3895
Chinn, H.I., Strickland, B.A., Jr., Waltrip, O.H. & McGeary, I.D. EFFECTIVENESS OF VARIOUS DRUGS IN PREVENTION OF AIRSICKNESS. STUDIES DURING ROUTINE TRAINING FLIGHTS. Proj. 21 1208 0012, Rep. 1, Sept. 1953, 3pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

3895
To determine the effectiveness of various medications in preventing airsickness during training flights, two tests were conducted. In the first, navigation trainees were used as Ss during their regular training flights with the following preparations: placebo; Parsidol, 25 mg; Benadryl, 25 mg, with scopolamine, 35 mg; and the Benadryl-scopolamine mixture with dexedrine, 5.0 mg. Flights ranged from 2 to 12 hours duration. The second group, consisting of student officers and airmen flying as passengers on a one- to two-hour flight, were treated as above. Questionnaires were completed immediately after landing concerning nausea, vomiting, drowsiness, or fatigue. The significance of adding an aneleptic drug to combat sedation effects was discussed.
T. R 6

3896
Chinn, H.I., Dugi, A.J. & Milch, L.J. EFFECTIVENESS OF VARIOUS DRUGS IN PREVENTION OF AIRSICKNESS. COMPARISON OF SCOPOLAMINE, POSTAFENE, AND PHENERGAN. Proj. 21 1208 0012, Rep. 2, Sept. 1953, 2pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

3896
To compare the effectiveness and side effects of certain promising air-sickness preventives (scopolamine, postafene, and phenergan) directly in the air, approximately 400 young airmen were studied. The procedure consisted of exposing 20 Ss simultaneously to an hour's flight of standardized turbulence. The medications (placebo and the three drugs) were randomly distributed on each flight. Each S received a capsule 24 hours before flight and a second, of identical appearance, one hour before. The incidence of vomiting was recorded by observers during flight, while all other side effects (dizziness, nervousness, sweating, dry mouth, excessive fatigue) were obtained through individual questionnaires.
T. R 9

3898
O'Brien, B. A STUDY OF NIGHT MYOPIA. Contract W33(038) F18317, WADC TR 53 206, May 1953, 23pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Rochester, Rochester, N.Y.).

3898
The literature on night myopia is reviewed in some detail and a critical evaluation of certain outstanding papers is presented. The effects of chromatic aberration, the Purkinje shift, spherical aberration, and involuntary accommodation in producing the myopia are considered. Two sets of experiments are described in which vision is restricted to cone vision thus eliminating the Purkinje shift. In one set both natural and ring aperture pupils distinguish between spherical aberration and involuntary accommodation. In the other, a ballistic flash technique prevents any accommodation after test target is displayed.
T. G. I. R 37

3913
Slade, J.J., Jr., Fich, S., Molony, D.A., Nanni, L.F., et al. THEORETICAL AND EXPERIMENTAL RESEARCH IN COMMUNICATION THEORY AND APPLICATION. Contract DA 36 039 SC 15314, Projs. 3 99 12 022 & 17 132 B 0, Prog. Rep. 8, July 1953, 11pp. Bureau of Engineering Research, Rutgers University, New Brunswick, N.J.

3913
This progress report summarizes research and development on communication theory and application. A continuation of the theoretical analysis of the effects of noise upon the detection of pulses by moments and the design of auxiliary equipment for the synthesis of sound are summarized briefly.
I. R 2

3916
Bass, D.E., Kleeman, C.R., Quinn, M., Maliszewski, T.F., et al. MECHANISMS OF ACCLIMATIZATION TO HEAT IN MAN: THE EFFECT OF PROLONGED HEAT EXPOSURE ON BODY WATER DISTRIBUTION AND ELECTROLYTE AND NITROGEN METABOLISM. Rep. 214, June 1953, 72pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

3916
Five healthy young soldiers were acclimatized to heat by living and working under controlled conditions for 14 consecutive days in a chamber maintained at 120 degrees F during 12 daytime hours and at 100 degrees F during the night. The following measurements were made: antipyrine, thiocyanate, and T-1824 spaces; sweat concentrations of Na, Cl, K, N, and creatinine; nitrogen and electrolyte balances; indices of adrencortical activity (circulating eosinophils and urinary 17-ketosteroids); pulse rates and rectal temperatures during exercise. Progressive dehydration and salt deficiency were minimized by replacing salt and water losses with 0.2 percent saline. Major physiologic adaptations were discussed.
T. G. R 97

3919
Fuch, F.L. INCIDENTS OF LEADERSHIP IN COMBAT. VOLUME V. ADMINISTRATION AND SUPERVISION OF DUTIES. Contract AF 18(600) 468, Res. Memo. 3, April 1953, 53pp. USAF Human Resources Research Institute, Maxwell AFB, Ala. (Psychological Services, Inc., Los Angeles, Calif.).

3919
A series of incidents demonstrating effective and ineffective leadership in the combat zone by Air Force officers was presented. These reports were obtained through personal interviews with officers on active duty in the Far Eastern Air Force. Fictitious names have been used but the ranks, types of units, and surrounding situational conditions were reported. All incidents represented some aspect of leadership behavior in the general area of administration and supervision of duties and were grouped under the following categories: 1) utilizing material and personnel, 2) delegating authority, 3) administering punishment or corrective action, and 4) employing verbal devices to affect harmony and motivation.

3920
Ruch, F.L. INCIDENTS OF LEADERSHIP IN COMBAT. VOLUME VI. EXECUTION OF DUTIES. Contract AF 18(600) 468, Res. Memo. 3, Feb. 1953, 51pp. USAF Human Resources Research Institute, Maxwell AFB, Ala. (Psychological Services, Inc., Los Angeles, Calif.).

3920
This report contained a series of incidents demonstrating effective and ineffective leadership in the combat zone by Air Force officers. These reports of actual situations were obtained through personal interviews with officers on active duty in the Far Eastern Air Force. In all cases names of individuals in the incidents remained anonymous to the interviewers; fictitious names have been added to the text. Ranks, types of units and surrounding situational conditions were reported. The incidents represented some aspect of Air Force leadership behavior in the general area of Execution of Duties.

3921
Dolch, J.P. AN INVESTIGATION OF SOME PHASE AND INTENSITY RELATIONSHIPS IN THE INTERFERENCE OF BONE- AND AIR-CONDUCTED SOUND. SUPPLEMENTARY REPORT NO. 2. Contract DA 36 039 SC 42562, Aug. 1953, 85pp. State University of Iowa, Iowa City, Iowa.

3921
To investigate some of the phase and intensity relationships in the interference of pure tones simultaneously transmitted through air and bone conduction channels, an apparatus was constructed to provide three separate pure tone channels of exactly the same audio frequency with independent phase and amplitude controls in two of the channels. A method of phase shifting provided continously variable phase shifts of 360 degrees with substantially no variation in the amplitude of the audio signal output. With the bone conduction receiver placed in the middle of the forehead, the subjects adjusted the phase and intensity of air conducted tones at each ear to the point where the bone-conducted tone was cancelled. Application of the findings to interphone communications were discussed.
T. G. I. R 31

3923
Warren, N.D., Mackie, R.R., Simmons, R.F. & Rodman, I.L. AN INDEX OF ACCIDENT EXPOSURE FOR FLYING IN USAF. HFORL Rep. 39, July 1953, 73pp. USAF Human Factors Operations Research Labs., Bolling AFB, Washington, D.C.

3923
A report is given on the initial phase of a research program designed to develop a method of evaluating flying experience which would reflect differences in exposure to accident hazard more accurately than does the simple summation of flying hours. The following operations were undertaken to develop the Index of Accident Exposure: 1) a unit of measurement combining hours and flights was developed to measure amount of experience, 2) measures of relative accident hazard for different kinds of flying experience were obtained, and 3) tentative weights for kinds of experience were developed and tested for accuracy of prediction from one sample to another. Pilot estimates of hazards were compared to estimates from accident data and pilot attitude was measured with regard to both methods of evaluating flying experience. T. G. I.

3924
Daniels, G.S., Meyers, H.C., Jr. & Worrall, Sheryl H. ANTHROPOMETRY OF WAF BASIC TRAINEES. Contract AF 18 (600) 30, WADC TR 53 12, July 1953, 103pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3924
Body size data for 63 measurements of 852 Women's Air Force basic trainees are presented for use by the designers of Air Force equipment. The statistics reported for each measurement include the mean, standard deviation, coefficient of variation, standard errors of these statistics, range, and selected percentiles from the first to the 99th. In general, these statistics are reported in both the metric and the English values. A complete description of the anthropometric techniques used is presented.
T. I.

3926
Berrien, F.K. & Hill, J.H. INSTRUCTOR PILOT PREDICTIONS OF STUDENT ACCIDENTS. Contract AF 18(600) 137, HFORL Memo. 38, Aug. 1953, 15pp. USAF Human Factors Operations Research Lab., Bolling AFB, Washington, D.C. (Institute for Research in Human Relations, Philadelphia, Penn.).

3926
An exploratory study of a new approach to prediction of accidents attributable to pilot error is reported. A survey of 58 instructor pilots located at seven Air Training Command bases was made. They were interviewed to determine whether, in their experience, they had expected certain of their students to have accidents, and whether their expectations had actually been borne out by subsequent events. The percentage of student accidents thus "predicted" was calculated and the reasons or behaviors which led to these "predictions" were tabulated. A search of accidents in relation to those pilots brought before Flying Evaluation Boards was made. Further research is recommended.
T. R 2

3927
Churchman, C.W. TABLES FOR SENSITIVITY TESTS CONDUCTED AT TWO STIMULI. Contract W20 018 ORD 13073, Proj. TSI 11 8, Memo. Rep. MR 540, ca. 1947, 90pp. Wayne Engineering Research Institute, Wayne University, Detroit, Mich.

3927
The major portion of this report consists of two tables: 1) weights and probits for areas under normal curve; and 2) estimates of the mean, standard deviation, and their errors from the percentage affected at two stimuli. Introductory material includes: 1) definition of sensitivity tests (tests of increased severity), manner in which such tests are made, and the use of the tables; 2) assumptions in the use of the tables; 3) example of the use of the tables in experimental work on explosives and detonative compounds; 4) alternative methods to the "two-stimulus" test described here; 5) explanation of the mathematics involved in the computations; and 6) amplification and accuracy of the tables.
T. R 12

3928
Woodcock, A.H. WET - COLD II A THEORETICAL INTERPRETATION OF THE SENSATION OF DAMP COLD EXPERIENCED BY CLOTHED MAN. Rep. 199, Feb. 1953, 40pp. USA Quartermaster Climatic Research Lab., Lawrence, Mass.

3928
A theoretical interpretation of why there is a sensation of coldness associated with high humidities near the freezing point is discussed. An earlier theory of heat transfer through wet insulation has been extended to include the theory of heat transfer through insulation when moisture is evaporated from the warmer boundary. This extension has been applied with varying external conditions of temperature and humidity, moisture permeability of the clothing, and solar or external radiation. Recommendations are made.
T. G. R 11

3929
Cohen, J. & Senders, Virginia L. AN EXPERIMENT ON DIAL CODING. Contract AF 18(600) 50, WADC TR 52 209, Nov. 1953, 16pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Antioch College, Yellow Springs, Ohio).

3929
To determine whether shape or color coding of dials would affect the speed and accuracy of locating particular dials in a display, three equated groups of Ss were tested over a five-day period on their ability to locate and check-read an instrument on a simulated instrument panel. On the sixth day, the locations of the instruments on the panel were changed, and the Ss were required to locate them. The three groups worked on different panels on which instruments were identified by: 1) labels only, 2) labels and color codes, and 3) labels and shape codes. The time to locate a given instrument and the accuracy of reading the direction of the pointer, as well as correct identification, were analyzed for effects of the coding.
T. G. R 4

3931
Dempsey, C.A. DEVELOPMENT OF A WORKSPACE MEASURING DEVICE. WADC TR 53 53, March 1953, 4pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3931
A workspace measuring device was described. It was developed to determine the maximum, minimum, and optimum space requirements of Air Force pilots when seated in the cockpit, and to simulate in the laboratory existing or proposed cockpit designs with an eye to proper space utilization.
I. R 2

3932
Buckley, Barbara B., Hanes, R.M. & Deese, J. SEARCH AREA AND TARGET DETECTABILITY ON A PPI CATHODE-RAY TUBE. Contract AF 33(038) 22642, WADC TR 52 303, April 1953, 12pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Johns Hopkins University, Baltimore, Md.).

3932
This experiment tested the possibility that detectability (thresholds) for small targets on a radarscope could be improved by having observers search part of the scope rather than all of it. Possible ways of assigning two observers to watch the same incoming data were of particular concern. Three methods of arranging the search area were tested: whole, left-right halves, and outer-inner annulus. In three separate experiments, thresholds for 24 Ss were obtained under these conditions: 1) only the search area was visible, 2) the entire scope was visible, and 3) pairs of observers searched different parts of the scope. In the first two experiments, single observers were used.
T. R 4

3933
Campbell, D.T. A STUDY OF LEADERSHIP AMONG SUBMARINE OFFICERS. Contract N6ORI 17, 1953, 208pp. Ohio State University Research Foundation, Columbus, Ohio.

3933
This report is concerned with the problem of the criteria in leadership studies and the relation of these criteria to a number of variables which describe what the leaders do and how they do it. The study is one of a series devoted particularly to the area of Naval leadership. Following a detailed analysis of the concept of leadership, the conditions under which the data were collected from 68 officers and 600 enlisted men comprising the crew of ten submarines are detailed. Following chapters describe types of data on ship effectiveness and ship morale, the analysis of such data to establish leadership characteristics, and other measures used along with the analysis of resulting data.
T. R 56

3935
Ellenhorn, M.J. & Orr, K.D. CLINICAL EFFECTS OF PROLONGED INSULATED RUBBER BOOT WEAR. Proj. 6 64 12 028, Subtask AMRL S 8, Rep. 116, May 1953, 34pp. USA Medical Research Lab., Fort Knox, Ky.

3935
To determine the clinical effects of prolonged insulated rubber boot wear, a total of 86 men were studied while also undergoing a nutrition study at the Army Winter Project, Pole Mountain Military Reservation, Wyoming, from 5 January to 15 March 1953. The foot study was performed during a period when the Ss were exposed to cold and activity. Four groups were formed: 1) continuous wear of insulated boots for 72 hours, 2) same conditions for leather combat boots, 3) insulated rubber boots with normal foot hygiene, and 4) same conditions for leather combat boots. Two separate studies were performed. Both subjective appraisal by the Ss and foot examinations conducted twice each day were made. Recommendations for fit, foot hygiene, and improvements to the boots were made.
T. I. R 21

3938
Clifton, C.T. (Princ. Investigator). THE NEED AND METHODOLOGY FOR DETERMINING NAVAL ENLISTED MANPOWER REQUIREMENTS. Contract NONR 520(00), June 1953, 55pp. The Clifton Corporation, Washington, D.C.

3938
Growing out of the Navy's mobilization planning need for more precise identification of enlisted billet skill requirements so that total requirements or demand could be matched with the available supply of skilled personnel, this pilot study was undertaken to determine: 1) the need for establishing such requirements in occupation entities other than the Emergency Service rating breakdowns, 2) the occupational entity most suitable for coding enlisted complement billets, 3) the methods to be used for such coding, 4) administrative instructions for field personnel for facilitating coding. Data were gathered by field visits to selected establishments, by written requests for information, and by analysis of ENJC-Qualifications for Advancement in Rating relationships. The findings were presented with regard to the above objectives. T. I.

3943
Truax, D.R. SOME MULTIPLE DECISION PROBLEMS. Contract N8ONR 520, Proj. NR 042 038, Task II, Tech. Rep. 10, June 1953, 29pp. Laboratory of Statistical Research, Dept. of Mathematics, University of Washington, Seattle, Wash.

3943
A statistical procedure is presented which will aid the experimenter who is faced with the task of deciding if the variability within several classes is uniform throughout the classes or, if not, which class exhibits the greatest amount of variability. The assumption is made that the distributions in each category are normally and independently distributed. Multiple decision problems discussed include comparison of several experimental categories with a control 1) when dealing with means and 2) when dealing with variances.
T. R 7

3945
Torrance, E.P. CREW PERFORMANCE IN A TEST SITUATION AS A PREDICTOR OF FIELD AND COMBAT PERFORMANCE. HFORL Rep. 33, March 1953, 43pp. USAF Human Factors Operations Research Labs., Bolling AFB, Washington, D.C.

3945
A battery of crew performance tests was devised for analyzing the difficulties which combat air crews experience in working together and for training these crews to function more effectively as teams. Procedures were developed for administering the tests, for observing test performance, and for interpreting results and predicting field performance on the basis of these results. Preliminary case study and statistical procedures yielded evidences of the validity of the procedures in predicting field performance under simulated survival conditions and combat performance over Korea.
T. I. R 25

3946
Magwire, C. SEQUENTIAL DECISIONS INVOLVING THE CHOICE OF EXPERIMENTS. Contract N6ONR 251, Tech. Rep. 19, July 1953, 33pp. Department of Statistics, Stanford University, Stanford, California.

3946
The general problem of the sequential decisions a statistician must make in the choice of taking an action without experimenting or performing an experiment is described first in verbal terms and then is formulated mathematically. An iterative method for obtaining Bayes solutions is given. The optimum sequential decision procedure for the problem under consideration is shown to be characterized as follows: if, at any stage of experimentation, there is a continuation which has smaller risk than the optimum stopping risk for that stage, the first experiment is performed. If there is no such continuation, an optimal terminal action (no experiment) is taken.
R 4

3959
Eriksen, C.W. PARTITIONING AND SATURATION OF THE PERCEPTUAL FIELD AND EFFICIENCY OF VISUAL SEARCH. Contract AF 33(038) 22642, WADC TR 54 161, April 1954, 11pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3959
This report described a series of experiments on the effects of various conditions of display upon visual search. The time required to locate a constant number of signals in a square display was determined 1) where the number of irrelevant signals was varied from 10 to 70 and 2) when the number of partitions of the display was varied by the use of grid lines. Grid lines were used to partition the display into a 9x9, a 13x13, and a 16x16 matrix. Search times obtained under the various conditions were analyzed for effects of saturation, partitions display size, and subjects.
T. G. R 5

3964
Long, E.R. & Lee, W.A. THE INFLUENCE OF SPECIFIC STIMULUS CUING ON LOCATION RESPONSES. THE THIRD OF A SERIES OF REPORTS ON "SET" AS A DETERMINER OF PERCEPTUAL RESPONSES. Contract W33(038) AC 21269, WADC TR 53 314, Dec. 1953, 14pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Virginia, Charlottesville Va.).

3964
This study is the third in a series of laboratory investigations designed to explore the concept of set and its applicability to the perception of stimuli against background "clutter." The present experiment sought to learn whether and under what conditions stimulus location would be benefitted by providing the observer with setting cues relative to the shape or contour of the critical stimulus figure to be detected, without any spatial location cuing. The following variables were studied: amount of areal clutter (number of confusion figures), degree of figural restriction (figural contour cuing), and temporal position of figural cuing with respect to stimulus presentation.

3967
Long, E.R. & Lee, W.A. THE ROLE OF SPATIAL CUING AS A RESPONSE-LIMITER FOR LOCATION RESPONSES. THE SECOND OF A SERIES OF REPORTS ON "SET" AS A DETERMINER OF PERCEPTUAL RESPONSES. Contract W33(038) AC 21269, WADC TR 53 312, Dec. 1953, 17pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Virginia, Charlottesville, Va.).

3967
This is the second in a series of investigations into the nature of perceptual set and its possible application to the process of data assimilation. Subjects were required to locate a single geometrical figure added to a 64-cell square matrix already containing 16 or 32 geometrical figures as confusion figures or clutter. To aid in location, the space in which the figure appeared was heavily outlined; this areal cuing was varied by enclosing different amounts of the matrix. Subjects were allowed to observe the outlined area 1) both before and after or 2) only after stimulus presentation. Frequencies of correct locations were analyzed to determine if perceptual error existed and if areal cuing increased location accuracy.
T. I. R 1

3968
Long, E.R., Henneman, R.H. & Reid, L.S. THEORETICAL CONSIDERATIONS AND EXPLORATORY INVESTIGATION OF "SET" AS RESPONSE RESTRICTION. Contract W33(038) AC 21269, WADC TR 53 311, Dec. 1953, 24pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Virginia, Charlottesville, Va.).

3968
This report is the first of a series relating to laboratory experiments designed to examine the nature of perceptual "set" and its application to human operator efficiency in the communication process. An analysis of message reception in the communication process lead to statements of the assumptions for a theoretical model of set and predictions derived from the model. An initial exploratory experiment was described which entailed the manipulation of three variables in a complex perceptual task requiring the Ss to locate and identify single distorted geometrical figures that had been added to a 64-cell square matrix already containing 16 other figures as "clutter." The variables were: 1) type of setting limitation, 2) degree of setting, and 3) type of response.
T. I. R 5

3970
O'Brien, B. & Miller, Norma D. A STUDY OF THE MECHANISM OF VISUAL ACUITY IN THE CENTRAL RETINA. Contract W33(038) AC 18317, WADC TR 53 198, May 1953, 54pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3970
A series of investigations were reported on the physics and physiology of vision involving a resolution of fine detail. In each study a method was found that yielded results so clear cut that no statistical analysis of the data was required. Measurements of transverse sections of human retinas yielded precise cone spacing data from center to edge of fovea. Measurements with an electric wave model confirmed the mechanism concentrating and isolating light by each cone. These histological data were correlated with measured acuity to show effects of cone spacing. A new ballistic flash technique was used to measure cone thresholds, eye movements, and double star acuity. Accuracy of fixation was demonstrated by a new technique. Resolving power of the retina was finally studied. T. G. I. R 19

3983
Spragg, S.D.S. & Mulfeck, J.W. VISUAL PERFORMANCE AS A FUNCTION OF THE BRIGHTNESS OF AN IMMEDIATELY PRECEDING VISUAL TASK. Contract W33(038) AC 18317, WADC TR 52 285, Dec. 1953, 16pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Rochester, Rochester, N.Y.).

3983
As part of a project on human factors in aircraft instrument lighting, this study was undertaken to determine how visual performance at low photopic brightness levels is affected by the brightness of an immediately preceding visual task. Two visual tasks were used: reading banks of instrument dials and reading banks of Landolt rings. The first task used a viewing distance of 28 inches and three brightnesses (2.9, 0.083, and 0.005 ft.-L); the second task had a viewing distance of 18 feet (periscopic viewing) and five brightnesses (6.0, 0.076, 0.01, 0.007, and 0.0035 ft.-L). The two tasks were performed successively but in different order by two separate groups of Ss. Time and accuracy scores were analyzed.
T. G. I. R 10

3984
Jenkins, W.L. & Karr, A.C. THE USE OF A JOY STICK IN MAKING SETTINGS ON A SIMULATED SCOPE FACE. Contract AF 18(600) 24, WADC TR 53 430, March 1954, 7pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Lehigh University, Bethlehem, Penn.).

3984
To determine the significance of certain variables in the use of a joystick to make settings in two dimensions on a simulated scope face, a series of experiments were conducted using apparatus where the movement of the joystick was translated directly into displacement of the cursor in approximately a linear fashion. Variables were: 1) length of joystick (12, 18, 24, and 30 inches); 2) ratio between joystick tip and movement of cursor (2, 2.5, and 3); 3) reversed operation (cursor moving down when stick is pushed away from operator); and 4) position of S's switch (in hand not operating joystick, pushbutton in top of switch, and foot pedal). Setting time, variability of settings, and missettings were analyzed for effect of variables on accuracy of settings.
T. I. R 1

3986
Cole, E.L., Milton, J.L. & McIntosh, B.B. ROUTINE MANEUVERS UNDER DAY AND NIGHT CONDITIONS, USING AN EXPERIMENTAL PANEL ARRANGEMENT. THE NINTH OF A SERIES OF REPORTS ON EYE FIXATIONS OF AIRCRAFT PILOTS. WADC TR 53 220, March 1954, 50pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3986
This is the ninth report in a series of investigations of eye movements of pilots during instrument flight. The frequency, duration, and sequences of eye movements made by 15 pilots when flying day and night maneuvers with a new panel arrangement were summarized and compared. Also, for comparison of standard and experimental panel arrangements, data previously obtained using the standard air force panel during routine maneuvers under day conditions were included. The data were analyzed in terms of the most frequently used instruments, differences between day and night flights, and differences between panels. Efficient panel arrangement was discussed.
T. G. I. R 9

3987
Gardner, J.F. & Lacey, R.J. AN EXPERIMENTAL COMPARISON OF FIVE DIFFERENT ATTITUDE INDICATORS. WADC TR 54 32, May 1954, 20pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3987

To compare two principles of aircraft attitude indication (earth reference with moving element representing horizon and airplane reference with moving element representing the aircraft), simulated indicators were "flown" in a Link Trainer by experienced pilots and by college students with no flight experience. Four indicators were used representing the two principles defined above and a fifth one provided a "stabilized sphere" type of presentation. Records of pilot performance for a variety of flight maneuvers, control reversals following rough air gusts, and pilot preferences were recorded and analyzed.
T. I. R 7

3989

Adler, H.E., Kuhns, Margaret P. & Brown, J.L. MASKING OF CATHODE RAY TUBE DISPLAYS BY AMBIENT ILLUMINATION. Contract AF 33(038) 22616, WADC TR 53 266, Nov. 1953, 20pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Columbia University, New York, N.Y.).

3989

To define the character of the relation between the luminance of a signal on a cathode ray scope and the approximate minimum ambient luminance which is effective in masking the signal, masking thresholds of ambient illumination were determined for a steady horizontal trace line displayed on a cathode ray oscilloscope. Ambient illumination was presented as a veiling luminance and also combined with three levels of direct illumination reflected from the tube face. Seven trace luminances were investigated at each of two trace widths, one and two mm. Implications for tolerable ambient illumination for radar operator workplaces are discussed.
T. G. I. R 16

3990

Deese, J. & Ormond, Elizabeth. STUDIES OF DETECTABILITY DURING CONTINUOUS VISUAL SEARCH. Contract AF 33(038) 22642, WADC TR 53 8, Sept. 1953, 48pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

3990

This report describes a series of experiments concerned with the problem of fluctuations in the detectability of weak signals during prolonged visual search. The task was a search for isolated targets that appeared from time to time on a single sweep of a PPI-type crt. These targets were brighter than the background noise, well above the differential threshold; and they were varied in time and location. Variables studied were rate of target appearance, intertarget time interval, spatial distribution, length of search period, and observer's knowledge of length of period.
T. G. R 12

3993

Fry, G.A. & Ihrig, N. EFFECT OF FLASHES OF LIGHT THROUGH THE CLOSED EYELID. PART I. PRESERVATION OF DARK ADAPTATION DURING A FLASH BY CLOSING THE EYELIDS. Contract AF 33(038) 15630, WADC TR 53 159, Part I, March 1953, 35pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Ohio State University Research Foundation, Columbus, Ohio).

3993

The major objective of this study was to investigate means of protecting one of the eyes during a short flash of light in order to preserve its dark adaptation. The second eye was used for critical seeing during the flash and the protected eye took over after the flash. The effect of a typical flash (125 ft.-c for a three-second period) upon dark adaptation of the passively closed eyes was measured by tracing the recovery of the ability to see. An afterimage method was devised for measuring retinal illuminance produced by light incident on the closed eyelid and was used to make a comparison of protection provided by closing the eyelid passively and tightly.
T. G. I.

3997

Archer, E.J., Wyckoff, L.B. & Brown, F.G. TRACKING PERFORMANCE AS MEASURED BY TIME CONTINUOUSLY ON TARGET. Contract AF 18(600) 54, WADC TR 54 210, March 1954, 15pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Wisconsin, Madison, Wisc.).

3997

The rationale and possible utility of using frequency and duration of "hits" for scoring human tracking performance was presented. Subjects practiced over a period of five days at one of two target speeds on the Mast Pedestal Sight Manipulation Test. Records of time-continuously-on-target frequency distributions were obtained for different stages of practice and on tasks of different difficulty. The type of shift in the distribution was examined as affected by practice and target speed. The usefulness of this scoring technique for evaluating the design of gunnery equipment was discussed.
T. G.

3998

Nystrom, C.O. & Grant, D.A. PERFORMANCE ON A KEY PRESSING TASK AS A FUNCTION OF THE ANGULAR CORRESPONDENCE BETWEEN STIMULUS AND RESPONSE ELEMENTS. Contract AF 18(600) 54, WADC TR 54 71, Jan. 1954, 16pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Wisconsin, Madison, Wisc.).

3998

To investigate the effect of angular noncorrespondence between indicators and controls, Ss were required to press keys to match a two- or four-light pattern appearing on a display panel. The panel contained eight red lights arranged in a row; the row could be placed in any one of five angular orientations (0 degrees, 45 degrees, 90 degrees, 135 degrees, and 185 degrees counter-clockwise). The fingerboard contained eight controls likewise arranged in a row but remained in a fixed horizontal position. Five groups of 18 Ss were run; each group received only one of the angular orientation conditions. Time to "match" the patterns of stimulus lights was analyzed for the effect of the various conditions.
T. G. R 6

3999

Anderson, N.H., Grant, D.A. & Nystrom, C.O. PERFORMANCE ON A REPETITIVE KEY PRESSING TASK AS A FUNCTION OF THE SPATIAL POSITIONING OF THE STIMULUS AND RESPONSE COMPONENTS. Contract AF18(600) 54, WADC TR 54 76, March 1954, 15pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Wisconsin, Madison, Wisc.).

3999

To determine the relative efficiencies of a number of spatial positionings of a stimulus panel and a response keyboard used in a repetitive key-pressing task, nine arrangements were used. The panel and the keyboard occupied independently positions that were to the left, right, or in front of the operator. Two modes of stimulus presentation were employed: self-pacing and automatic pacing. Response time and number of key presses were measured; latencies were also measured in the automatic paced procedure.
T. G. I. R 6

4000

Williams, R.L. (Proj. Dir.). EXPERIMENTS IN THE DESIGN OF THE FOUR BASIC TYPES OF MAP SYMBOLS. Contract NONR 609(03), Proj. NR 088 006, Jan. 1954, 3pp. Cartographic Lab., Yale University, New Haven, Conn.

4000

This yearly progress report outlines the general and specific objectives of experiments in four basic types of map symbols--spot, line, over-all pattern, and word. The work completed to date is summarized.

4003
Massachusetts Institute of Technology. NOTES FROM MIT SUMMER COURSE ON OPERATIONS RESEARCH. JUNE 16-JULY 3, 1953. 176pp. Massachusetts Institute of Technology, Cambridge, Mass.

4003
This is a set of notes taken during lectures of the Massachusetts Institute of Technology's summer course in Operations Research in 1953. Operations research is defined as an activity by which trained advice can be given to management on quantitative matters that can be handled scientifically. The various lectures include the following topics: probability--fundamental concepts, distributions, ordered statistics, and mathematical models; time series; waiting lines; Monte Carlo applications; linear programming; operational experiments; transport, railroads; applications to stock market prediction--a business problem and a bus problem; review, differential equation approach, and game theory.
T. G. I. R 70 (approx.)

4005
Comfort, Elizabeth & Gillespie, K.W. RESPIRATORY RESPONSE TO OXYGEN BREATHING WITH A FULL-HEAD OXYGEN MASK. WADC TR 53 130, April 1953, 13pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

4005
An investigation was conducted to determine the extent to which dead space affects use and operation of full-head oxygen masks. Quantitative measurements of gas flow into the mask (k-1 helmet) during a single breathing cycle at various levels of mask pressure were compared with similar data recorded at a level of mask pressure considered by the S to represent optimum breathing comfort. Probable concentration of carbon dioxide in inspired air during breathing was estimated by applying results of Haldane analyses of gas samples of mask air to data resulting from analyses of oscillographic tracings of breathing patterns. Ten Ss were studied. Physiological and subjective acceptability of this type of mask were discussed.
G. I. R 4

4006
Barger, D.M. & Roush, R.G. A VELOCITY MODULATED RASTER DISPLAY FOR BRIGHTNESS DISCRIMINATION STUDIES. Contract AF 33(038) 22642, WADC TR 53 249, Aug. 1953, 6pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Johns Hopkins University, Baltimore, Md.).

4006
A research instrument for the study of human brightness discrimination is described. Two standard and one modified oscilloscopes are used to produce a rectangular light field consisting of a raster of vertical sweep lines on a cathode ray tube face. Independent control of the brightness of each vertical sweep line in the raster permits study of observer ability in detecting differences in brightness in the light field as a function of brightness differences between adjacent homogeneous fields, the relative size of adjacent fields, and the brightness contour or gradient which exists between two fields homogeneous in brightness. Block and schematic diagrams are included.
I.

4007
Soloyanis, G. & Corso, J.F. THE EFFECTS OF SOUND ON AUTOKINETIC MOVEMENT. Contract AF 33(038) 786, WADC TR 53 447, June 1953, 17pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Pennsylvania State College, State College, Penn.).

4007
To determine the effects of monaural and binaural pure tone stimulation (1000 cps) on the total magnitude and horizontal directional displacement of autokinetic movement, 21 subjects were tested. Eight experimental conditions (six of differential auditory stimulation, two of equal binaural stimulation) and three control conditions (pretest, within test, post test) were used with a total of 4620 judgments made in all. The data were analyzed through rank order and analysis of variance techniques for effects of auditory stimulation on the visual illusion of apparent movement. In addition, the effects of repeated light exposures (visual satiation) on magnitude of apparent movement were determined.
T. G. R 18

4008
Brown, R.H. & Baldwin, A.W. APPARATUS FOR RESEARCH ON THE DISCRIMINATION OF VELOCITY. RDB Proj. NR 513 050, NRL Rep. 4283, Dec. 1953, 6pp. USN Research Lab., Washington, D.C.

4008
This report describes an apparatus for research on the discrimination of velocity. A target moving at controlled velocity (direction and speed) is provided. It is also possible to vary independently the brightness of the test spot and the interval of time during which it is seen. Experimental arrangements, the optical system, control of exposure time and stimulus movement, and calibration data are given. The above equipment was developed to be used in a program of basic research in tracking, specifically in the study of the visual processes used by the tracker in predicting the motion of a target.
T. I. R 4

4009
Mast, G.M. RADAR TARGET FOLDER VIEWER. FINAL REPORT. Contract AF 33(600) 15271, July 1953, 15pp. Mast Development Company, Inc., Davenport, Iowa.

4009
A means for presenting to the navigator of a bomber the data from the radar target folder (marked paper prints of real or synthetic radar returns from the target approach and target area) in close proximity to his radar screen is described. The Radar Target Folder Viewer presents comparison radar target pictures from a 35 mm film strip in a manner that provides for minimum visual readaptation and permits convenient comparison of scope returns.
I.

4010
Lightfoot, C., Carhart, R. & Gaeth, J.H. EFFICIENCY OF IMPAIRED EARS IN NOISE. A. THRESHOLDS FOR PURE TONES AND FOR SPEECH. Contract AF 33(038) 22645, Proj. 21 1203 0001, Rep. 4, Sept. 1953, 18pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Northwestern University, Evanston, Ill.).

4010
To determine the influence of noise on the auditory efficiency of persons with impaired hearing, an audiometric study was made of the effects of thermal noise on the monaural air-conduction thresholds of 31 subjects of normal hearing and of 76 persons with various types and degrees of hearing loss. Pure-tone thresholds and speech (spondaic words) thresholds were obtained for quiet conditions and for noise conditions. Over-all noise levels for the controls and for 36 of the hard-of-hearing were 60 and 80 decibels, and for the remaining 40 subjects the levels were 80 and 95 decibels. Results were analyzed in terms of comparisons between the two groups and also against the background of knowledge regarding masking in the normal ear.
T. G. R 12

4012
Pepler, R.D. THE EFFECT OF CLIMATIC FACTORS ON THE PERFORMANCE OF SKILLED TASKS BY YOUNG EUROPEAN MEN LIVING IN THE TROPICS. A REPORT ON THE FIRST TWO YEARS' PSYCHOLOGICAL EXPERIMENTS AT SINGAPORE. R.N.P. 53/765, C.E.S. 394, T.R.U. 22/51, Feb. 1953, 8pp. Climatic Efficiency Subcommittee, RNPRC, London, England. (Royal Naval Tropical Research Unit, University of Malaya, Singapore).

4012
The purpose of the work described here is primarily to validate, by experiment on men living in the tropics, the findings from a series of experiments carried out in England using a number of skilled tasks performed in warm and humid indoor climates. The subjects in England had been given short daily exposures to the hot climates for several weeks prior to the experiments. Two experiments on pointer alignment, one on Morse Code reception, and two on visual vigilance are described briefly together with the main findings. The extent to which they agree with findings from the experiments in England is discussed. The relative humidity of the climates, level of skill and of motivation of subjects, and task difficulty are identified as qualifying conditions.
R 10

4014
McMahan, C.A., Folger, J. & Fotis, S.W. GRADUATES OF THE AIR CORPS TACTICAL SCHOOL, 1921-1940. A DEMOGRAPHIC ANALYSIS OF THE POPULATION OF GRADUATES AND AN INQUIRY INTO THE RELATIONSHIP BETWEEN ACADEMIC PERFORMANCE AND CAREER DEVELOPMENT. Tech. Res. Rep. 15, April 1953, 57pp. USAF Human Resources Research Institute, Maxwell AFB, Ala.

4014
This is a study of the members of the classes which graduated annually from the Air Corps Tactical School throughout the 20-year period from 1921 to 1940. The data used were those readily obtainable from official military sources; the principal sources were the Official Army Register and the Official School Board Proceedings. It consists of a description and an analysis--a description of the population at time of graduation and as of December 1947 with respect to age, rank, educational background, rating, corps, and other characteristics; and an analysis of the factors relating to academic performance at the ATCS as well as the relationship between academic performance at the school and later career development. Strengths and weaknesses of the study are discussed. T. G.

4016
Williams, S.B. (Proj. Dir.). OPERATOR EFFICIENCY AS A FUNCTION OF SCOPE SIZE. Contract AF 30(602) 578, Prog. Rep. 1, Sept. 1953, 5pp. Dept. of Psychology, College of William and Mary, Williamsburg, Va.

4016
This first progress report of research on radar operator efficiency as a function of scope size describes the apparatus (a simulated radar scope) that has been designed. The theory and design of the experiment are discussed.

4017
King-Ellison, Patricia & Jenkins, J.J. THE ROLE OF LANGUAGE IN BEHAVIOR. VISUAL DURATION THRESHOLD AS A FUNCTION OF WORD FREQUENCY. A REPLICATION. Contract N8ONR 66216, Tech. Rep. 6, ca. 1952, 7pp. University of Minnesota, Minneapolis, Minn.

4017
To examine the relationship between perception time and word frequency, ten experimental words (five-letter "paralogs") were selected. A pack of 100 cards, each bearing one word, was made up for each of 15 Ss. In each pack two of the words appeared 25 times; two appeared ten times; two appeared five times; two appeared twice; and two appeared once. Dummy cards (14) were added. Each S was told that the words were Turkish words and was required to spell and pronounce the words on each card in the deck. After 20 minutes of unrelated reading, the ten words were exposed tachistoscopically, beginning with 30 msec. and increasing with successive exposures, until correct identifications were made. Mean exposure time at recognition was analyzed in relation to frequency of appearance in the pack. T. G. R 9

4020
Corso, J.F. THE EFFECTS OF NOISE ON HUMAN BEHAVIOR. Contract AF 33(038) 786, WADC TR 53 81, Dec. 1952, 65pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Pennsylvania State College, State College, Penn.).

4020
This report is a comprehensive summary of a program of research on the effects of high intensity noise on human behavior. Six major studies were conducted and are reviewed. The following information is provided for each: abstract, purpose, procedure, results and conclusions, and a summary statement. The various studies are: 1) intermittent loud noise and mental performance, 2) individual differences under the stress of high intensity noise, 3) personality characteristics under stress of high intensity noise, 4) interference effects on retention of learned material, 5) effects on certain psychological variables and 6) interference effects on retention.
T. G. I. R 72

4021
Richards, D.L. & Shearme, J.N. MEASUREMENT OF ELECTRICAL SPEECH LEVEL: SUMMARY OF RELATIONSHIPS BETWEEN MEASUREMENTS USING DIFFERENT METHODS. Res. Rep. 13676, Nov. 1952, 9pp. Post Office Engineering Dept., Research Station, Dollis Hill, London, England.

4021
The indication of a speech voltmeter is influenced by the mechanical and electrical characteristics of the meter; however, simple relations exist between the readings of most voltmeters. Data are assembled from nine studies which enable the calculation of the relation between the readings of most speech voltmeters of known characteristics. In addition, the readings can be referred to a quantity independent of a particular meter--the percentage of time during which the instantaneous power of a speech signal does not exceed the meter reading. Some data on readings taken on logatoms are included although the above relations do not hold in these cases.
T. G. R 9

4022
Richards, D.L. & Shearme, J.N. SOME MEASUREMENTS OF THE POWER DISTRIBUTION OF SPEECH SIGNALS. Res. Rep. 13677, May 1953, 8pp. Post Office Research Station, London, England.

4022
In the course of various investigations, measurements have been made of the distribution in time of the instantaneous power of several types of speech signal. The results of these measurements are collected in this report for reference. They include measurements on commercial quality and high quality speed signals and on logatom signals. In addition to the instantaneous power distributions, some data are given on the distribution of mean power averaged over a given period.
T. G.

4026
Daniels, F., Jr., Vanderbie, J.H. & Bommarito, C.L. ENERGY COST OF CARRYING THREE LOAD DISTRIBUTIONS ON A TREADMILL. Rep. 203, March 1953, 24pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

4026
The energy cost of carrying loads of 27 to 78 lbs. on a horizontal, motor-driven treadmill at 3.5 mph (93.87 meters a minute) was determined for six test Ss. The loads were distributed in three positions: high on a packboard, low on a packboard, and around the waist as "saddle bags." Empirical formulae were developed from the data for predicting total energy output for carrying loads up to 80 lbs. in these three positions. The meaning of these formulae in terms of body mechanics is not known. Method of carrying loads was also evaluated in terms of subjective preferences of the Ss. The rationale for basic studies in load carrying was discussed at some length.
T. G. I. R 21

4029
Evans, R.N. & Smith, L.J. A STUDY OF PERFORMANCE MEASURES OF TROUBLE SHOOTING ABILITY ON ELECTRONIC EQUIPMENT. Contract N6ORI 07142, Proj. NR 153 124, Oct. 1953, 138pp. College of Education, University of Illinois, Urbana, Ill.

4029
To learn more about technician effectiveness, research was conducted to develop and study suitable performance test measures for use with electronic technicians. The administration of performance tests for electronic technicians was also investigated. A criterion measure of trouble-shooting was obtained through administration of individual trouble-shooting performance tests to 57 subjects using the SG-1b surface search radar. Each subject also was administered a battery of reference tests and a paper form of a trouble-shooting test, the "Tab Test." Data on inter-observer reliability, inter-scorer reliability, internal consistency reliability, face validity, and test acceptability were reported.
T. I. R 1

4035
Kendler, H.H. EXPERIMENTAL ANALYSIS OF PROBLEM-SOLVING BEHAVIOR. Contract NONR 187(00), Proj. NR 150 064, Tech. Rep. I, Nov. 1953, 38pp. Dept. of Psychology, University College of Arts & Sciences, New York University, New York, N.Y.

4035
A research program, exploratory in nature, dealing with factors influencing problem-solving behavior is described. Basic to all the experiments is an attempt to extend conditioning theory to problem-solving behavior. The results of the experiments are presented in five chapters, four of which report the studies of a particular problem area--tests of the extinction hypothesis, verbal factors in concept formation, the acquisition of flexibility in problem-solving situations, and frequency of reinforcement in concept formation behavior. The fifth chapter presents the general rationale of the researach program.
T. R 20

4037
Bridges, D.B.J., Davis, J.E., Holmes, D.W., McMaster, R.C., et al. ELEMENTS OF A MECHANIZED SUPPLY INFORMATION FLOW SYSTEM. Contract AF 33(616) 2183, EO R 468 3 SR 12, WADC TR 53 504, Dec. 1953, 66pp. USAF Aeronautical Research Lab., Wright-Patterson AFB, Ohio. (Battelle Memorial Institute, Columbus, Ohio).

4037
A description of the flow of information between the user of materiel and Base Supply is given for a typical Air Force base. The issue cycle for expedited and routine requisitions is covered. A preliminary functional description is given of the Materiel Information Flow Device to be applied to the information-flow problem. The description is based on the logical design as of November 15, 1953. An introduction to digital computer practice is appended.
T. I.

4039
Hall, F.G. THE ROLE OF CARBON DIOXIDE IN ALTITUDE TOLERANCE. Contract W33 038 AC 14101, WADC TR 53 57, March 1953, 30pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Duke University, Durham, N.C.).

4039
Four studies are reported on the role that carbon dioxide (CO_2) plays in human Ss at altitude. 1) The relative influence of hypoxic and CO_2 stimuli upon pulmonary ventilation in the peracute hypoxic state was determined using ten Ss at simulated altitudes of 25,000 ft. 2) The effect of adding CO_2 to inspired air on the duration of useful consciousness at 30,000 and 35,000 ft. simulated altitudes was studied on nine Ss. 3) CO_2 and respiratory regulation were studied on 14 Ss at simulated altitude of 22,000 ft. breathing gas mixtures with varying concentrations of CO_2. 4) The effect of adding CO_2 to inspired air on the elimination of nitrogen was made on seven Ss exposed to simulated altitude of 20,000 ft.
T. G. R 20

4042
Tiffin, J. (Proj. Dir.). THE DEVELOPMENT AND EVALUATION OF A METHODOLOGY FOR ESTABLISHING VISUAL REQUIREMENTS FOR NAVAL PERSONNEL. FINAL REPORT. Contract N7ONR 39423, Proj. NR 152 129, Tech. Bull. 53 7, Oct. 1953, 158pp. Purdue Research Foundation, Purdue University, Lafayette, Ind.

4042
A methodology was developed that provides a feasible means of establishing visual requirements for battle station assignments. The methodology consisted of determining the relationship between performance of Ss on a job-sample test and various levels of artificially induced vision. To evaluate the method, a job-sample test was constructed and the relationship between performance and near visual acuity was determined by rather complex statistical procedures and also by simple graphical procedures. The results were discussed in terms of the manner in which the necessary data can be gathered and analyzed in the practical situation.
T. G. R 33

4048
Nachman, M. THE INFLUENCE OF SIZE AND SHAPE ON THE VISUAL THRESHOLD OF THE DETECTABILITY OF TARGETS. Contract AF 33(616) 432, Tech. Note 109, Dec. 1953, 53pp. Optical Research Lab., Boston University, Boston, Mass.

4048
To test predictions made from a theory proposed by Lamar, Hecht, Shlaer, and Hendley that the contrast ($\Delta I/I$) required to detect a rectangular target was a positive function of the area within 1.5 minutes from the edge (defined as the useful area) of the target, two experiments were conducted. Differential thresholds of detectability were obtained for a series of 24 rectangles which varied in area, useful area, and perimeter. The second study also obtained differential thresholds of detectability for a series of seven stimuli composed of pairs of rectangles. Threshold data were analyzed as functions of area, perimeter, useful area, and separation distance between rectangles.
T. G. I. R 7

4050
Courtney, D. (Proj. Dir.). PSYCHOLOGY AND GROUND SAFETY. Contract AF 18(600) 301, HFORL Rep. 43, Aug. 1953, 146pp. USAF Human Factors Operations Research Labs., Bolling AFB Washington, D.C. (Institute for Research in Human Relations, Philadelphia, Penn.).

4050
This report presents an analysis of the Ground Safety Director's job together with pertinent psychological literature. Based upon library research and field visits to representative Air Force bases, the functions and areas of knowledge important in the work of the Ground Safety Director are outlined. These areas are then reorganized into six topics for intensive treatment (the results of which are presented in this report): psychological factors in accident causation, safety promotion procedures, principles of driver training, principles and procedures of driver evaluation, practical principles of effective interviewing, and human relations and safety.
R 565

4063
Tanner, W.P., Jr. & Swets, J.A. A NEW THEORY OF VISUAL DETECTION. Contract DA 36 039 SC 15358, DA Proj. 3 99 04 042 & Signal Corps Proj. 29 194B 0 & Proj. M970, Task EDG 3, Tech. Rep. 18, Sept. 1953, 33pp. Engineering Research Institute, University of Michigan, Ann Arbor, Mich.

4063
A new theory of visual detection is presented. The theory is based on the theory of signal detection of Peterson and Birdsall, who consider the problem as that of evaluating statistical hypotheses. Predictions based on the theory are compared with predictions based on conventional psychophysical theory. Some experimental data are reported.
T. G. I. R 3

4076
Brown, R.H. THE VISUAL DISCRIMINATION OF VELOCITY AS A FUNCTION OF STIMULUS DURATION AND LUMINANCE. Proj. NR 554 010, NRL Prob. Y04 01, NRL Rep. 4372, May 1954, 10pp. USN Research Lab., Washington, D.C.

4076
As one of a series of studies conducted to determine how man discriminates velocity and acceleration, four observers discriminated velocity at eight speeds for each of eight exposure times. The observer presented with a spot travelling at a controlled speed was required to give an unequivocal response to the visual movement--direction of travel. The minimal luminance required for the discrimination was determined for each condition. Threshold data were analyzed for sources of variation: duration of stimulus, rate of stimulus, and observer effects. The significance of the findings for understanding the visual processes of a tracker in predicting motion of a target was discussed.
T. G. R 14

4080
Hofstetter, H.W. OPTOMETRIC CONTRIBUTIONS IN ACCOMMODATION AND CONVERGENCE STUDIES. J. Amer. Optom. Ass., March 1954, 25(8), 431-439. (Div. of Optometry, Indiana University, Bloomington, Ind.).

4080
This paper considers the accommodation-convergence relationship as a product of cooperative optometric study and research by men in various fields. Graphical presentation of established facts and relationships are used to show working units for each function and their relationship, accepted zones within which clear and single binocular vision can be presented by all possible combinations of accommodation and convergence, various methods for establishing the limits of clear binocular vision clinically, and some actual cases. The relationship between visual training and accommodation-convergence is discussed.
G.

4094
Ward, H.O. EFFECT OF CHROMATIC ADAPTATION UPON NORMAL COLOR VISION. FINAL REPORT, PHASE I. Contract NONR 1066(00), Proj. NR 140 061, March 1954, 41pp. Ohio State University Research Foundation, Columbus, Ohio.

4094
An apparatus for investigating chromatic adaptation is described. It consists of a monochromator for presenting adapting stimuli to the left eye of the observer, a colorimeter for presenting monochromatic test stimuli to the same eye while permitting measurement of chromaticity and brightness matches by means of a tristimulus match with monochromatic components presented to the right eye. The test procedures are given in detail and procedures used in calibrating the wavelength and luminance controls are described. The various stimulus components are comprised of narrow bands of the spectrum. Luminance controls are explained.
G. I. R 6

4118
USN Air Test Center. INSTALLATION AND EVALUATION OF THE NAVY COMPOSITE APPROACH LIGHTING SYSTEM. Proj. TED PTR AE 10007.1, ET311 461, Rep. 1, Dec. 1953, 13pp. Electronic Test Div., USN Air Test Center, Naval Air Station, Md.

4118
To evaluate the Navy Composite Approach Lighting System, the System was installed at Naval Air Station, Patuxent River, Maryland. This System combines the best features of various approach systems previously evaluated. Eleven scheduled flights (each included at least three passes at the lights) were made on the System in various types of airplanes during both visual and instrument weather. Pilots completed questionnaires after each flight. Recommendations are included.
I. R, 4

4120
Aeronautical Research Council. THE BIOLOGY OF FLYING, REPORT OF A SYMPOSIUM HELD AT THE BRITISH ASSOCIATION MEETING IN BELFAST, SEPTEMBER, 1952. EP 240, May 1953, 15pp. Engineering Physics Sub-Committee, Aeronautical Research Council, London, England.

4120
A report of a symposium on the biology of flying is presented. Dr. K.G. Bergin, Medical Superintendent, BOAC, London Airport, dealt with some of the physiological and biological problems met with in civil air transport. Group Captain W.K. Stewart, of the Royal Air Force Institute of Aviation Medicine, considered the physiological problems of high performance military aircraft. Dr. W.E. Hicks, of Cambridge University spoke on skill and the airman, and Mr. G.A. Rendel, of the Royal Aircraft Establishment, Farnborough, discussed the engineering problems of conditioning aircraft for human occupation and control. Each talk is reported at some length.

4126
McIntosh, B.B. THE INFORMATION-HANDLING CAPACITY OF THE HUMAN AS A FUNCTION OF CERTAIN CHARACTERISTICS OF THE STIMULUS SET. M.A. Thesis, 1953, 37pp. Ohio State University, Columbus, Ohio.

4126
To study the effects of patterns formed by stimulus lights and the probabilities of occurrence of various lights on the human's information handling capacity, seven stimulus sets were used which varied in 1) number of stimuli on panel, 2) spatial relations between these stimuli, and 3) frequency of occurrence of each stimulus within the set. The stimuli were presented randomly at a prescribed rate for each of the stimulus sets and the two Ss responded by pressing one of the matched response keys. The results were analyzed in terms of frequency and type of response to each of the stimuli, the number of no responses, and the amount of information transfer per second from each stimulus set.
T. G. I. R 8

4127
Bridgman, C.S. & Wade, E.A. SENSITIVITY TO CHANGES IN STIMULUS SIZE. REACTION TIME AS A FUNCTION OF RATE OF CHANGE. Contract AF 18(600) 54, WADC TR 53 199, April 1953, 10pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Wisconsin, Madison, Wisc. & Tufts University, Medford, Mass.).

4127
To determine the relation between rate of stimulus size change and reaction time, ten subjects were required to respond to size changes in a circular target by pushing a lever forward when the target decreased and pulling it back when an increase was observed. The initial target size was 42 millimeters subtending an angle of one-half degree at observer's eye; rates of change in target diameter ranged from six to one millimeter per second, corresponding to angular rates of 4.2, 3.5, 2.8, 2.1, 1.4, and 0.7 minutes of arc per second. Reaction times were analyzed as a function of rate of target size change. The results are discussed with reference to their use as a "third dimension" (range) on a visual indicator such as a radar scope.
T. G. I. R 2

4133
Ferguson, H. INVESTIGATION OF THE ACCELERATION AND JOLT HISTORIES DURING ESCAPE FROM HIGH SPEED AIRCRAFT. WADC TR 52 278, Suppl. 1, Sept. 1953, 24pp. USAF Aeronautical Research Lab., Wright-Patterson AFB, Ohio.

4133
In an earlier report upper bound acceleration-time curves are exhibited showing upper bounds to the magnitudes of accelerations that may occur after a given time, t, of escape from an aircraft. These curves depend only on escape speed and a minimum altitude for the first half sec. and only on escape speed thereafter. This report presents the result found by replacing the previously assumed constant drag coefficient by a uniform-one-step drag coefficient to account for the sharp drag coefficient change expected as the escape unit passes through mach speed one. In this report the algebraic sign of the acceleration is not suppressed at the end and hence it will refer to lower bounds of negative accelerations rather than upper bounds.

4136
Elkind, J.I. TRACKING RESPONSE CHARACTERISTICS OF THE HUMAN OPERATOR. Contract AF 18(600) 322, HFORL Memo. 40, PRP 2, Sept. 1953, 13pp. USAF Human Factors Operations Research Labs., Bolling AFB, Washington, D.C.

4136
Mathematical relations are developed for use in determining and expressing the system characteristics of the human operator when he is tracking a randomly moving target. An experimental tracking problem is described and experimentally determined system characteristics are presented. Effects upon the system characteristics of varying the width of the stimulus power spectrum are shown.
T. G. I. R 15

4139
Tucker, L.R. A RATIONAL CURVE RELATING LENGTH OF REST PERIOD AND LENGTH OF SUBSEQUENT WORK PERIOD FOR AN ERGOGRAPHIC EXPERIMENT. Contract N6ONR 270 20, Proj. NR 150 088, March 1954, 19pp. Princeton University, Princeton, N.J.

4139
A rational function was developed relating the length of a rest period and length of subsequent work period in an ergographic experiment. Simple energy relations were postulated and used for a critical organ or neuromuscular structure whose performance failure would terminate the work period. Three subjects used a finger ergograph with a block limiting the excursion of the finger tip. The rate of finger contractions was one per second; failure to make a complete stroke ended each work period. Each of the selected rest periods was used once at each session. Mean length of work periods following each length of rest period was determined for each S.
T. G. R 3

4141
Balke, B. GAS EXCHANGE AND CARDIOVASCULAR FUNCTIONS AT REST AND IN EXERCISE UNDER THE EFFECTS OF EXTRINSIC AND INTRINSIC FATIGUE FACTORS. B. THE INFLUENCE OF PHYSICAL FATIGUE UPON WORK CAPACITY. Proj. 21 1201 0014, Rep. 2, Feb. 1954, 17pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4141
To investigate the influence of physical fatigue upon physical performance, optimal work capacity was determined during exercise on the treadmill. Heart rate, blood pressure, and respiratory gas exchange in response to gradually increasing work were used as criteria of performance. Physical fatigue of various degrees was induced by steady state work on the treadmill over a given time period at different work load levels. After a resting period, work capacity was tested again.
T. G. R 8

4142
McCleary, R.A. & Johnson, R.H. PSYCHOPHYSIOLOGICAL EFFECTS OF COLD: II. THE ROLE OF ALCOHOL INGESTION AND COMPLEXION IN MANUAL PERFORMANCE DECREMENT. Proj. 21 1202 0004, Rep. 2, March 1954, 9pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4142
To evaluate the effect of ingesting a moderate amount of alcohol on subsequent manual performance in the cold and to recheck a previous report concerning the role of complexion differences in cold weather efficiency, 64 Ss were timed on a manual performance test at four different ambient temperatures (0, -10, -20, and -40 degrees F) after ingestion of 60 cc of 40 percent (by volume) alcohol. About half the group were blondes and half brunettes. The data from this experiment were compared with those from a previous experiment in which no alcohol was ingested in terms of working time, warm-up time (stopping to warm hands), and total time. Differences in complexion were evaluated.

4144
Hauty, G.T. & Payne, R.B. METHODS FOR THE MITIGATION OF WORK DECREMENT. Proj. 21 1601 0004, Rep. 4, Dec. 1953, 14pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4144
To determine the relative and joint effects of pharmacological, task simplification, and motivational methods for mitigation of decrement resulting from prolonged work, 168 Ss were given preliminary training on a compensatory pursuit task involving simulated aircraft instruments and controls. They then performed the task for seven hours after having been randomly assigned to the 42 combinations of seven pharmacological conditions, three systems of presenting information concerning performance adequacy, and two differing proximities of goals. The single and joint effects of these conditions were appraised at critical points throughout the work period. At the conclusion, the Ss performed a dissimilar perceptual-motor task for 16 minutes to test transfer effects. T. G. R 12

4145
Chinn, H.I. & Redmond, R.F. EFFECT OF DRUGS ON AIRBORNE PERSONNEL I. PRIMAQUINE AND HYPOXIA TOLERANCE. Proj. 21 1208 0009, Rep. 1, April 1954, 3pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4145
To determine whether the dose of primaquine used in malaria therapy will affect hypoxia tolerance, the following experiment was performed. The time of useful consciousness (T.U.C.) for each S breathing an oxygen-nitrogen mixture was determined. When the S made gross errors on a standard writing test, counting backwards from 1000, he was asked to write his name; the clock was stopped when the writing became illegible. Blood samples were analyzed for hemoglobin and methoglobin. Then 14 Ss received 15 mg of primaquine daily for 14 days. Blood samples were again analyzed for hemoglobin and methoglobin and the T.U.C. was determined. The significance of the findings on aerial transportation of medicated passengers was discussed.
T. R 3

4146a
Taylor, H.L., Henschel, A., Mickelsen, O. & Keys, A. SOME EFFECTS OF ACUTE STARVATION WITH HARD WORK ON BODY WEIGHT, BODY FLUIDS, AND METABOLISM. Contract AF 33(038) 21914, Proj. 21 32 004, Rep. 5, March 1954, 9pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (University of Minnesota, Minneapolis, Minn.).

4146a
Data were reported on body weight and metabolism of healthy young men undergoing starvation with hard work. Experiments are reported in which men starved from 2.5 to 4.5 days while performing work on the motor-driven treadmill in amounts that resulted in a total daily caloric expenditure of 3500 to 4000 calories a day. The effects of acute starvation with and without work were compared by collecting data from the literature on men who had merely starved for five days.
T. G. R 24

4146b
Henschel, A., Taylor, H.L. & Keys, A. PERFORMANCE CAPACITY IN ACUTE STARVATION WITH HARD WORK. Contract AF 33(038) 21914, Proj. 21 32 004, Rep. 6, March 1954, 8pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (University of Minnesota, Minneapolis, Minn.).

4146b
The performance of healthy young men during starvation with hard work was studied under carefully controlled conditions in two experiments. Four men were Ss for a 2.5-day fast and 12 men for a five-day fast. The men walked at 3.5 mph on a ten percent grade (average expenditure of 550 calories per hour) for four hours each day in the shorter fast period and for three hours daily in the longer period. Recovery of performance was studied after four and after five days of refeeding.
T. G. R 14

4147
Hauty, G.T. THE EFFECTS OF DRUGS UPON THE COMPONENTS OF HAND STEADINESS. Proj. 21 1601 0004, Rep. 5, June 1954, 8pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4147
To appraise possible differential effects of analeptic and soporific drugs upon coarse and fine manual tremor, 66 male, basic, airmen volunteers were given practice on an apparatus designed to measure the two components of hand steadiness. The Ss were then assigned randomly to six groups receiving different dosages of analeptic and sedative drugs. An hour following drug administration, three successive measurements of hand steadiness were obtained at hour intervals. The data were treated by analysis of variance techniques to appraise differential effects of the drug treatments on fine tremor and coordinative activities.
T. G. I. R 14

4166
White, C.E. MEMORANDUM ON NOISE MEASUREMENTS. Proj. NM 003 041.34, Memo. Rep. 53 11, July 1953, 11pp. Sound Branch, USN Medical Research Lab., Naval Submarine Base, Conn.

4166
This memorandum was written to answer some primary problems in the measurement of noise and in the interpretation of resultant data. The main areas dealt with were: 1) methods of measuring noise levels encountered in working areas and in audiometric testing spaces; 2) noise limits for these areas; 3) information on the frequency spectrum of noise; and 4) design and/or treatment of audiometric testing areas. A selected list of current publications which could be of assistance in studying and controlling noise conditions was appended.
R 14

4243
Winder, C.L. & Wurtz, K.R. SOME EFFECTS OF INDUCED SUCCESS AND FAILURE ON JUDGMENT BEHAVIOR. Contract NONR 225 (01), Proj. NR 150 087, Tech. Rep. 5, Aug. 1954, 24pp. Dept. of Psychology, Stanford University, Stanford, Calif.

4243
Judgment or decision-making was studied within the general framework of ego-psychology which focusses attention on this aspect of human behavior. The success-failure dimension of the psycho-social situation was manipulated by verbal confirmation of success or failure or by no evaluation being given. Two types of tasks were employed: 1) judgments based on S's experience with no stimulus material immediately present, and 2) judgments based on objective stimulus material. The effects of the variation in the psycho-social situation on judgment behavior was measured by speed, confidence, and stability of choice.
T. R 22

4245
Dean, S.J. THE GENERALITY OF EXPECTANCY LEVEL AS A FUNCTION OF SET. Contract NONR 225 (01), Proj. NR 150 087, Tech. Rep. 7, Aug. 1954, 12pp. Dept. of Psychology, Stanford University, Stanford, Calif.

4245
To investigate differences in the generality of expectancy level on two tasks as a function of differential instructions concerning the nature of the tasks, two groups of college students were given the same two tasks and asked to try to predict their scores prior to each trial. The first task was to write down as many words as possible beginning with eight letters of the alphabet; the second was card sorting. Group I was told that both tasks were intelligence tests, while Group II was told that the first task was an intelligence test and the second was a perceptual-motor speed test. Number of trials, scoring units, and shape of performance curves were identical for both tasks and all Ss received the same set of predetermined scores. Differences between the groups were analyzed. R 23

4254
Wand, Barbara and Mollenkopf, W.G. SELECTION AND CLASSIFICATION TESTS FOR WOMEN. A REVIEW OF THE LITERATURE. Contract NONR 694(00), Tech. Bull. 54 11, June 1954, 64pp. USN Classification & Survey Research Branch, Bureau of Naval Personnel, Washington, D.C. (Educational Testing Service, Princeton, N.J.).

4254

This review of literature examines the appropriateness of using with women the same selection and classification procedures that are used with men in situations where both sexes are selected for the same job. Particular attention is paid to reports of the selection of women for jobs similar to billets in the USN. Two valuable sources of information proved to be USAF reports of selection of personnel for Air Force technical schools and British reports on the selection of women for the Auxiliary Territorial Service during World War II. Most industrial studies are found to be based on one sex. Implications of the findings are discussed.
T. R 194

4255

Grings, W.W., Rigney, J.W., Bond, N.A., Jr. & Summers, S.A. STUDY OF ELECTRONICS TROUBLE SHOOTING SKILL: II. INTERCOMPARISONS OF THE MASTS TEST, A JOB SAMPLE TEST, AND TEN REFERENCE TESTS ADMINISTERED TO FLEET ELECTRONICS TECHNICIANS. Contract NONR 228(02), Proj. NR 153 093, Tech. Rep. 10, Aug. 1953, 34pp. Department of Psychology, University of Southern California, Los Angeles, Calif.

4255

The study reported here is part of a general program investigating the job skills of the naval electronics technician. Based on earlier studies, a job-sample test requiring the repair of standardized equipment was developed, along with a symbolic version of the tasks involved (MASTS test). This report contains a summary of the results of a preliminary study in which the MASTS test, a job-sample test, three conventional electronics tests, and several ability reference tests were administered to a small sample of experienced electronics technicians in the fleet.
T. G. I.

4290

USN Chief of Naval Operations. COLD WEATHER MEDICINE. SERIES OF OPERATIONAL BRIEFS. Proj. OP 03D3, March 1954, 32pp. USN Chief of Naval Operations, Washington D.C.

4290

This brief is an analysis, briefing, correlation, and synthesis of voluminous material on specific phases of Arctic operations in relation to medical problems. Phases of physiological, psychological, and dental medicine are mentioned and treated only insofar as they represent definite information on a specifically cold weather problem. Supplements are planned as soon as more definite knowledge becomes available. Physiological medical problems treated here are hypothermia (cold-injury), carbon monoxide poisoning, snow blindness, insect control, and parasitic worms; and psychological problems are indoctrination, training, and recreation. Dental problems are not treated in detail.
R 20

4291

Banet, L. & Proscia, P.A. REPORT OF INVESTIGATION ON IMPROVED COVER GOGGLES FOR CHIPPERS AND WELDERS. FINAL REPORT. Proj. 5488 3, Rep. NS 181 013, June 1954, 16pp. USN Material Lab., Brooklyn, N.Y.

4291

Improved chippers and welders cover goggles of three manufacturers were evaluated in laboratory and service tests. The goggles were worn by shipyard welders, chippers, and caulkers during actual shipbuilding operations and by other Naval personnel during welding and grinding operations. The laboratory study included determination of field of view provided by symmetrical and unsymmetrical goggles as well as wearing tests. Favorable and unfavorable comments from the user's tests were tabulated and discussed.
T. I. R 10

4292

USN Air Development Center. EFFECT OF REFLECTION PLOTTER ON SIGNAL DISCERNIBILITY ON AIRBORNE RADAR INDICATORS. Proj. ADC EL 8202, Rep. NADC EL L5373, May 1953, 6pp. USN Air Development Center, Johnsville, Penn.

4292

To determine the effect on signal discernibility of the insertion of a reflection plotter between the crt of the radar and the operator, two pieces of equipment were set up for testing, one with a reflection plotter and one without. The Ss, who did not know which indicator was equipped with the plotter, were required to identify a series of targets on both indicators by calling out the bearing as soon as it was seen and to continue identification as long as possible as the signal level was reduced. Each S was given six rotations of the sweep on each azimuth setting and four azimuth settings for each signal level. The average number of missed targets was plotted against target attenuation and compared for the two conditions.
G. I.

4296

Pride, A.M. FLIGHT TESTS OF APPROACH LIGHT SYSTEMS. FINAL REPORT. Proj. PTR AE 827, Rep. 2, Aug. 1952, 6lpp. USN Air Test Center, Patuxent River Air Station, Md.

4296

To determine the most desirable configuration among three approach light systems (Slopeline, British, and French) a comparative evaluation was made under weather conditions which in many cases were severe enough to close the air station to normal instrument flights. Recommendations are included.
T. G. I. R 11

4297

Hyland, J.J. TURN AND BANK INDICATOR WITH WHITE BALL AND WHITE CENTER MARKINGS, EVALUATION OF; LETTER REPORT #1, FINAL REPORT. Proj. TED PTR AE 7359.39, May 1953, 7pp. USN Air Test Center, Naval Air Station, Md.

4297

Tests were conducted to determine the readibility of a turn and bank indicator with white ball and white center markings under day, night, and simulated and actual instrument flight conditions. The test instrument was installed in the cockpit of F9F, BuNo 12540, in place of the radio altimeter. The standard air-driven turn and bank indicator remained in normal position as a comparison instrument. All instruments were illuminated by means of red false panel lighting. The instruments were observed by seven pilots during a total flight time of 21 hours--six night hours, five simulated instrument hours, and two actual instrument conditions.
I. R 3

4298

House, H.A. COMPARISON OF TAXI LIGHT SYSTEMS FOR VP AND VR AIRCRAFT, FINAL REPORT. Proj. PTR EL 52018, Rep. 1, June 1954, 13pp. USN Air Test Center, Patuxent River Air Station, Md.

4298

To determine the taxi lighting system most suitable for VP and VR aircraft, five possible means of supplying lighting were compared: 1) a separate taxi light on the nose or nose wheel of the plane, 2) a controllable multipurpose light, 3) intermittent use of regular landing lights, 4) landing lights having a second low wattage filament for taxiing, and 5) an oscillating taxi light. In addition, different wattage lamps and one versus two lamps were compared. Lights were installed in a test airplane and pilots were requested to operate and evaluate the lights while taxiing in unlighted areas at night.
T. I. R 4

4300
Duerfeldt, C.H. INDICATOR FOR AIRPLANE ATTITUDE IN TAKE-OFF, EVALUATION OF REPORT 1, FINAL REPORT. Proj. PTR AD 346, Oct. 1954, USN Air Test Center, Patuxent River Air Station, Md.

4300
Windshield markings were evaluated to determine their usefulness in assisting the pilot to obtain a desired airplane attitude during take-off and landing. The markings were used during normal field take-offs, catapult launchings, FCLP, and normal field landings. Results were based upon the opinions of five experienced jet pilots.
I.

4310
Clark, B., Nicholson, Marjorie A. & Graybiel, A. "FASCINATION:" A CAUSE OF PILOT ERROR. Proj. NM 001 059.01.35, May 1953, 18pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

4310
This report enlarged the definition of "fascination" (target fixation) and determined some of the various types as it occurs in naval flight students. Twenty-five flight instructors were interviewed and a questionnaire was administered to 502 flight students. A content analysis of experiences with fascination was made and the relationship between experiences with fascination and accidents and unsatisfactory flights in training was determined. Several suggestions were advanced for reducing this flying hazard.
T. R 2

4311
Schaefer, H.J. THEORY OF PROTECTION OF MAN IN THE REGION OF THE PRIMARY COSMIC RADIATION. Proj. NM 001 059.13.06, Aug. 1953, 17pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

4311
The potential hazards to humans from exposure to the primary cosmic radiation in flight at extreme altitudes centers upon the heavy nuclei component of the primary radiation. In two preceding reports the microspatial determination of the ionization dosage along a heavy nucleus track in tissue was derived in quantitative terms in its radial and longitudinal component. It was shown that in the terminal section of the tracks (the thin-down part) the dosage reaches excessively high values. In this report the actual number of the thin-down hits per hour in a "standard man" for all altitudes and all latitudes and for all components of a heavy spectrum is derived. Relationships between number of hits and thickness of shielding layers are graphically presented.
G. I. R 6

4325
Berrien, F.K. & Sammons, H. A STUDY OF CHECK-OUT PROCEDURE IN JET AIRCRAFT. Contract AF 18(600) 137, HFORL Rep. 40, Aug. 1953, 43pp. USAF Human Factors Operations Research Labs., Bolling AFB, Washington, D.C. (Institute for Research in Human Relations, Philadelphia, Penn.).

4325
To investigate the relation between check-out procedures (an examination of a pilot to determine whether he is competent to fly a particular type of aircraft) and accident frequency, a rating procedure was developed through use of an interview and data blank. After pretesting the data blank in the field, data collection from 14 operational jet squadrons was accomplished. Ratings of completeness of check-out procedures were studied in relation to pilot error accidents and accident frequency over a four-month period. Recommendations were made for improving the check-out procedures.
T. G. I.

4330
Huggins, W.H. A THEORY OF HEARING. AFCRC TR 53 14, May 1953, 124pp. USAF Electronics Research Directorate, AFCRC, Bedford, Mass.

4330
A model of the inner ear has been developed which combines into a simple, plausible mechanism the mechanical, dynamical, anatomical, and neurological details of the cochlear structure. The mechanism adequately accounts for the results of a variety of physical and psychological experiments. It suggests a functional purpose for certain anatomical details of the cochlear partition and it unifies into a single consistent construct the experimental facts concerning hearing.
T. G. I. R 24

4337
Ford, T.R. OFFICER AFFILIATION WITH THE AIR FORCE RESERVE TRAINING PROGRAM, 1953. Res. Memo. 24, Jan. 1954, 24pp. USAF Human Resources Research Institute, Maxwell AFB, Ala.

4337
This report presents an analysis of demographic data pertaining to 1,234 inactive duty Air Force Reserve officers residing in selected areas of Alabama and Georgia. Attention is focused on the relationships existing between various characteristics (age, rank, number of dependents, education, aeronautical rating, civilian occupation, and Air Force occupational specialty) of these officers and affiliation or non-affiliation with an Air Force Reserve training program.
T. G.

4342
Timberlake, P.W. COMPARATIVE EVALUATION OF THREE PRESENTATIONS OF THE LEAR VERTICAL GYRO REMOTE ATTITUDE INDICATOR. Proj. APG/ADA/19 A, June 1953, 13pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

4342
To make a comparative evaluation of three presentations of the B-1A Lear attitude indicator for use in current jet aircraft, a total of 82 missions were flown in both fighter and bomber type airplanes by pilots with various degrees of previous experience with the standard Lear attitude indicator. The test indicators were used in simulated instrument flight during take-off, maximum climb, level flight at low and high altitude, recovery from unusual positions, maximum letdown, range orientation, Ground Control Approach recovery and go-around. Recommendations are included.
T. I.

4343
Timberlake, P.W. EVALUATION OF GRADUATES OF THE AIRCRAFT CONTROL AND WARNING OPERATOR COURSE. Proj. APG/ADA/69 A, Oct. 1953, 21pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

4343
To evaluate the ability of the graduates of the Aircraft Control and Warning Operator Course to perform the job for which they were trained, four airmen test students, selected to provide an academic cross section of the class, were brought to Elgin Air Force Base immediately after graduation. They were used as regular replacements in a radar control unit during a 60-day test period. Each graduate was assigned to a supervisor who made his daily work assignments and rated his performance. Interviews were also held with graduates and supervisors in an attempt to determine basic causes of observed weaknesses. Data were tabulated and discussed in terms of advisable changes in the training course.
T.

4359
Putnam, W.B. OPERATIONAL SUITABILITY TEST OF THE MF-1 ATTITUDE INDICATOR. TERMINATION REPORT. Proj. APG/TAT/ 103 A, March 1954, 10pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

4359
To evaluate the MF-1 Attitude Indicator as a flight instrument and to determine its suitability as a dive angle indicator for use in dive bombing, flight tests were conducted. Approximately 40 hours flying time were accomplished with the instrument installed in the rear seat instrument panel of a T-33 jet trainer (instrument flying phase). The dive bombing phase was accomplished with the indicator mounted in the instrument panel of an F-86F aircraft with runs made at various angles between 20 and 70 degrees at altitudes ranging from 10,000 to 20,000 feet. Pilot opinions were gathered and assessed.
I.

4362
Lesiw, W. A COMPARISON OF METHODS FOR ACHIEVING TRIGGER BURST CONTROL. Proj. 7708, Task 77141, AFPTRC TR 54 17, May 1954, 28pp. USAF Armament Systems Personnel Research Lab., Lowry AFB, Colo.

4362
To make a comparative evaluation of two methods for achieving burst-interburst interval control of triggering in the flexible gunner's task, 129 flexible gunnery students in a stage of training preceding air-to-air instruction were studied. Two methods of training for burst control were used: a counting method and a buzzer-synchronizing method. Five days of practice on one of the two methods was given to each S followed by a retest six days after the last practice day. Changes in burst estimates with practice and retention after six days were analyzed for effect of method.
T. G. I. R 6

4364
Brandenburg, R.E. FLIGHT TEST EVALUATION OF THE SPECIALTIES AND KOLLSMAN ANGLE OF ATTACK INDICATORS. Tech. Note WCT 53 77, Rep. R 653 1605, Feb. 1954, 23pp. USAF Directorate of Flight and All-Weather Testing, Wright-Patterson AFB, Ohio.

4364
To evaluate two different angle of attack indicators (Specialties and Kollsman) in terms of their practicability during landing approach and in cruise control, flight tests were conducted on T-33A jet trainer aircraft. Both indicators were installed in the same plane and tested simultaneously. Level flight runs were flown at 2,000, 6,000, 8,000, and 25,000 feet throughout the entire speed range of the aircraft at each altitude. Accelerated and unaccelerated stalls were flown at 10,000 and 30,000 feet; two climbs were made to approximately 36,000 feet; simulated cruise conditions and ground control approach runs were made. Repeatability and effect of turbulent air conditions on accuracy are discussed. Recommendations are included.
T. G. I.

4371
Senders, Virginia L. & Cohen, J. THE INFLUENCE OF METHODOLOGY ON RESEARCH ON INSTRUMENT DISPLAYS. Contract AF 18(600) 50, WADC TR 53 93, April 1953, 32pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Antioch College, Yellow Springs, Ohio).

4371
The research that has been done on instrument displays (61 studies) is reviewed in terms of the methodology used, the philosophy underlying its use, the ways in which the choice of a method has limited the problems to be studied, and the limits placed by the method upon the validity (applicability) of the results. The findings are presented in tabular form and discussed critically. Three classes of future research are briefly outlined.
G. I. R 64

4374
Simmons, C.F. HUMAN FACTORS IN PERSONAL EQUIPMENT FAILURES. WADC TR 53 244, Dec. 1953, 11pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

4374
A review of the "In Service" conditions pertaining to the effectiveness of the standard Air Force personal equipment is presented using as an example detailed conditions of the Type P-3 Protective Helment. The manner in which the safety of the aircrewman is affected by the headgear is shown to the extent that too many of the deaths resulting from attempts to escape from the aircraft by seat ejection may be attributed to conditions reported. An outline is provided presenting corrective action considered necessary to achieve maximum protection possible from the equipment provided. Photographs illustrate the conditions described.
I. R 3

4375
Hall, J.F., Jr., Polte, J.W., Kelley, R.L. & Edwards, J., Jr. COOLING OF CLOTHED SUBJECTS IMMERSED IN COLD WATER. WADC TR 53 323, April 1953, 34pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

4375
To determine 1) the amount of body insulation or clothing that would provide maximal cold-water protection without impractical restrictions due to bulk, 2) the effect of body insulation on hand and foot cooling, and 3) the effect of sudden cold-water immersion upon the metabolic rates of Ss wearing the indicated types of insulation, a series of 26 experiments using seven Ss was conducted. Hand, foot, average skin temperatures, and metabolism were measured before and during immersion (up to the neck) in cold water (32-39 degrees F). Underlying clothing of 2.3, 3.7, and 4.7 clo insulation was worn under an outer water-impermeable, anti-exposure suit. Average skin and extremity cooling rates were calculated.
T. G. I. R 14

4378
Imber, B.M., Stern, I.D. & Vanderplas, J.M. VISUAL FIELD RESTRICTION AND APPARENT SIZE OF DISTANT OBJECTS. WADC TR 54 23, Jan. 1954, 11pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

4378
To investigate the effect of reduced visual field size upon the apparent size of distant objects when the factors inherent in optical systems are eliminated from the situation, four observers made judgments comparing the apparent size of a variable-sized white square, set at a distance of 500 ft. and viewed monocularly through an aperture, with the apparent size of a standard 20-inch square viewed binocularly at a distance of 30 ft. Aperture sizes from five to 60 degrees were used to restrict the visual field. The findings are discussed in relation to the large decreases in apparent size of objects when viewed through a telescope.
T. G. I. R 11

4379
Wyckoff, L.B., Bridgman, C.S. & Tabory, L. THE EFFECT OF AN IMPROVED ORIENTATION AID ON TARGET ACQUISITION WITH THE HEMISPHERIC SIGHT. Contract AF 18(600) 54, WADC TR 54 67, Jan. 1954, 6pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Wisconsin, Madison, Wisc.).

4379

To test the effect of a simple orientation aid on the speed of slewing and acquiring targets that have been spotted outside the periscopic type sight, subjects were tested using velocity hand controls. The aid consisted of eight illuminated lines radiating from the center of the target space and stationary with respect to this space. Such an aid could be incorporated as a moving reticle in the focal plane of sight. Two groups of subjects were tested for a period of eight daily sessions, one with and one without the sight. Cumulative time for acquiring the target was recorded for each run of 38 targets and the two groups were compared at each stage of practice.
T. G.

4381

Archer, E.J. IDENTIFICATION OF TARGET CONCEPTS AS A FUNCTION OF INFORMATION LOAD. Contract AF 18(600) 54, WADC TR 54 202, March 1954, 9pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Wisconsin, Madison, Wisc.).

4381

To investigate the effect of information load on response time, 12 groups of six Ss each served in an experiment on target identification. The groups corresponded to the cells of a three by four factorial design having one to four bits of relevant and zero to two bits of irrelevant information presented to the S by a single stimulus source. The task was to identify oscilloscope patterns by positioning four lever-action switches and to test identification by pressing a push-button. The response measure was the time required to identify 32 consecutive patterns. Errors were also recorded. Time to respond was analyzed as a function of relevant and irrelevant information load.
T. G. R 4

4383

Howes, D.H. ON THE INTERPRETATION OF WORD FREQUENCY AS A VARIABLE AFFECTING SPEED OF RECOGNITION. WADC TR 54 282, June 1954, 12pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

4383

An interpretation of the inverse relationship between the duration threshold of a word and its frequency of occurrence is outlined in which the frequency of a word in the Thorndike-Lorge tables serves as an estimate of the frequency with which college students would have used that word at the time the duration thresholds were measured. The validity of this estimate is tested by three experiments based on a rank-correlation procedure with additional experiments providing a check on the method. Some reasons for preferring the proposed interpretations to others that have been suggested are mentioned.
T. R 12

4387

Coakley, J.D. & Fucigna, J.T. A HUMAN ENGINEERING REVIEW OF THE CONTROL TOWER CONSOLE, AN/FRC-19. Contract AF 30(602) 215, Task .04, RADC TN 54 16, Dec. 1953, 19pp. Dunlap and Associates, Inc., Stamford, Conn.

4387

This report presents the findings resulting from a human engineering review of the Control Tower Console AN/FRC-19, conducted at the Radio Receptor Corporation, Brooklyn, New York, and Mitchell Air Force Base, Minneola, New York. The Control Tower Console is a system for consolidating equipment necessary for effective control of air traffic by an airfield control tower. In addition to the general evaluation, with recommendations included, appendices contain an evaluation of the details of separate components of the system and the functions of personnel who utilize the console.
T. I.

4388

Lacey, R.J. SUITABILITY OF THE GRAY INSTRUMENT PANEL FOR USE IN USAF AIRCRAFT. WCRD TN 54 12, April 1954, 17pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

4388

To determine the functional suitability of a gray instrument panel for use in USAF aircraft, two aircraft were equipped with a gray instrument panel and gray cockpit surround, including right and left consoles and floor. No instruments or control positions were changed. Pilots (38) were randomly assigned for flights in each aircraft; upon completion of each flight, the pilot completed a questionnaire designed to evaluate the functional suitability, visual adaptation, and appearance of the gray panel. Various Air Force Bases and one aircraft manufacturer were asked to comment regarding acceptability of gray panels. Recommendations were included.
T. R 2

4390

Schmidt, I. & Bingel, A.G.A. EFFECT OF OXYGEN DEFICIENCY AND VARIOUS OTHER FACTORS ON COLOR SATURATION THRESHOLDS. Proj. 21 31 002, April 1953, 21pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4390

The effects of oxygen deficiency, alcohol, and coffee on color saturation thresholds were studied. The colors tested were red, green, and blue presented, by the use of filters, to one half of a circular white test area of foveal size. The subject observed the test area with a neutral-adapted eye and named the color of the mixture half if he perceived a color difference. Color was added in an amount close to the color saturation threshold. Percentage of correct response, determined before and after an agent (hypoxia, alcohol, caffeine) was effective, served as an indicator of color sensitivity. Conclusions drawn from the standpoint of aviation medicine are presented.
T. G. I. R 22

4392

Payne, R.B. & Hauty, G.T. THE PHARMACOLOGICAL CONTROL OF WORK OUTPUT DURING PROLONGED TASKS. Proj. 21 1601 0004, Rep. 2, May 1953, 13pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4392

To determine the relative and joint effects of a motivational technique (different levels of indictrination as to significance of the study for an important operational problem of the Air Force) and an analeptic drug upon prolonged performance of a perceptual-motor task, preliminary training was given to 80 Ss on a complicated compensatory pursuit task involving simulated aircraft instruments and controls. The Ss then worked for four hours under the various motivational and pharmacological conditions (two analeptic drugs, a sedative, and a placebo). The treatment effects were appraised in terms of general course of performance, terminal levels attained, and the attitudes and feelings generated in the experimental setting.
T. G. R 20

4393

Payne, R.B. & Hauty, G.T. THE EFFECTS OF MOTION-SICKNESS PREVENTIVES UPON CERTAIN PERCEPTUAL-MOTOR COMPONENTS OF THE PILOT'S TASK. Proj. 21 1601 0004, Rep. 3, May 1953, 5pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4393

To appraise the relative effects of two motion-sickness preventives (hyoscine and bendaryl-hyoscine) upon certain perceptual-motor components of pilot skill, 64 subjects received training on a compensatory pursuit task involving simulated aircraft instruments and controls. They then continued work for four hours under conditions designed to appraise the relative effects of the two drugs which differed in protective capacity. The effects were viewed in terms of the general course of performance and the terminal level obtained. Results are discussed with regard to aircrew effectiveness.
T. G. R 6

4398

Winsmann, F.R., Vanderbie, J.H. & Daniels, F., Jr. ENERGY COST OF WEARING ARMORED VESTS AND CARRYING PACK LOADS ON TREADMILL, LEVEL COURSE, AND MOUNTAIN SLOPES. Rep. 208, May 1953, 11pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

4398

The energy cost of wearing an eight-pound, laminated nylon, armored vest with zipper closed was measured while subjects were walking, with and without a 40-pound pack load, on 1) a treadmill, 2) a level course, and 3) climbing slopes of from 3 to 22 degrees. Metabolic rates, sweat loss, and final pulse rates of six subjects were compared for each condition.
T. I.

4399

Newman, R.W. MODEL AND SIZE DATA FOR THE DESIGN OF MEN'S CLOTHING. Proj. 64 02 001, Rep. 217, July 1953, 16pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

4399

This study presents average data on bodily dimensions of approximately 25,000 United States soldiers. The series is successively divided into subgroups on the basis of size (Chest Circumference), model (Drop or Chest Circumference minus Waist Circumference), and length (Stature). Mean values on size groups and models within size groups are presented in tabular and graphic form; length groups within the models and sizes are given in tabular form only. It is recommended that the data presented here be considered in any proposed major revision of the U.S. Army men's service uniform.
T. G.

4400

Daniels, F., Jr., Lyman, J. & Vanderbie, J.H. A STUDY OF THE EXPERIMENTAL PACK T 53-8 WITH A REVIEW OF METHODS FOR STUDYING LOAD-CARRYING SYSTEMS. EPD Rep. 225, March 1954, 27pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

4400

The T53-8 load-carrying system (an experimental pack designed to balance the load fore and aft, to minimize motion of load, and to stabilize the load) was compared to other systems (Standard Combat Pack, United Kingdom Z-2, and the packboard) by methods aimed at evaluating the effect of the pack on the man at all times during a complex activity. The methods used included: 1) energy expenditure studies, 2) performance tests, and 3) dynamic physical measurements. Findings from the three types of studies were analyzed in terms of comparisons among the packs as well as the value of each test used. A discussion of the rationale for field and laboratory studies for load-carrying systems was presented. Recommendations were made regarding the most promising methods.
T. G. I. R 14

4409

Comstock, C.C. & Oberst, F.W. THE MEDIAN DETECTABLE CONCENTRATION OF DIBORANE, PENTABORANE AND DECABORANE BY ODOR FOR MAN. Res. Rep. 206, Aug. 1953, 5pp. USA Chemical Corps Medical Labs., Army Chemical Center, Md.

4409

To determine the median detectable concentration of diborane (B_2H_6), pentaborane (B_5H_9), and decaborane ($B_{10}H_{14}$) by odor for man, threshold determinations were made by 10 to 15 Ss for each of the three boron hydrides. The Fair-Wells osmoscope was used. Concentrations of diborane vapor were determined by chemical analysis and those for penta- and decaborane were determined by a nominal method. Median detectable concentrations by odor were presented in both tabular and graphic form. After-effects from smelling the vapors were discussed.
T. G. R 4

4423

Ershoff, B.H. NUTRITION AND ADJUSTMENT TO STRESS. Contract DA11 009 QM 17938, Proj. 7 84 12 011, Rep. 25, Aug. 1953, 2pp. USA Quartermaster Food & Container Institute for the Armed Forces, Chicago, Ill. (Emory W. Thurston Laboratories, Research Division, Los Angeles, Calif.).

4423

As part of a study on nutrition and adjustment to stress, 23 hypophysectionized male rats and ten intact animals were employed. Twelve of the experimental rats and the ten controls were fed a basal ration while the remaining experimental rats were fed a similar ration supplemented with dessicated whole liver powder. Weight increments over a period of six weeks were recorded. Swimming tests in cold water were conducted on all rats at the conclusion of the six-week period to examine the effects of liver feeding on performance in this stress situation in addition to checking the effect of pituitary participation.

4426

Edgerton, H.A., Feinberg, M.R. & Zalkind, S.S. PERSONNEL FACTORS IN POLAR OPERATIONS. Contract NONR 871(00), Proj. 295, May 1953, 106pp. Richardson, Bellows, Henry and Company, Inc., New York, N.Y.

4426

To supply systematic information on personnel requirements for polar operations a survey of existing and available literature was made as a first step. On the basis of a summary of the findings from the literature, an interview guide was prepared directed toward the clarification of problem areas in which published reports were incomplete or ambiguous. Individual and group interviews were held with 53 individuals having polar or extreme cold experience and personal letters sent to 19 other such persons. The findings are discussed under five headings: 1) selection, 2) problems of orientation and indoctrination, 3,4) effects of polar conditions on job performance and on morale, and 5) physical and physiological reactions to extreme cold. Both operational and research recommendations were made in some detail. R 192

4436

Hogan Laboratories, Inc. INTERIM ENGINEERING REPORT ON INFOMAX. Contract AF 33(616) 362, Rep. 1176 IR 11, Jan. 1954, 20pp. Hogan Laboratories, Inc., New York, N.Y.

4436

This interim report set forth the progress made on a research study in development, design, and testing of a system (the Infomax communication system) for transmitting information over long radio circuits where both poor signal-to-noise ratios and bad multipath conditions prevail. An experimental comparison between synchronous and linear detection was completed with a further test of effect of letter size in noisy Infomax copy. A method for printing test copy on 16 mm film for use in the new scanner was devised and equipment for the system has been developed.
T. G. I.

4438
Goodyear Aircraft Corporation, Akron, Ohio. FLIGHT CONTROLS HUMAN DYNAMIC RESPONSE STUDY. FINAL REPORT. Contract NOAS 53 013 C, Rep. AE 61 6, Nov. 1953, 21pp. USN Bureau of Aeronautics, Washington, D.C.

4438
This report describes the construction and use of a movable cockpit capable of providing realistic simulation of aircraft movements in addition to the usual visual display. The basic techniques of the problem are described in an earlier report. A major portion of this report describes the design features of the apparatus. Some data on motion characteristics common to most pilots are given and tests of a simple, linear approximation of pilot dynamics are discussed.
G. I. R 3

4440
Felton, W.W., Fritz, E. & Grier, G.W., Jr. AIR-GROUND COMMUNICATIONS IN TERMINAL AIR TRAFFIC CONTROL. FINAL REPORT. Contract CCA 28588, March 1953, 67pp. Franklin Institute Laboratories, Philadelphia, Penn.

4440
This report contains the principal findings of a two-year study of communications measurements at Washington National Airport and Langley Air Force Base, the purpose of which was to describe and analyze the use of air-ground channels for voice communications in air traffic control. Channel density, types of information transmitted, actual information value (measured in bits), communication difficulties, and suggested modifications of the system are presented.
T. G. I. R 3

4451
Miller, R.B., Folley, J.D., Jr., Smith, P.R. & Swain, A.D. SURVEY OF HUMAN ENGINEERING NEEDS IN MAINTENANCE OF GROUND ELECTRONICS EQUIPMENT. Contract AF 30(602) 24, RADC TR 54 31, Feb. 1954, 302pp. American Institute for Research, Pittsburgh, Penn.

4451
The procedures, results, and human engineering research problems derived from a field study of the maintenance of ground electronics equipment at Air Defense sites are described. Verbal and written questionnaires were developed and administered to all available personnel at six sites, observation data were collected, and special techniques of equipment and activity analysis were used. The following problem area were derived and discussed at length: 1) accessibility, 2) presentation of technical information, 3) test equipment, 4) work conditions, 5) environmental effects, 6) safety, 7) component size, 8) power problems, 9) color-coding of equipment, 10) warning indicators, 11) cable connectors, 12) panel controls and meters, 13) circuit-switching arrangement, etc. T.

4458
Bach, L.M.N., Sperry, C.J., Jr. & Long, R.I. ARTIFICIAL MOONLIGHT PROJECT. SEVENTH TECHNICAL REPORT. Contract DA 44 009 ENG 775, Proj. 8 18 06 001, Sept. 1953, 30pp. Tulane University, New Orleans, La.

4458
This report presents some data on the distribution of illumination from searchlight beam scatter as measured with a physical photometer. Iso-foot candle curves as determined over several distances on three surfaces (parallel to ground and facing sky, perpendicular to ground and facing direction in which searchlight was swung in azimuth, and surface perpendicular to ground facing away from searchlight) are presented. Weather data for those hours during which data were collected are included.
T. G.

4459
Bach, L.M.N., Sperry, C.J., Jr. & Long, R.I. ARTIFICIAL MOONLIGHT PROJECT. SECOND ANNUAL REPORT. Contract DA 44 009 ENG 775, Proj. 8 18 06 001, June 1953, 15pp. Tulane University, New Orleans, La.

4459
This annual report presents some data on distribution of illumination from searchlight beam scatter and some visual threshold data for the detection of targets under such illumination. Since the report is a continuation of previous reports, there is no discussion of general background. There is discussion of instrumentation problems and presentation of some field measurements obtained with visual photometers of illumination on five surfaces at distances of 3,000, 5,000, 8,000,and 14,000 yards from the searchlight. The visual thresholds were obtained on nine subjects at points 25, 50, and 75 yards in nighttime field trials. Problems encountered in gathering such data are discussed.
G.

4464
Sandel, T.T., Teas, D.C., Feddersen, W.E. & Jeffress, L.A. THE LOCALIZATION OF AIRBORNE SOUND. Contract NOBSR 52267, DRL A Rep. 78, Aug. 1954, 22pp. University of Texas, Austin, Tex.

4464
Three experiments on the localization of sound employing loudspeakers as the sources to be localized were conducted. The first experiment used a single speaker at a time; the second and third used pairs of speakers either in phase or in phase opposition. All three used the same device for indicating direction of signal source--an additional speaker carried by a movable arm and producing a clearly localizable, wideband noise. This source was adjusted in location by the subject until it seemed to be in the same direction as source to be localized. Five subjects were used throughout the experiments. Accuracy of localization and interaural time, intensity and loudness differences were analyzed and discussed. Advantages of the methodology employed were indicated.
T. G. I.

4470
Slade, J.J., Jr., Fich, S., Molony, D.A., Nanni, L.F., et al. THEORETICAL AND EXPERIMENTAL RESEARCH IN COMMUNICATION THEORY AND APPLICATION. Contract DA 36 039 SC 42703, Projs. 3 99 12 022 & 17 132B 0, Prog. Rep. 1, March 1954, 25pp. Bureau of Engineering Research, Rutgers University, New Brunswick, N.J.

4470
A progress report of work accomplished on a research program in communication theory and application was presented. Measurements of the characteristics of the random noise generator (described in earlier reports) were made. The study of voice was directed toward the development of electric circuity capable of continuously determining the frequencies that characterized speech and of synthesizing these frequencies to reproduce speech. A theoretical analysis of several types of coding was made to determine the permissible signal to noise ratio in a system of moment detection having a prescribed bandwidth and speed of signalling.
T. G. I.

4473
University of Pennsylvania. UNIVERSAL DIGITAL OPERATIONAL FLIGHT TRAINERS. Contract NONR 551(02), Rep. 54 45, June 1954, ca. 200pp. Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Penn.

4473

The first phase of research conducted to determine the feasibility of actuating Operational Flight Trainers using a universal digital computer is reported. Two primary developments have been previously reported: 1) development of a stability chart enabling predictions of solutions of flight equations using specified quadrature formulae and quadrature time interval, and 2) the design of a high-speed "sequential" digital computer. In this paper two new quadrature formulae are discussed, the circuits used in the digital OFT are described, changes incorporated into the sequential computer are delineated, flight instrumentation is discussed, and some tests are reported on the essential correctness of the stability chart approach.
T. G. I.

4474

University of Pennsylvania. DESIGN OF DIGITAL FLIGHT TRAINERS. Contract NONR 55102, Rep. 54 08, Prog. Rep. 2, July 1953, ca. 150pp. Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Penn.

4474

Progress was reported on research conducted to determine the feasibility of actuating Operational Flight Trainers with a universal digital computer. Major emphasis was placed, during the period reported, on three topics: 1) The logical structure of a serial machine using serial memory has been laid out in almost complete detail, 2) The equations of motion of the F9F airplane have been studied in detail to determine all its possible characteristic frequencies, and 3) A new quadrature method has been synthesized. The results of mathematical studies, the reprogramming of the flight equations, and the logical structure of the serial simulator were described.
T. G. I.

4479

Chang, S.H., Essigmann, M.W., Stubbs, H.L., Dolansky, L.O., et al. VISUAL MESSAGE PRESENTATION. PART I OF FINAL REPORT. Contract AF 19(122) 7, Item I, Feb. 1954, 153pp. Northeastern University, Boston, Mass.

4479

This part of the final report summarizes the results of theoretical and experimental studies performed during the period from May, 1949, to February, 1954, on the general problems of visual message presentation and speech compression. Practical details concerned with special equipment for speech-analysis purposes are given in Part II (issued separately). Chapter I defines the general problem under study and provides pertinent background theory. The experimental methods employed and results obtained are given in Chapter II. The last chapter presents conclusions based upon the research and makes specific recommendations for future development of speech-compression systems based upon the phonoid-identification and formant-tracking schemes.
T. G. I. R 132

4482

Clark, K.E., Gee, Helen H., Perry, D., Albitz, Diane, et al. MEASUREMENT OF INTEREST PATTERNS. ANNUAL REPORT. Projs. N6ORI 21203 & NR 151 248, Task III, Nov. 1953, 87pp. Department of Psychology, University of Minnesota, Minneapolis, Minn.

4482

The several chapters of this annual report describe the work on interest measurement as it has progressed along various lines: 1) description of general scope of project and present status of data collection; 2) summary of work completed on Navy and civilian scoring keys for the Navy Vocational Interest Inventory; 3) summary of several studies on relation of NVII scores to school achievement in the Navy; 4) a like summary related to on-the-job performance in civilian occupations; 5) comparison of some responses on NVII and the Strong Vocational Interest Blank; and 6) description of methods developed in the project to portray measured interests in profile form with mean profiles given for each of a number of Navy rates.
T. I.

4492

Neel, R.G. NERVOUS STRESS IN THE INDUSTRIAL SITUATION. Contract N6 ONR 232, presented at the American Psychological Association Meeting, New York, N.Y., Sept. 1954, 14pp. American Psychological Association, Washington, D.C.

4492

To point up some of the factors within the industrial situation which relate to the nervous tension and worries of the employee, data are presented here that represent a small part of a study of psychological factors related to morale and productivity in a heavy equipment manufacturing industry. A one-third sample of the hourly workers (N=5700) is used for analysis. The data were obtained by a questionnaire designed to get at nervous tension and worry. For a criterion measure, answers to a "jumpy-nervous" item were dichotomized and correlated with a number of questions concerned with attitudes toward foremen, work group, working conditions, productivity system, etc.
T.

4495

Whittenburg, J.A. INDICATORS OF BEHAVIOR DECREMENT. A FURTHER EXPERIMENTAL INVESTIGATION OF PERCEPTUAL EFFICIENCY DURING SUSTAINED VIGILANCE. Proj. DA 49 007 MD 222 (OI 19 52), Tech. Rep. 17, ca. 1953, 40pp. Dept. of Psychology, University of Maryland, College Park, Md.

4495

In an investigation on the effects of sustained vigilance on perceptual efficiency, this study was made to provide information concerning the nature of behavior that is measured by the Mackworth Clock Test. Each of 13 Ss performed twice under two experimental conditions: 1) response was made only to occurrence of variable stimulus (double jump of pointer); and 2) response was made to both variable and standard (single jump) stimuli. Each S was tested approximately three hours on each condition. Three dependent variables were used: errors of omission or failure to detect stimulus, critical flicker frequency, and stress experience inventory. Error data were analyzed for individual differences and all scores were studied for relationships with each other.
T. G. R 14

4515

Beach, C.K., Paolucci, D.J. & Milano, J.E. THE DEVELOPMENT OF A MULTI-PURPOSE ANALYSIS TECHNIQUE FOR NAVY RATINGS. Contract NONR 401(10), Tech. Bull. 53 1, Part I, Oct. 1953, 163pp. Personnel Analysis Div., USN Bureau of Naval Personnel, Washington, D.C. (New York State School of Industrial and Labor Relations, Cornell University, Ithaca, N.Y.).

4515

The development of a multi-purpose analysis procedure for the Gunner's Mate Billet is described. Particular emphasis is placed on data collection for maintenance, casualty diagnosis and rectification procedures, and operational sequences of new weapons in the field of ordnance. The three-inch/50 Rapid Fire Twin Mount was selected as the vehicle for study. Based on the expressed needs of current and potential consumers within the Bureau of Naval Personnel, methods, instruments, and techniques were developed and applied in the field. Results include a detailed breakdown of weapon casualties in terms of frequency, casualty analysis, rectification procedure, time requirements, personnel proficiency, battle station assignments, etc.
T. I. R 10

4517
Luce, R.D. A SURVEY OF THE THEORY OF SELECTIVE INFORMATION AND SOME OF ITS BEHAVIORAL APPLICATIONS. Contract CU 10 54 NONR 266(21) BASR, Proj. NR 042 115, Tech. Rep. 8, June 1954, 139pp. Bureau of Applied Social Research, Columbia University, New York, N.Y.

4517

This document presents a synopsis of the discrete theory of selective communication. The presentation is most deeply influenced by Shannon's work, although there has been some departure from it. The second part of the report is concerned entirely with applications of the theory to problems in psychology: the entropy in printed English, distribution of words in a language, the capacity of the human being and rates of information transfer, reaction time and information transfer, visual threshold and word frequencies, the information transmitted in absolute judgments, sequential dependencies and learning, concept formation, and other such categories. A short summary of Shannon's theory of continuous communication systems is appended.
T. I. R 102

4522
Mayer, Sylvia R. THE EFFECT OF INDUCED EFFORT, TRACING AND DRAWING ON VISUAL FORM LEARNING. Contract AF 33(616) 432, Tech. Note 115, Sept. 1954, 49pp. Optical Research Lab., Boston University, Boston, Mass.

4522

A study was made of the effectiveness of several techniques for training in target identification. The techniques differed in kind of effort and amount of effort employed during the learning of targets: 1) "task-related" effort involved observation, tracing, and drawing of targets; and 2) "task-unrelated" effort was induced in various degrees by use of a hand dynamometer. Identification tests were given after two- and ten-minute intervals. Conditions for maximum retention were identified. The effect of effort was further analyzed with respect to structural complexity of target, nature of identification errors, and individual differences. The findings were discussed in relation to photo- and radar interpretation training.
T. G. I. R 11

4526
Armstrong, J.G. U.K. 10-MAN COMPOSITE RATION PACK. Projs. DID 468, DRML 173 35 2 & PCC D50 78 70 13, Rep. 173 2, Aug. 1954, 18pp. Directorate of Inter-Service Development, Ottawa, Ontario, Canada & Defence Research Medical Labs., Toronto, Ontario, Canada.

4526

To guide the development of a Canadian ration pack for small group feeding, United Kingdom Ten-Man Composite Ration Packs were issued to Canadian troops on training exercises during the winter 1949-1950. Reports were received from nine groups comprising a total of 450 personnel on acceptability of various items, convenience for use, packaging, and way in which improvements could be made.
T.

4528
Neely, K.K. ACOUSTIC PROPERTIES OF HEADGEAR: II. HELMETS LTD. HEADGEAR ASSEMBLY. DRML Proj. 100 43 72, DRML Rep. 100 3, P.C.C. D77 82 30 04, April 1954, 18pp. Defence Research Medical Labs., Toronto, Ontario, Canada.

4528

To determine the acoustic insulation properties and the listener-intelligibility properties of crash and inner helmets manufactured by Helmets, Ltd. and General Textile Mills, Inc., two series of tests were run. In the first test, the open-ear threshold of hearing for nine test tones was determined for 15 Ss and compared with thresholds obtained while wearing the various items of headgear. In the second test, six Ss responded to intelligibility tests while wearing the headgear items with a noise level of 110 db. The data from these tests were analyzed for differences attributable to the headgear worn.
T. G. I. R 5

4666
Rubinoff, M. & Weygandt, C.N. DESIGN OF DIGITAL FLIGHT TRAINERS. Contract NONR 551(02), Res. Div. Rep. 54 09, Sept. 1953, 198pp. Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Penn.

4666

This report describes the development and design of a digital flight trainer. Three phases in the development of the trainer are reported: 1) mathematical techniques for fast but accurate solution of flight equations, 2) the logical structure of a special-purpose digital machine capable of ultrahigh-speed computation, and 3) reliable circuits not only for the digital computer but for conversion to and from analog form, multiplexing, and cockpit transformation. The method of "stability charts," a technique developed for assuring solutions to the several differential equations and related information on flight conditions, such as control forces and range, is discussed in considerable detail. A "parallel" simulator, which is about three times faster than the serial machine, is also described. T. G. R 6

4670
Richards, D.L. THE INTERDEPENDENCE OF SOUND ERRORS WITHIN LOGATOMS USED IN ARTICULATION MEASUREMENTS: STATISTICAL THEORY. Res. Rep. 13650, 1953, 13pp. Post Office Engineering Dept., Research Station, Dollis Hill, London, England.

4670

Whereas the results of many articulation measurements are adequately expressed by logatom or sound articulation percentages, studies of a more detailed character require numerical expression to be put to the error incidence of the separate sounds of the logatoms and to the degree of interdependence of these errors. A theory has been developed which enables the extent of interdependence to be expressed in useful numerical terms. Suitable tests of significance are also given. The process has been applied to one set of results as an example.
T. R 4

4673
O'Hare, J.E., Carlson, Q.H. & Tamblyn, W.E. ANALYSIS OF THE ENVIRONMENTAL CONDITIONS AFFECTING ACCIDENTS AT SEA. H.O. Misc. 15444, 1954, 35pp. USN Hydrographic Office, Washington, D.C.

4673

A relationship between the frequency of accidents at sea (damage of $1500 or more to vessel or cargo) and meteorological and associated oceanographic factors is presented. Accident data used are those for United States vessels during the years 1947-1951. These accidents are primarily in the North Atlantic and North Pacific areas. The area distribution of accidents as related to annual, seasonal, and diurnal factors, and the probability of ship accidents per billion ton miles of cargo along trade routes are presented.
G. I. R 8

4677

Aeroplane & Armament Experimental Establishment. COCKPIT APPRAISAL AND NIGHT FLYING ILLUMINATION ASSESSMENT. Second part of Rep. AAEE 840/1, Jan. 1954, 6pp. Aeroplane & Armament Experimental Establishment, Ministry of Supply, London, England.

4677

An appraisal of the pilot's cockpit and night flying illumination of the aircraft Marathon XA 260, a production of T.Mk. 11, was made. Since a cockpit appraisal of the mock-up T.Mk. 11, VX 229, had already been made, only those items changed in this production version or not previously appraised have been commented upon. The following aspects of the cockpit were discussed: entry and seating, controls, emergency exits, and lighting.
I.

4685

Bommarito, C.L. & Harvey, W.J. AN APPARATUS FOR MEASURING THE WORK DONE IN SLED PULLING. Proj. 64 12 001, Rep. 222, Sept. 1953, 13pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

4685

A direct-writing ergometer, used principally for field use in measuring the amount of work done in pulling trailed loads, is described. Work loads of men operating under extremes of cold in the field have been measured where it is difficult or impossible to standardize conditions. Principal components for the instrument are a calibrated spring to measure forces and a trailed bicycle wheel to measure distances. A stylus attached to the spring marks the forces on a wax-surfaced paper which is fed through the instrument in proportion to the distance traveled by the wheel. Methods of calculating power and efficiency are given.
G. I.

4686

Nutt, A.B. PRINCIPLES OF CANOPY DESIGN FOR MILITARY AIRCRAFT. WADC TR 53 92, April 1953, 97pp. USAF Aircraft Lab., Wright-Patterson AFB, Ohio.

4686

A comprehensive review of all aspects of canopy design for military aircraft is presented. Data on canopy design from many sources are correlated with past service experience, and conclusions are drawn relative to desirable and undesirable features of various canopy designs. Basic design considerations, all available and prospective transparent materials, structural aspects, enclosure frame design, and jettisoning and testing requirements are included. A complete bibliography is incorporated as a source of more detailed information on various phases of the subject.
T. G. I. R 42

4791

Neely, K.K. ACOUSTIC PROPERTIES OF HEADGEAR: I. RCAF HEADGEAR ITEMS. Proj. 100 43 72, Rep. 100 2, July 1953, 28pp. Defence Research Medical Labs., Toronto, Ontario, Canada.

4791

To determine the adequacy of various items of Royal Canadian Air Force headgear in the maintenance of efficient voice communications and in the protection of the ear from noise, two series of tests were conducted: acoustic insulation tests and listener-intelligibility tests. Four helmet modifications and two oxygen masks were tested singly and in various combinations.
T. G. I. R 14

4822

Miller, R.B., Folley, J.D., Jr. & Smith, P.R. THE VALIDITY OF MAINTENANCE JOB ANALYSIS FROM THE PROTOTYPE OF AN ELECTRONIC EQUIPMENT. PART II. K-1 BOMBING-NAVIGATIONAL SYSTEM. Contract AF 33(038) 12921, Proj. 507 008 0001, Feb. 1953, 86pp. American Institute for Research, Pittsburgh, Penn.

4822

A procedure developed earlier for the anticipation of maintenance job requirements for an electronics equipment was applied to the K-1 Bombing Navigational Set, an equipment already in field use. The procedure consists mainly of making a detailed analysis, in terms of behaviors, of the demands imposed upon the maintenance mechanic by the equipment. In the application to K-1, two separate job analyses were made, one from available manufacturer's records kept during the prototype stage of equipment development and one from data available on production models in field installations. A comparison was then made of the two analyses for degree of similarity. Training implications were discussed.
T. G.

5385

McCleary, R.A. PALMAR SWEAT AS AN INDEX OF ANXIETY. A FIELD METHOD SUITABLE FOR LARGE GROUPS. Proj. 21 1207 0004, Rep. 1, Oct. 1953, 11pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

5385

A method for measuring palmar sweat, as an index of anxiety, in large groups of Ss simultaneously under nonlaboratory conditions is described. The method requires an S to grasp a bag of crystals whose color shifts with increasing hydration. The color of the crystals, as judged by comparison with a set of standards, yields a measure of the amount of palmar sweat secreted over a 15-minute test period. An experiment involving both anxious and nonanxious Ss studied at three ambient temperatures (40, 70, and 100 degress F) is also reported. A further field study involving 248 infantry troops under simulated combat conditions is described to indicate the general usefulness of the technique.
G. I. R 7

5876

Kerslake, D. McK. FACTORS CONCERNED IN THE REGULATION OF SWEAT IN MAN. FPRC 879, May 1954, 23pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

5876

To test the hypothesis that sweat rate depends on the temperature of receptors situated at some depth in the skin, a series of experiments were conducted. 1) Observations were made on three Ss of skin temperatures and of sweat rates at various rates of working (walking the treadmill) in warm environments of low humidity. 2) The humidity was raised to a moderately high level, and observations were repeated. 3) The same Ss were then studied at rest in warm and very humid environments. On the basis of the findings, suggestions were made as to the factors concerned in the regulation of sweat production in man.
T. G. R 25

5880
Lovell, G. DESIGN AND DEVELOPMENT OF THE R.A.E. DUMMY OF THE STANDARD AIRMAN. Tech. Note Mech. Eng. 176, May 1954, 27pp. Royal Aircraft Establishment, Farnborough, Hants, England.

5880
A dummy of the standard airman, developed by the Royal Aircraft Establishment for use in dynamic and static tests, is described. It has the dimensions of the average airman; the limbs and complete man have approximately the correct weights and centers of gravity. Its weight is normally 166 pounds but can be varied if desired. The dummy can be dressed in standard aircrew clothing, equipment, and headgear. There are cavities for instruments in the head and in the upper and lower trunks. This dummy has been used in extensive seat ejection trials to test its suitability for experimental use.
T. I. R 3

5881
Middleton, D. THE STATISTICAL THEORY OF DETECTION I. OPTIMUM DETECTION OF SIGNALS IN NOISE. Tech. Rep. 35, Nov. 1953, 72pp. Lincoln Lab., Massachusetts Institute of Technology, Bedford, Mass.

5881
A complete theory of detection is presented that is capable of treating general types of signals (periodic, aperiodic, and random waves) in noise of arbitrary statistical character. By proper formulation of the detection problem as a test of statistical hypotheses, the precise structure of the optimum detector is specified and minimum detectable signals can be defined uniquely when suitable decision curves are constructed. Appendices include some results of sampling theory and integral equations associated with optimum filtering.
I. R 37

6557
Bondurant, S., Blanchard, W.G., Clarke, N.P. & Moore, F. EFFECT OF WATER IMMERSION ON HUMAN TOLERANCE TO FORWARD AND BACKWARD ACCELERATION. Proj. 7222, Task 71746, WADC TR 58 290, July 1958, 10pp. USAF Aero Medical Lab., Wright Patterson AFB, Ohio.

6557
Accepted physical principles suggest that immersion of Ss in water should constitute effective protection against some of the effects of acceleration. This premise was evaluated in a study of the duration of tolerance of immersed Ss to forward and backward accelerations of six through 14 g. Respiration was maintained by the use of skin divers' breathing equipment. In addition to reported tolerances, comments were made concerning the S's ability to move and on postacceleration symptoms.
T. G. I. R 8

11,176
Kirsch, H.A. AN AIDED-TRACKING SYSTEM SIMULATOR. NOTS Tech. Memo. 1778, June 1954, 39pp. USN Ordnance Test Station, China Lake, Calif.

11,176
To obtain an aided-tracking system suitable for high speed tracking, controllable by one operator, and reliable for use on missile test ranges under adverse weather conditions, this study was initiated. Derivations of the transform functions representing four aided-tracking systems were shown: 1) displacement-plus-velocity; 2) lead-displacement, displacement-plus-velocity; 3) displacement, velocity-plus-acceleration; and 4) lead-displacement, displacement, velocity-plus-acceleration. A description was included of the design and development of an aided-tracking-system simulator, a servomechanism capable of converting a linear input displacement into four basic output-motion components which form the required systems when combined suitably.
G. I. R 8

13,400
Rosenbaum, G., Dobie, Shirley I. & Cohen, B.D. VISUAL RECOGNITIVE THRESHOLDS FOLLOWING SENSORY DEPRIVATION. Amer. J. Psychol., Sept. 1959, LXXII(3), 429-433. (Wayne State University, Detroit, Mich.).

13,400
Divergent results reported in the literature in the area of sensory deprivation may be due to variations in conditions of deprivation, or to differences in measures of behavioral efficiency employed, or both. This study compares the effects of two different conditions of sensory deprivation on perceptual functioning in vision. Recognitive thresholds for five-digit numbers were obtained after periods of 0, 5, 15, and 30 minutes of total and of partial visual deprivation. Thirty-two subjects were divided into two equal groups, one subjected to total and one to partial visual deprivation. Results are discussed as they relate to findings reported in the literature, and to hypotheses regarding the effects of visual deprivation.
T. G. R 5

13,441
Naval Res. Rev. ANIP. Naval Res. Rev., Jan. 1960, 1-6.

13,441
The Army-Navy Instrument Program for fixed-wing and rotary-wing aircraft is a research effort seeking to provide the instrumentation, display, and control capabilities required to achieve maximum effectiveness of the operator or pilot-vehicle combination under all environmental conditions. Some of the achievements are described briefly in this report; among those mentioned are the helicopter flight-simulator dynamic platform and various instrument systems, the contact analog display, and advanced control systems.
I.

14,499
Flanagan, J.C. (Dir.). IMPROVING PERFORMANCE IN LOADING OPERATIONS. RESEARCH NOTES No. 15, May 1959, 4pp. American Institute for Research, Pittsburgh, Penn.

14,499
This note described research procedures used to discover why loading of heavy equipment into transport vehicles in a military organization took so much time. The major effort was to compile and analyze systematic records of the activities of each crew member. The measures taken for improvement consisted of: 1) development of working principles as a basis for task reorganization, 2) preparation of an activity chart, and 3) preparation of a supervisory control sheet. The result of field tests were described. The applicability of these methods to other problems of management were discussed.
I.

14,812
Seminara, J.L. & Peters, G.A. HUMAN FACTORS RESPONSIBILITIES OF DESIGN ENGINEERS. Paper 213, ASME Paper 57 A 167, 1959, 4pp. American Society of Tool Engineers, Detroit, Mich. (Research Section, USA Picatinny Arsenal, Dover, N.J.).

14,812
Presented is a critical observation of the role of the design engineer in human factors. Reasons for aircraft and equipment failures are discussed as are the functions of human factors specialists.
R 10

15,350
Pickett, J.M. & Decker, L.R. TIME FACTORS IN PERCEPTION OF A DOUBLE CONSONANT. Language and Speech, Jan.-March 1960, 3(1), 11-17. (USAF Operational Applications Lab., AFCRC, Bedford, Mass.).

15,350
This experiment was conducted to investigate the perceptual distinction between a single stop consonant, /p/, and its double counterpart, /p-p/. The joint effects of two factors were studied: 1) the duration of silence and 2) the rate of utterance of the surrounding test sentence. Listeners were furnished written copies of two alternative test sentences which had been recorded on tape so as to provide a set of ten sentences with ten different closure durations. Listeners were instructed that the sentences would be spoken in random order on the tape and asked to identify the sentence in each case. Results were discussed in terms of the interaction between rate of utterance, perception of the consonant, and its duration. Trends of articulatory and perceptual data were compared.
G. R 7

15,351
Plomp, R. & Bouman, M.A. INTEGRATIVE AND DECAY ACTION OF THE AUDITORY SYSTEM. Rep. IZF 1960 2, ca. 1960, 18pp. Institute for Perception RVO-TNO, Soesterberg, The Netherlands.

15,351
This paper deals with the question of how sound signals of different durations are perceived. An analytical study of threshold data for single and periodical tone pulses was made and inferences were drawn as to the existence of an integration and a decay mechanism, whereby only the energy with the critical bandwidth takes part.
G. I. R 6

15,352
Pollack, I. "LONG-TIME" DIFFERENTIAL INTENSITY SENSITIVITY. J. acoust. Soc. Amer., March 1955, 27(2), 380-381. (USAF Operational Applications Lab., AFCRC, Washington, D.C.).

15,352
This note considered the differential intensity threshold for noise bursts made over "long" (one-half, one, three day, and longer periods) time intervals. In a given 30-second sitting a listener was presented three five-second noise bursts. The sound level of the first was judged relative to the last signal heard in the previous session; the second sound level was then judged relative to the first; and the third was the reference signal for the next experimental session. The over-all reference level was 90 db sound pressure level. Long- and short-term judgments were compared graphically.
G.

15,353
Plutchik, R. AUDITORY PAIN THRESHOLDS FOR INTERMITTENT "WHITE" NOISE. Contract NONR 2252(01), Feb. 1960, 9pp. USN Office of Naval Research, Washington, D.C. (Hofstra College, Hempstead, N.Y.).

15,353
To determine pain and unpleasantness thresholds for intermittent tones using a random noise source, four subjects were asked to match the intensity of a white noise against pure tones of 1000, 2500, and 4000 cycles set at various intensity levels ranging from 90 to 120 db. A linear equation was found to approximate the matching data for all frequencies. The subjects were then required to indicate unpleasantness and pain thresholds using interrupted white noise at 3, 6, 10, and 15 pulses per second as well as the thresholds for a pure tone at 1000 cycles. Threshold data for noise and for pure tone were compared and tentative explanations for the findings were suggested.
T. I. R 4

15,355
Rehman, I. USNEL FLIGHT DECK COMMUNICATIONS SYSTEM: PART 4. ANATOMICAL AND PHYSIOLOGICAL CRITERIA GOVERNING THE DESIGN OF THE NOISE ATTENUATING RADIO COMMUNICATIONS HELMET. FINAL REPORT. SC 06401, NE090602 5 21(NEL B1 19), Rep. 925, April 1960, 22pp. USN Electronics Lab., San Diego, Calif.

15,355
This is the fourth part of a five-part report coverin the development and evaluation of an integrated system designed to provide reliable communications on jet aircraft carriers. This part deals with the noise communications helmet to be worn by deck personnel. The helmet was developed on the basis of an anatomical and physiological study and is of an adjustable type permitting universality of fit. The advantages of this helmet over the hard shell types in reducing fatigue, discomfort, ischemia, and pain are discussed. A field evaluation aboard USS LEXINGTON was conducted.
T. I. R 4

15,356
Rice, E.A. POLAROGRAPHIC STUDIES OF THE CAT'S AUDITORY CORTEX. Proj. 7231, Task 71786, WADC TR 59 769, Dec. 1959, 15pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

15,356
The effects of oxygen deprivation on the negative and positive components of the evoked cortical potential as recorded from the auditory cortex of the cat were studied with a polarographic technique. Oxygen deprivation was produced by hypoxia, asphyxia, and hypnotic and convulsant drugs. The size and shape of the evoked response (in microvolts) for both components were analyzed for the time (six to eight minutes) during which oxygen availability was varied. The results were discussed in terms of the generating mechanisms of such electro-cortical responses.
G. I. R 15

15,357
Rowland, G.E. & Kulp, C.M. A METHOD OF MAKING DIMENSIONAL MEASUREMENTS OF COMPLEX MOTIONS. Contract NONR 2856(00), Rep. 60 1 2, March 1960, 50pp. Rowland & Company, Haddonfield, N.J.

15,357
A method was devised and is described in detail for acquiring accurate information regarding the characteristics of the envelope of space occupied by the dynamic human engaged in purposive work. The method involves the use of one-camera motion picture photography; the data obtained provide the tridimensional coordinates in time and space of any portion of the body or of the work space As a test of feasibility of the technique, four different tasks were studied: walking, a two-man duty station replacement interaction, lift-carry operation, and the same operation performed by two men. Four subjects approximately representative of the fifth and 95th percentile American male body dimensions were used. The influence of fatigue on their task performance was studied.
T. G. I. R 10

15,358
Air Reduction Company, Inc., Murray Hill, N.J. CLOSED CIRCUIT RESPIRATION/VENTILATION SYSTEM PHASE I. Contract AF 33(616) 3856, Proj. 6333, Task 63612, WADD TR 60 33, Jan. 1960, 104pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

15,358
A literature survey was conducted to determine the physiological requirements of a man supported in an artificial atmosphere. Concurrently, a study was made of the environmental considerations which, combined with the physiological requirements, defined the desired characteristics of a closed circuit respiration/ventilation system. Such a system was designed to support a man on a hypothetical twelve-hour mission. The design, fabrication, and testing are treated separately in this report and limited results of tests of the assembled system are included.
T. G. I. R 76

15,359
Bartlett, R.G., Jr. & Phillips, N.E. RESTRAINT ADAPTATION AND ALTITUDE TOLERANCE IN THE RAT. Proj. MR005.15 2001, Subtask 3, Rep. 2, March 1960, 10pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

15,359
To determine the effects of adaptation to restraint on the relationship between restraint and altitude tolerance in the rat, two groups, each of 32 adult male rats, were established. Each member of one group was placed in a small cylindrical restraining cage for a period of seven days; the others were not so restrained. Immediately prior to exposure, each group was subdivided into two groups, one restrained and one unrestrained. All animals were then exposed to a simulated altitude of 33,500 with an ascent rate of 2,000 ft. per minute. Survival duration (30 sec. after respiration ceased) was timed from attainment of terminal altitude. Effects of body weight (measured prior to exposure) were studied along with adaptation effects.
G. R 5

15,360
Baines, D.J. & Baxter, J.R. LINK TRAINER TESTS ON SIMPLE MODIFICATIONS TO THE THREE POINTER ALTIMETER. Note ARL HE 6, April 1960, 20pp. Aeronautical Research Labs., Australian Defence Scientific Service, Melbourne, Australia. (Department of Aeronautics, University of Sydney, Sydney, Australia).

15,360
Tests of reading accuracy and reading time were conducted in a Link trainer on a standard three point altimeter and two simple modifications to it. The modifications involved the replacement of one or more pointers by discs, the re-design of the remaining pointers and the provision of colored sectors on the dial to provide altitude warning. The subjects, 18 pilot trainees, were required to fly a strenuous flight pattern which involved vertical speeds of up to 20,000 feet per minute and were asked at various intervals to read off their altitudes. Each pilot flew a course using each altimeter. Reading errors and time to make a reading were analyzed for differences due to altimeter design.
T. I. R 1

15,361
Baker, C.H. & Lavery, J.J. PERFORMANCE DURING TRAINING AS A CRITERION OF RETENTION OF MOTOR SKILLS. ca. 1952, 28pp. Defense Research Board of Canada, Toronto, Ontario, Canada.

15,361
Two experiments were undertaken: 1) to determine a) the effect of varying amounts of practice with error feedback on subsequent retention, and b) whether the degree of subsequent retention is a function of time; and 2) to study a technique for presenting error feedback in a novel way in order to enhance subsequent retention. In the first experiment, four groups of 12 Ss each were required to draw lines of a stated length while blindfolded. Error feedback was a statement of "right" or "wrong." Experimental conditions varied for each of three groups; the fourth group served as control. Effect of the form of error feedback provided during training on subsequent retention was investigated and implications of results for the design of simulators were discussed.
T. G. R 11

15,362
Creelman, C.D. DETECTION OF COMPLEX SIGNALS AS A FUNCTION OF SIGNAL BANDWIDTH AND DURATION. Contract AF 19(604) 2277 & Contract NONR 1224(22), NR 049 122, 2659 8 T, Tech. Rep. 99 & AFCRC TN 59 59, Jan. 1960, 16pp. Dept. of Electrical Engineering, University of Michigan Research Institute, Ann Arbor, Mich.

15,362
An experimental examination of the efficiency of human observers in detecting a stimulus wave form which consists of a train of damped sinusoids was reported. The signal duration and degree of damping (or spectral bandwidth) were varied, with the energy of the signal held constant. The combined effects of duration and of increased signal bandwidth on signal detection were analyzed. The results were compared to previous data collected with sine-wave stimuli.
T. G. I. R 12

15,363
Callaway, E., III & Yeager, C.L. RELATIONSHIP BETWEEN ALPHA PHASES AND REACTION TIME. Contract NONR 2931(00), May 1960, 9pp. Langley Porter Neuropsychiatric Institute, San Francisco, Calif.

15,363
This report presents a method for studying the relationship between brain potentials and behavior. The particular application that illustrates the technique is a study of the relationship between human ten-cycle-per-second "alpha rhythm" and speed of reaction to a visual stimulus. The equipment used allows presentation of a stimulus at a predetermined alpha phase; the subject presses a key in response and reaction time is automatically recorded. The results from two experiments are analyzed in terms of the theory of a "neuronic shutter" relating alpha activity to behavior.
T. G. I. R 11

15,364
Harbold, G.J. WHISPERED MONOSYLLABIC SPEECH, INITIAL AND FINAL CONSONANT CONFUSIONS. Ohio State University Research Foundation Contract N6ONR 22525, Proj. NR145 993 & Bumedsurg. Proj. MR005.13 7003, Subtask 1, Rep. 86, March 1960, 13pp. USN School of Aviation Medicine, Naval Air Station, Fla.

15,364
The purpose of this study was to investigate listener recognition of recorded monosyllables compared according to cognate consonants. Four male speakers recorded 100 words randomly: 50 words using voiceless cognate consonants and 50 containing five pairs of cognate consonants—five words with each pair in the initial position and five words with each pair in the final position. Each speaker list was presented under each of four listening conditions; 12 subjects served for each speaker list under one listening condition. Subjects were required to write down the words they heard. Possible speaker differences, responses to consonants in both initial and final positions, and responses for each consonant under each signal-to-noise listening condition were considered.
T. G. R 9

15,365
Haight, F.A. THE GENERALIZED POISSON DISTRIBUTION. Reprint 80, Aug. 1959, 5pp. Institute of Transportation and Traffic Engineering, University of California, Los Angeles, Calif.

15,365
The assumption of random distribution of arrival times of cars in a study of vehicular traffic was found to be unsatisfactory because: 1) very small gaps do not occur as frequently as theory requires, and 2) some interference between vehicles exists which introduces an element of regularity into arrival times. Alternative models were discussed: Feller's model for Type I particle counter and Gerlough's suggestion to translate the negative exponential distribution away from the origin. A Type III distribution was suggested and was developed as a more satisfactory type of solution.
T. R 8

15,366
Haight, F.A. TWO QUEUES IN PARALLEL. Reprint 70, 1958, 10pp. Institute of Transportation and Traffic Engineering, University of California, Los Angeles, Calif. (Reprinted from: Biometrika, Dec. 1958, 45, 401-410).

15,366
"The method of differential-difference equations is used to investigate the case in which each arrival to a system of two queues joins the shorter queue, or, if they are of equal length, one particular queue. In case each person must remain in the queue which he originally joins, relations are obtained between the asymptotic state probabilities. If queuers are permitted to change queues whenever it seems advantageous to do so, the formulation is simplified, and explicit expressions are obtained."
R 1

15,367
Haight, F.A. OVERFLOW AT A TRAFFIC LIGHT. Reprint 78, 1959, 5pp. Institute of Transportation and Traffic Engineering, University of California, Los Angeles, Calif. (Reprinted from: Biometrika, Dec. 1959, 46, 420-424).

15,367
Under the assumption of continued input in every circumstance except zero queue length, the probability is computed of Z cars being in the queue at the beginning of a red phase of fixed cycle lights when there were X cars in the queue at the beginning of the preceding green phase. The case of traffic along a main street into a signalized intersection which is governed by a light possibly actuated by side street traffic is also considered.
R 5

15,368
Haight, F.A. QUEUEING WITH RENEGING. Reprint 74, 1959, 14pp. Institute of Transportation and Traffic Engineering, University of California, Los Angeles, Calif.

15,368
This paper considers a queue in which a person who has joined it may decide to leave if it appears that the time consumed will exceed the time he has available. Three specific problems are treated: 1) How to make a rational decision while waiting in a queue, 2) The probable effect of this decision, and 3) The behavior of a queue in which all persons are employing such a procedure.
G. R 10

15,369
Haight, F.A. TOWARDS A UNIFIED THEORY OF ROAD TRAFFIC. REPRINT 68. April 1958, 14pp. Institute of Transportation and Traffic Engng., University of California, Los Angeles, Calif. (Reprinted from: Operations Res., Nov.-Dec. 1958, 6(6), 813-826.).

15,369
Three types of descriptive theories of vehicular traffic (vehicles treated individually, statistically, or as particles satisfying a certain partial differential equation) are treated briefly. It is indicated how the three methods correspond to different types of traffic situations and how the properties common to each type are dealt with. The operating speed y of a car is a function of desired speed x and traffic density λ, where x and y are random variables and λ a real parameter. Relationships are proposed between the distributions of x and y and quantities which occur in empirical studies of traffic. It is postulated that for large λ queueing theory may be usefully employed, and several necessary modifications are discussed.
I. R 35

15,370
Klein, S.J., Freda, R.N. & Lowi, B.H. THE EFFECTS OF HYPOXIA ON AUDITORY SENSITIVITY. III. THRESHOLD SHIFTS WITH MASKING IN THE OPPOSITE EAR. Proj. TED NAM AE 5112, Rep. NAMC ACEL 429, March 1960, 14pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

15,370
To determine auditory threshold shifts in human Ss in the presence of a masking signal as a function of 1) the percent oxygen in the inspired gas, 2) the frequency at which the threshold is being measured, and 3) the method of transmitting the signal (bone or air conduction), five male adults inspired from tanks an oxygen-nitrogen mixture of 9.6 and 20.96 percent oxygen by volume. Air and bone thresholds, with masking in the opposite ear, were determined at frequencies ranging from 256 to 4096 cps in one-octave increments before tank breathing, during tank breathing, and at ten-minute intervals up to one hour after return to normal breathing. The results were analyzed for the conditions under which reduced oxygen intake affects hearing sensitivity.
G. R 7

15,371
Kelly, J., Dennen, W. & Martel, R. RESEARCH REPORT AN EXPERIMENTAL STUDY OF VARIABLES ASSOCIATED WITH THE LEARNING OF MORSE CODE PART I. Oct. 1958, 16pp. Educational Methods & Evaluation Dept., USA Security Agency School, Fort Devens, Mass.

15,371
In an effort to select and utilize the most efficient and practical methods of training Morse Code operators, an investigation was conducted of variables in the learning situation that were judged to be of singular importance to the outcome of training in the job situation: 1) incorporation of actual job features into initial training, 2) diversification of teaching techniques, and 3) overlearning. Three groups of enlisted students in the USA Security School, equated on general ability on General Technical Score (Army General Classification Battery) and code aptitude, were trained to receive International Morse Code by three different instructional techniques designed to test the three variables. An evaluation of variable (1) was reported here. (See also 15,372).
T. G.

15,372
Kelly, J., Dennen, W. & Martel, R. RESEARCH REPORT AN EXPERIMENTAL STUDY OF VARIABLES ASSOCIATED WITH THE LEARNING OF MORSE CODE PART II. Jan. 1958, 26pp. Educational Methods & Evaluation Dept., USA Security Agency School, Fort Devens, Mass.

15,372
This was a continuation of the study reported in 15,371 on variables associated with the learning of Morse Code. The second and third variables--diversification of training techniques and overlearning--were reported herein. Data from the three training groups were used in evaluating the effects of the first and second variables. All three groups were administered a series of standardized tests to evaluate the effect of overlearning.
T. G. I.

15,373
Kawabata, H. COURSE OF THE POTENTIAL CHANGE IN THE HUMAN ELECTRORETINOGRAM DURING LIGHT ADAPTATION. J. opt. Soc. Amer., May 1960, 50(5), 456-461. (Dept. of Psychology, Florida State University, Tallahassee, Fla.).

15,373
To confirm the course of ERG potential changes during light adaptation and to study the photopic and scotopic conditions of the retina through the ERG phenomena, various conditions of light stimulation were used. Four male Ss were used to obtain: 1) light adaptation course to a white (26 degree) test stimuli of retinal illuminances of 5.0, 4.5, and 4.0 log trolands, 2) early light adaptation course to same light luminances as before, 3) light adaptation course to red test stimulus in relatively high adapting intensity, and 4) light adaptation courses of K and b waves to red test light of weak adapting intensity.
G. I. R 17

15,375
Levin, W.C., Schneider, M. & Gerstner, H.B. INITIAL CLINICAL REACTION TO THERAPEUTIC WHOLE-BODY X-RADIATION - SOME CIVIL DEFENSE CONSIDERATIONS. Rep. 60 1, Nov. 1959, 9pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Medical Branch, University of Texas, Galveston, Tex.).

15,375
This report describes early clinical events displayed by 11 cancer patients after whole-body roentgen treatment in a single large dose and compares these events with published reports of "radiation sickness" with acute sequelae observed in nuclear accidents. The potential role of early radiation-induced response in nuclear disasters is evaluated.
T. R 14

15,376
Kelley, C.R., Bowen, H.M., Ely, J.H. & Andreassi, J.L. TRACKING TRAINING III: TRANSFER OF TRAINING. Contract NONR 1908(00), Tech. Rep. NAVTRADEVCEN 1908 00 3, Jan. 1960, 67pp. USN Training Device Center, Port Washington, N.Y.

15,376
The number and cost of training equipment increases under the assumption that skills are specific to particular tasks. The hypothesis that tracking skill was not entirely specific to particular systems and that a general tracking trainer could be designed was investigated in previous studies. The present study investigated the transfer of training in tracking tasks with special attention to the existence of general tracking skill. Data were collected from field and pilot studies and laboratory experiments. Implications of results of the investigation for the design of tracking trainers are discussed.
T. G. I. R 4

15,377
Kobrick, J.L. & Crist, B. QUARTERMASTER HUMAN ENGINEERING HANDBOOK SERIES: VII. THE SIZE AND SHAPE OF THE AVAILABLE VISUAL FIELD DURING THE WEARING OF ARMY HEADGEAR. Proj. 7 83 01 007, Tech. Rep. EP 133, May 1960, 21pp. USA Quartermaster Research & Engineering Center, Natick, Mass.

15,377
This report furnishes information in tabular form on the size and shape of available visual fields during the wearing of 12 Army headgear ensembles. Schematic diagrams are also provided to aid in visualizing size and shape of the visual fields. The measurements were made on four soldier test subjects with normal vision. Visual fields were mapped for bareheaded vision and for each of the headgear ensembles.
T. G. R 7

15,378
Lathrop, R.G., Grave, C. & Laney, S.G. EVALUATION OF THE HUMAN FACTORS ASPECTS OF THE GAM-77 (HOUND DOG). ARDC Proj. 131B, APGC Proj. 131BS1, APGC TN 60 19, April 1960, 31pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

15,378
The objective of this study was to obtain data upon which judgments in the following kinds of areas could be made: deficiencies in human engineering, training requirements, quality of operator and maintenance publications, environmental hazards, manpower requirements, protective device requirements, and fatigue factors in aircrew training. Observation, informal interviews, review of equipment at an aviation plant, a publication check-list, tabulation of personnel requirements against recommended tables of organization and research of available literature on fatigue were among methods used for data gathering. Recommendations were made for improvement of operational capabilities of weapon systems.
T. I. R 10

15,379
Logie, L.C., Brown, W.L., Pizzuto, J.S. & Overall, J.E. SOME EVIDENCE SUGGESTING THE PERCEPTION OF MODERATE-INTENSITY RADIATION AMONG ALBINO RATS. Rep. 60 5, Sept. 1959, 5pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (University of Texas, Austin, Tex.).

15,379
Two experiments designed to test the hypothesis that albino rats perceive x-radiation as a noxious stimulus are reported. Each experiment involved two conditions which were exactly alike except for the location of a protective lead shield. For half of the subjects, the lead shield was located in front of the right-hand compartment of the shuttle-boxes; for the other half, the lead shield was in front of the left-hand compartment. The boxes were placed in front of an x-ray machine operated so as to give an average dose rate of one roentgen per minute inside the non-shielded compartment. Time spent by each subject in the non-shielded compartment was recorded over a period of 20 hours. Sex differences were also investigated.
T. G. R 3

15,380
Lit, A. MAGNITUDE OF THE PULFRICH STEREOPHENOMENON AS A FUNCTION OF TARGET THICKNESS. J. opt. Soc. Amer., March 1960, 50(3), 321-327. (Vision Research Labs., University of Michigan, Ann Arbor, Mich.).

15,380
When filters of unequal optical density are placed in front of the two eyes, a target which is actually oscillating in a frontoparallel plane appears nearer than it really is for one direction of stroke and farther than it really is for the return stroke (Pulfrich stereophenomenon). Measurements of the near and far displacement of an oscillating black vertical rod were obtained as functions of: 1) target thickness, 2) target velocity, and 3) condition of unequal binocular retinal illuminance. Two observers were used.
T. G. I. R 5

15,381
Loeb, M. COMPARISON OF ATTENUATION OF THREE HELMETS AND A PAIR OF MUFFS BY THE THRESHOLD SHIFT METHOD. Proj. 6X95 25 001, Task 01, Rep. 429, July 1960, 5pp. USA Medical Research Lab., Fort Knox, Ky.

15,381
To measure the acoustical attenuation characteristics of three helmets and a good representative pair of earmuffs, the shift in threshold at various frequencies which occurred when personnel were wearing the items was determined. Eight enlisted personnel (United States Armor Board) served as subjects. Auditory threshold for pure tones of 125, 250, 500, 1000, 2000, 4000, and 8000 cycles per second were obtained in quiet and with each item being tested. Median attenuation values were determined for each helmet and the earmuff. Recommendations for necessary noise protection devices were made.
T. R 3

15,382
Loeb, M. & Schmidt, E.A. INFLUENCE OF TIME ON TASK AND FALSE INFORMATION ON EFFICIENCY OF RESPONDING TO PURE TONES. Proj. 6X95 25 001, Task 01, Rep. 426, July 1960, 8pp. USA Medical Research Lab., Fort Knox, Ky.

15,382
To determine whether responses to faint and moderately loud, simple, infrequent auditory stimuli may be maintained over a period of time and whether simulated knowledge of results may be used to maintain performance, ten subjects were asked to respond rapidly to infrequent, randomly presented brief, low frequency tones over four 50-minute periods on successive days. During two of these periods subjects responded to ten decibel tones; during the other two, to 60 decibel tones. For one period at each intensity, information was given after each response which supposedly related to performance but actually did not. Reaction times and failures to respond were analyzed for the effect of the above conditions.
T. G. R 11

15,383
Hicks, S.A. THE EFFECTS OF FOUR HOURS CONFINEMENT IN MOBILE ARMORED PERSONNEL CARRIERS ON SELECTED COMBAT RELEVANT SKILLS: A PILOT STUDY. ORD Proj. TH1 1000, Tech. Memo. 3 60, ca. 1960, 37pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

15,383
This study was undertaken to determine changes in general combat relevant performance as a result of four hours confinement in a maneuvering Armored Personnel Carrier. Fifty enlisted men were tested both before and after confinement on tests designed to measure stamina, response time, gross motor coordination, arm steadiness, equilibrium, and eye-arm coordination. Performance data were compared for the two testing periods for changes attributable to confinement. The general procedures used and the appropriateness of the measuring devices were studied in terms of their usefulness for future research in this area.
T. I. R 7

15,384
Licklider, J.C.R., Christman, R.J. & Guttman, N. ON JAMMING SPEECH COMMUNICATION WITH COHERENTLY AMPLITUDE-MODULATED INTERFERENCE. Contract AF 18(600) 1219, AFCRC TN 57 58, Oct. 1957, 22pp. USAF Operational Applications Lab., Bolling AFB, Washington, D.C. (Massachusetts Institute of Technology, Cambridge, Mass.).

15,384
Two ways of achieving the goal of speech intelligibility to friendly and unintelligibility to enemy ears were investigated. In both techniques an interfering signal was superimposed upon the speech signal which, when removed, left the speech intelligible. The two techniques were based on different strategies for shaping the interference to impair intelligibility, and each is described and illustrated.
G. I. R 3

15,385
McNaughtan, I.I., Day, D.J. & Beckman, E.L. INVESTIGATIONS INTO THE PROBLEM OF CANOPY OPENING IN ESCAPE FROM DITCHED AIRCRAFT. Mech. Eng. TN 299, FPRC Paper 1091, Sept. 1959, 37pp. Royal Aircraft Establishment, Farnborough, Hants, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

15,385
This report presented a re-evaluation of the problem of canopy jettison from a submerged aircraft. When an aircraft has ditched and submerged with the canopy closed, the canopy may be forcibly held shut by the water pressure load. A theoretical analysis of the problem was made and preliminary trials conducted to evaluate the factors which prevent jettisoning of the canopy. The time required for a subject to jettison the canopy manually after the aircraft had submerged to 30 feet was determined. Recommendations were included.
T. G. I. R 3

15,386
McFarland, R.A., Domey, R.G., Warren, A.B. & Ward, D.C. DARK ADAPTATION AS A FUNCTION OF AGE: I. A STATISTICAL ANALYSIS. J. Geront., April 1960, 15(2), 149-154. (Dept. of Industrial Hygiene, Harvard School of Public Health, Boston, Mass.).

15,386
To make a detailed statistical study and interpretation of the relationship between age and dark adaptation, 240 male subjects, 30 from each decade ranging from the teen-age level through the age of 89 years, and drawn from a wide variety of sources, were tested using the Hecht-Schlaer Adaptometer. After one minute in the dark followed by pre-exposure to 1600 millilamberts for three minutes, dark adaptation thresholds were taken for 21 time intervals over a 40-minute period. The analysis included the determination of the cone-rod transition point and of age and dark adaptation threshold intercorrelations. The significance of these data in practical situations is considered.
T. G. R 24

15,387
Muhlick, L., Shanker, P. & Dvorak, A. AN IBM TYPE 650 PROGRAM FOR COMPUTING CORRELATION COEFFICIENTS BETWEEN PAIRED VARIABLES. Contract NONR 477(08), March 1960, 11pp. Division of Counseling and Testing Services, University of Washington, Seattle, Washington.

15,387
A program is given which computes correlation coefficients between pairs of three digit variables for up to 24 pairs at a time. Output includes correlation coefficients for each of the pairs of variables, means, variances, and standard deviation for each of the variables, sums and sums of squares for the variables, and sums of cross products for each of the pairs of variables. The program is self-restoring which permits computation of a larger number of correlation coefficient variables. The program is in fixed decimal form, and will handle up to 10,000 cases with scores ranging from 000 to 999.
R 3

15,388
Mills, A.W. LATERALIZATION OF HIGH-FREQUENCY TONES. J. acoust. Soc. Amer., Jan. 1960, 31(1), 132-134. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.).

15,388

To test the duplicity theory of auditory localization--that perception of the direction of a sound source is based on interaural differences in phase or time for sounds of low frequency and interaural differences in intensity for sounds of high frequency, thresholds for interaural difference between the intensities of dichotic tone pulses were measured on five Ss by the method of constant stimuli at frequencies between 250 and 10,000 cps and at a sensation level of 50 db. The threshold data were compared with those produced by the just noticeable deviation from the median plane of an actual source of tone pulses. The relation between the discrimination of dichotic differences in phase and intensity and the discrimination of actual direction was shown in a graphical summary.
G. R 9

15,390

Moser, H.M., Dreher, J.J., O'Neill, J.J. & Adler, S. A COMPARISON OF SINGLE- AND DOUBLE-BOUNCE TRANSMISSION UPON THE INTELLIGIBILITY OF OPERATIONAL WORDS. Contract AF 18(600)316, RF Proj. 519, Tech. Rep. 30 & AFCRC TN 55 69, Aug. 1955, 4pp. Ohio State University Research Foundation, Columbus, Ohio.

15,390

This study extends previous studies of the effects of voluntary stuttering upon the transmission of two-digit numbers and single words. A "double-bounce" type of transmission was employed to investigate the hypothesis that no difference would be found in articulation scores between "single-bounce" and "double-bounce" transmission of single words. Material recorded by a male speaker consisted of 50 words randomized into six lists of 50 test items each. Ten listeners were trained on practice lists using non-stuttered speech. Intelligibility scores for the two types of transmission were compared.
T. G. R 5

15,392

Sampson, P.B., Elkin, E.H., Heriot, J. & Nelson, R. HEAD AND EYE TRACKING IN RESPONSE TO VELOCITY AND ACCELERATION INPUTS. FINAL REPORT. Contract NONR 494(16), Proj. NR 144 122, April 1960, 45pp. USN Physiological Psychology Branch, ONR, Washington, D.C. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.).

15,392

This study was conducted to find out how well visual tracking could take place when both the head and the eyes were free to follow moving targets and to discuss the relevance of the findings to the use of the eye as a control mechanism. The target swung horizontally about the subject at three different velocities (30, 60, and 90 degrees per second) and three accelerations (5, 20, and 45 degrees per second squared). Photographic records were analyzed for tracking error in degrees of head and eyes. Results were compared with those in the literature for tracking with the head fixed. An electric circuit analog was developed for part of the data and used to predict head and eye output in response to acceleration units.
T. G. I. R 21

15,393

The Sierracin Corporation. MA-3 ELECTRICALLY HEATED FACEPIECE. Contract AF 33(616) 3746, Proj. 6333, Task 63617, WADD TR 60 88, Jan. 1960, 21pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

15,393

A proprietary, transparent, electrically conductive coating, "Sierracote III," was successfully incorporated into laminated, formed, optically and thermally satisfactory facepieces for production pressure helmets. Some experimentation with surface coated parts of monolithic acrylic structure was also conducted.
I.

15,395

Steiner, S.H. STANDARDIZATION OF AN ENDPOINT TO POSITIVE ACCELERATION ON THE HUMAN CENTRIFUGE. Proj. 7222, Task 71746, WADC TN 59 426, Dec. 1959, 8pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

15,395

To establish an objective and standardized endpoint for positive acceleration experiments, a comparison was made of blackout thresholds to a red filtered light of 760μ, raised 0.5 log units above the visual threshold in dark adapted subjects and to a white light in the same subjects. Differences among the subjects as well as differences between the two lights were analyzed. The variability of results from centrifuge to centrifuge was discussed together with physiological implications, advantages, and possible sources of error.
T. G. R 7

15,396

SantaMaria, L.J., Klein, S.J. & Greider, H.R. THE MAINTENANCE OF THERMAL COMFORT IN A FULL PRESSURE SUIT AT SIMULATED ALTITUDE. Aerospace Medicine, April 1960, 31, 288-295. (USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.).

15,396

To determine the effects of various environmental factors on flow rates necessary for the maintenance of comfort in a full pressure suit, three subjects were exposed to different levels of ambient and ventilating temperatures (125 and 60, 125 and 90, 150 and 60, and 150 and 90 degrees F). The subject wore the full pressure suit, under which was worn the ventilating garment, for two hours at simulated altitude of 18,000 feet. Additional information was obtained regarding effects of the experimental conditions on various physiological measures while subjects reported a feeling of comfort on a seven-point scale. The data were studied by analysis of variance methods.
T. G. R 7

15,397

Senay, L.C., Jr., Christensen, M.L. & Hertzman, A.B. FINGER AND FOREARM CUTANEOUS BLOOD FLOWS DURING CHANGING AMBIENT TEMPERATURES. Contract AF 33(616) 3357, Proj. 7164, Task 71830, WADD TR 60 15, March 1960, 46pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

15,397

To study cutaneous vascular responses to heat stress, nude subjects (resting state) were exposed to a slowly rising ambient temperature from a comfortable environment of about 16 degrees C. to one of 45 degrees C. Cutaneous vascular events were recorded continuously over a period of approximately four hours. The experimental design permitted systematic description of changes in blood flow in skin of hand and forearm during heat exposure, appraisal of the influence of local skin temperature on the vasodilation in same area, and of the relation of cutaneous vasodilation to local sweating response, and the measurement of the maximal vasodilation which could be attained in a particular skin region.
T. G. I. R 20

15,398

Siegel, A.I., Bulinkis, J., Hatton, R. & Crain, K. A TECHNIQUE FOR THE EVALUATION OF OPERATOR PERFORMANCE IN PRESSURE SUITS AND OTHER FLIGHT APPAREL. Contract N156 34553, March 1960, 97pp. USN Crew Equipment Lab., NAMC, Philadelphia, Penn. (Applied Psychological Services, Wayne, Penn.).

15,398

The need for a rigorous method for evaluating perceptual and motor performance in full pressure suits and other flight apparel has been a continuous one in naval aviation. This report describes a method, based on a series of generally accepted measurement techniques, for meeting this need. The scheme is based on determinations of performance capability of the following types: rate of movement, psychomotor coordination, manual dexterity and light manipulatory performance, work-space requirements, visual field, anthropometric flexibility, manipulative area, and effort required to perform the task. The methods, apparatus, and equipment for performing the required measurements are described.
T. G. I. R 3

15,399

Torgersen, P.E. AN EXAMPLE OF WORK SAMPLING IN A HOSPITAL. Reprint 12, Nov. 1959, 4pp. Engineering Experiment Station, Ohio State University, Columbus, Ohio. (Reprinted from: J. Industr. Engng., May-June 1959, 197-200).

15,399

This article illustrates with a case study two of the newer applications of work sampling: 1) analysis of human activities in a setting somewhat alien to the industrial engineer and 2) measurement of performance in professional work groups. The example given concerns a work sampling of the work of the registered nurse in a hospital. A step-by-step description is given of the preliminary work and the manner of making the observations. The data from 1600 observations are presented in tabular form and used to point up the possibilities of work sampling in this type of situation.
T. R 7

15,400

Wokoun, W. DETECTION OF RANDOM LOW-ALTITUDE JET AIRCRAFT BY GROUND OBSERVERS. Proj. 5U16 04 012, Tech. Memo. 7 60, June 1960, 59pp. USA Ordnance Human Engineering Lab., Aberdeen Proving Ground, Md.

15,400

The efficiency of the human ground observer in detecting and identifying jet fighter aircraft was studied as a function of size of sector observed (360, 180, 90, and 45 degrees) and aircraft altitude (500 and 1500 feet), when targets appeared essentially at random. Particular emphasis was placed on allowing subjects (30) minimal information about when and where aircraft might appear. Three types of aircraft (T-33, F-86, and F-100) approached along six courses at the two altitudes. Results include cumulative probability curves indicating the likelihood that aircraft will be detected or identified at any given distance for the various combinations of search sector size and altitude, as well as supplementary analyses.
T. G. I. R 6

15,401

Wulfeck, J.W., Crook, Dorothea J. & McBride, P.I. STUDIES ON DARK ADAPTATION EXPERIMENTS I, II, AND III - THE PRE-EXPOSURE TOLERANCE OF THE HUMAN FOVEA ADAPTED TO DIFFERENT BRIGHTNESS LEVELS, INCLUDING DARKNESS. FINAL REPORT PERIOD: 1 SEPTEMBER 1952 - 30 AUGUST 1953. Contract AF 30(602) 199, RADC TR 54 88, Oct. 1954, 34pp. USAF Rome Air Development Center, Griffiss AFB, N.Y. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.).

15,401

The effect on foveal dark adaptation of pre-exposure of the eye for brief durations to light of relatively low brightnesses was investigated. Monocular measurements were made of both absolute brightness sensitivity (RL) and difference or contrast sensitivity (DL), using a one-degree square centrally-fixated test patch. The three experiments dealt with 1) the pre-exposure tolerance of the dark-adapted fovea, 2) the pre-exposure tolerance of the fovea adapted to different brightness levels, and 3) the pre-exposure tolerance as measured by contrast sensitivity. Pre-exposure brightnesses ranged from 0.10 to 100 ft.-L and duration from 1 to 100 seconds. Adaptation levels of 0.10, 1.0, and 10 ft.-L were used.
T. G. I. R 14

15,402

Chase, R.A., Sutton, S. & First, Daphne. A DEVELOPMENTAL STUDY OF CHANGES IN BEHAVIOR UNDER DELAYED AUDITORY FEEDBACK. Sept. 1959, 21pp. Communications Lab., Department of Biometrics Research, New York, N.Y. (Columbis University College of Physicians and Surgeons, New York, N.Y.).

15,402

To investigate whether age is related 1) to the degree and kind of changes which occur in speech under delayed auditory feedback and 2) to the attitude of the child toward the experience of speaking under this condition, eight to ten children at each age from four to nine were required to speak under conditions of auditory feedback and delayed auditory feedback. Speech samples were recorded and analyzed for changes. All results were analyzed by nonparametric techniques. Results were related to those reported in previous studies. Differences in performance as these related to age were discussed in terms of developmental level, general mental development, and to possible differences in function at the receptor level.
T. R 12

15,403

Chase, R.A., Harvey, S., Standfast, Susan, Rapin, Isabelle, et al. STUDIES ON SENSORY FEEDBACK: THE EFFECT OF DELAYED AUDITORY FEEDBACK ON SPEECH AND KEY-TAPPING. Aug. 1959, 25pp. Communications Lab., Department of Biometrics Research, New York, N.Y. (Columbia University College of Physicians and Surgeons, New York, N.Y.).

15,403

Assuming that alteration in sensory feedback information would result in change in motor performance in question, the present investigation sought to answer: 1) are changes in time and intensity of speech and key-tapping under Delayed Auditory Feedback (DAF) qualitatively the same for the two motor systems?, 2) does the same DAF result in more change in motor performance for one system than for the other?, 3) does the amount of change in a subject's performance under DAF in the two modalities correlate? Fourteen subjects were asked to repeat the sound "b" in groups of three sounds under normal and delayed feedback. They were also asked to tap on a key in groups of three under the same conditions.
T. G. I.

15,404

Caldwell, L.S. THE EFFECT OF FOOT-REST POSITION ON THE STRENGTH OF HORIZONTAL PULL BY THE HAND. Proj. 6X95 25 001, Task 03, Rep. 423, June 1960, 17pp. USA Medical Research Lab., Fort Knox, Ky.

15,404

To determine the effects of foot-rest position on the strength of horizontal pull by the hand, 11 Ss were observed under the following conditions. Three thigh angle (0, 10, and 20 degrees) were combined factorially with three knee angles (110, 130, and 150 degrees) to produce nine foot-rest positions. At each position the peak strength of the hand movement was determined at four elbow angles (60, 95, 130, and 165 degrees). The data, mean strength of pull movement in lbs., were analyzed to find optimum foot-rest position for maximum strength of handpull.
T. G. R 9

15,405

Clarke, F.R. CONFIDENCE RATINGS, SECOND-CHOICE RESPONSES, AND CONFUSION MATRICES IN INTELLIGIBILITY TESTS. J. acoust. Soc. Amer., Jan. 1960, 31(1), 35-46. (Hearing and Communication Lab., Indiana University, Bloomington, Indiana).

15,405

A series of studies were conducted dealing with the responses of human observers to speech stimuli transmitted in a background of white Gaussian noise. In all cases the listeners attempted to identify the transmitted items and then made a second response in an attempt to convey additional information. The second response was either a second-choice identification or a confidence rating (estimation of the probability that the identification was correct). The information gained by both types of responses was computed from the data of two similar experiments using message sets of 4 and 16 items. Rating responses were used to generate receiver operating characteristic (ROC) curves and to predict performance of a different group of observers whose task was to monitor subsets of messages. T. G. R 22

15,406

Brown, J.L., Phares, L. & Fletcher, Dorothy E. SPECTRAL SENSITIVITY OF THE EYE BASED ON VISUAL ACUITY. Proj. TED ADC AE 5210, Bumedsurg. Task MR 005.13 6002.1, Rep. 12, & Rep. NADC MA 6006, April 1960, 28pp. USN Aviation Medical Acceleration Lab., NADC, Johnsville, Penn.

15,406

To obtain spectral sensitivity thresholds using visual acuity as a criterion, relative energy thresholds were measured for the identification of the orientation of grating test objects and for light detection at each of 32 narrow wavelength bands throughout the visible spectrum (400 and 710 mu). Visual acuity requirements were 0.33, 0.20, 0.11 minutes of arc; some additional data were obtained for five other acuity levels between 0.45 and 0.09. Two observers were used. Log relative energy thresholds for light detection and for three acuity levels were analyzed and compared with predictions derived from the literature in which other threshold criteria were used. Practical use of the findings are indicated.
T. G. I. R 11

15,407

Brown, R.H. ANALYSIS OF VISUAL SENSITIVITY TO DIFFERENCES IN VELOCITY. Projs. A W 102 002 (AV 53001), NE 091 600 2(S 1893) & W 1164, NRL Rep. 5478, May 1960, 16pp. USN Research Lab., Washington, D.C.

15,407

This report presents an analysis of the data of an extensive experimental literature on visual sensitivity to differences in velocity. Such differences have commonly been measured by presenting two objects that move at slightly different but constant speed; the least detectable difference in speed is the differential threshold for the magnitude of velocity. Threshold data were plotted against speed for comparison stimuli that were presented adjacent, separate, or superimposed. The sensitivity was calculated and expressed in terms of the ratio of the threshold to speed. This ratio for velocity was applied to tracking and other predictive behavior.
T. G. I. R 51

15,408

Dempster, W.T., Gabel, W.C. & Felts, W.J.L. THE ANTHROPOMETRY OF THE MANUAL WORK SPACE FOR THE SEATED SUBJECT. Amer. J. phys. Anthrop., Dec. 1959, 17(4), 289-317. (Department of Anatomy, University of Michigan, Ann Arbor, Mich.).

15,408

The anthropometry of the manual work area was approached by an indirect method using photographic records of time exposures showing the motions of a tiny neon lamp at the hand grip. The records of 22 seated male subjects were analyzed for eight sets of motions involving the forward-directed hand and different grip orientations. The limits of space within reach relative to the mid-sagittal junction of the seat and chair back were defined. Variability data were obtained from the graphical records of the different hand-range spaces. The findings are discussed in relation to the geometry of the more effective hand positions and in relation to practical problems of work space designing.
T. G. I. R 48

15,409

Elliot, P.B. TABLES OF D'. Contract AF 19(604) 2277, 2659 7 T, Tech. Rep. 97 & AFCRC TR 59 55, Oct. 1959, 40pp. Dept. of Electrical Engineering, University of Michigan Research Institute, Ann Arbor, Mich.

15,409

Tables of d' for yes-no and forced-choice experiments are presented in this report together with explanations and assumptions involved in the calculations. The tables were compiled for use in a specific type of experiment in signal detectability in which a single signal with fixed probability of occurrence is transmitted over a channel with band-limited white Gaussian noise.
T. G. R 3

15,410

Egan, J.P., Greenberg, G.Z. & Schulman, A.I. ANALYSIS OF THE METHOD OF FREE RESPONSE IN SIGNAL DETECTABILITY. PRELIMINARY REPORT. Contract AF 19(604) 1962, Nov. 1959, 16pp. Hearing and Communication Lab., Indiana University, Bloomington, Ind.

15,410

This is a preliminary report of a procedure for deriving a single measure of detectability where signals are presented randomly and under a method of free response The problem was to discover a procedure allowing all yes-responses to be separated according to rightness or wrongness of the response. A detailed analysis of the model used and the method developed is presented.
G. I. R 7

15,411

Frances, A.S. THE PERSONNEL PROBLEMS OF OFFICE AUTOMATION. Dunlap and Associates, Inc., Stamford, Conn. (Reprinted from: The Office, Dec. 1959, 4pp.).

15,411

This article discusses the personnel conversion operations needed when automatic equipment is installed in an office. A model is presented which covers most of the personnel problems to be expected and the methods of using the model are discussed. The advantages of a systematic procedure for determining the basis for personnel conversion are pointed up.
I.

15,415

Garner, W.R. & Carson, D.H. A MULTIVARIATE SOLUTION OF THE REDUNDANCY OF PRINTED ENGLISH. Psychol. Rep., 1960, 6(Mono. Suppl. 3 V6), 123-141. (Johns Hopkins University, Baltimore, Md.).

15,415

This paper presents an analytic approach to the solution of the problem of the redundancy of printed English. Separate sources and kinds of restraint are identified and their interrelationship examined. A multivariate analysis of the sequential constraint was performed using data from the literature. Additional data were obtained from 160 persons who were required to insert single letters deleted at various positions of different length sequences. From the figures obtained, redundancy is computed.
T. G. R 11

15,416

Harker, G.S. TWO STEREOSCOPIC MEASURES OF CYCLOROTATION OF THE EYES. USAMRL Proj. 6X95 25 001, Task 02, Rep. 419, April 1960, 16pp. USA Medical Research Lab., Fort Knox, Ky.

15,416

To demonstrate the equivalence of two stereoscopic measures of myologic cyclophoria (1) vertically displaced points of light to be adjusted to equidistance or verticality in stereoscopic vision, and 2) a peripheral circle added to the displaced dots, with the dots adjusted to bring them into the plane or parallel to the plane of the circle), six observers were studied. Five- and twenty-minute sequences of alternating measures were run on two different days. Obtained measures were analyzed for differences between the two configurations.
G. I. R 9

15,417

Hershgold, E.J. & Riley, M.B. DIET INDUCED VARIATIONS IN TOLERANCE TO ALTITUDE HYPOXIA IN THE MOUSE. Proj. 7220, Task 71742, WADC TN 59 419, Dec. 1959, 4pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (Reprinted from: Proc. Soc. exp. Biol., 1959, 100, 831-834).

15,417

To investigate effects of diet on resistance to hypoxia, mice were used as experimental subjects. One group of mice was fed large amounts of carbohydrate prior to exposure to altitude hypoxia, another was fed lipids of varying saturations while fasting, another had large amounts of fat added to the normal diet, while other groups were fasted or fed only the normal diet. The animals were exposed to simulated altitudes of 33,000 feet; the time when each animal took its last breath was recorded and analyzed for the effect of diet in prolonging survival time.
T. R 12

15,418

Horst, P. OPTIMAL ESTIMATES OF MULTIPLE CRITERIA WITH RESTRICTIONS ON THE COVARIANCE MATRIX OF ESTIMATED CRITERIA. Psychol. Rep., 1960, 6(Mono. Suppl. 6 V6), 427-444. (University of Washington, Seattle, Wash.).

15,418

Two approaches to the problem of optimal utilization of manpower resources have been made traditionally: vocational guidance and vocational selection. The technical problem involved, "optimal differential assignment," has been approached in several ways. The present paper presented an approach which has the advantage of relative independence of number of cases involved (hence is not prohibitively expensive) and provides a complete mathematical formulation, the solution for the equations being obtainable by "straightforward well-known classical methods." A numerical example of the method was given.
T. R 5

15,419

Hauty, G.T. & Wendt, G.R. SECONDARY OCULAR NYSTAGMUS AS A FUNCTION OF INTENSITY AND DURATION OF ACCELERATION. Rep. 60 29, April 1960, 11pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (University of Rochester, Rochester, N.Y.).

15,419

To determine the nature of the secondary nystagmic response, three male subjects were subjected to three different velocities of rotation (180, 90, and 45 degrees per second) reached by different accelerations. With head fixed with a forward inclination of about 15 degrees, the subject experienced a trial consisting of a selected value of acceleration followed by five minutes of constant rotation, then a selected value of deceleration and a five-minute stationary period. The entire sequence of nystagmic responses was continuously recorded. From these records the secondary nystagmus was analyzed in terms of intensity and duration relations with the physical stimulus. The problem of origin is discussed.
T. G. R 34

15,420

Howland, D. APPLICATION OF OPERATIONS RESEARCH TO HIGHWAY PROBLEMS. Reprint 8, Jan. 1959, 9pp. Engineering Experiment Station, Ohio State University, Columbus, Ohio. (Reprinted from: Highway Res. Bd. Proc., 1958, 37, 72-80).

15,420

The basic character of operations research is described briefly as an attempt to conceive of specific problems as problems in the area of decision theory. In terms of this characterization, a question is raised regarding the role of operations research in the analysis of highway problems. Some examples of the application of this type of research to highway problems are given. This approach is compared with the traditional approach to highway problems. Some advantages as well as the difficulties associated with the use of operations research in this manner are pointed out.
R 11

15,421

Velasquez, T. CORRELATION BETWEEN ALTITUDE AND CONSCIOUSNESS TIME IN HIGH-ALTITUDE NATIVES. Rep. 60 8, Dec. 1959, 10pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Institute of Andean Biology, Dept. of Pathological Physiology, Faculty of Medicine, Lima, Peru).

15,421

The consciousness time was determined after withdrawal of oxygen supply at 32,000, 34,000, 36,000, 38,000, and 40,000 feet of simulated altitude, in high-altitude natives, residents of Morococha, located at 14,900 feet. A correlation curve between level of altitude and consciousness time was derived from the results. The end-point used corresponded to the time of "imminent unconsciousness."
T. G. I. R 7

15,422

University of California. HUMAN THERMAL TOLERANCE AND THERMAL BIOTECHNOLOGY. Contract AF 33(616) 5402, Prog. Rep. 58 30, April 1958, 6pp. Dept. of Engineering, University of California, Los Angeles, Calif.

15,422

A skin diffusion study of the water transfer through amputee stumps is described briefly. Some generalized statements are presented on the basis of preliminary analysis of results. A supplement contains a description of two physiological-thermal models of the heat transfer within and between man and his environment.
G. I.

15,423

Stevens, J.C., Mack, J.D. & Stevens, S.S. GROWTH OF SENSATION ON SEVEN CONTINUA AS MEASURED BY FORCE OF HANDGRIP. Contract NONR 1866(15), 6pp. Psycho-Acoustic Lab., Harvard University, Cambridge, Mass. (Reprinted from: J. exp. Psychol., Jan. 1960, 59(1), 60-67).

15,423

This is one of a series of studies investigating the validity of the general psychophysical law that subjective magnitude grows as a power function of stimulus magnitude. The subjects produced forces on a hand dynamometer to match various levels of subjective intensity for five kinds of criterion stimuli: electric current applied to the finger, white light, white noise, a 1000-cycle tone, and a 60-cycle vibration applied to the fingertip. The force of the handgrip in pounds was analyzed as a function of the intensity of the various criterion stimuli. The forms of these functions were then predicted by ratio scales of subjective intensity determined independently by the procedure of numerical estimation.
T. G. R 12

15,425
Benson, A.J. & Dearnaley, E.J. ESTIMATES OF ABILITY DURING ITERATIVE PERFORMANCE OF A FATIGUING TASK AND MEASURES OF ELECTROMYOGRAPHIC ACTIVITY IN A MUSCLE GROUP NOT DIRECTLY INVOLVED. Rep. 1092, July 1959, 1pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

15,425
To examine the relationship between EMG activity while Ss attempted to maintain a constant tension on a double-handled isometric myograph for as long as possible and estimates made by the Ss of how long they could continue, the integrated EMG was recorded from the left gastrocnemius soleus muscle group during three separate pulls separated by a five-minute rest. Each S was instructed to pull as long as he could and to estimate before and at 15-sec. intervals how long he could maintain the tension; duration of pulls, estimates of duration, and EMG were analyzed for relationships with fatigue, learning, and p rsonal data items.
T G. R 10

15,426
Benson, A.J. & Dearnaley, E.J. ESTIMATES OF ABILITY DURING A FATIGUING TASK WITH AND WITHOUT COMPETITION AND MEASUREMENT OF ELECTROMYOGRAPHIC ACTIVITY IN MUSCLE GROUPS NOT DIRECTLY INVOLVED. Rep. 1089, Feb. 1959, 13pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

15,426
The experiment reported here was a preliminary inquiry into two possible approaches to the general problem of fatigue and motivation: 1) the measurement of electromyographic activity in muscles not engaged in the primary task, and 2) subjective estimates of performance. In ten subjects the integrated electromyogram was recorded from the left gastrocnemius soleus muscle group while the subject attempted to maintain a tension of ten kilograms on a double handled isometric myograph. Experimental conditions were: 1) the tension achieved was not displayed, 2) the tension developed was displayed, 3) tension was displayed and an award was made for maximum duration and accuracy. Estimates of pull duration were made before (and at 15-minute intervals) each pull.
G. I. R 18

15,427
Blatteis, C.M. THE AFFERENT INITIATION OF SHIVERING. Proj. 6X64 12 001, Task 8, Rep. 418, March 1960, 12pp. USA Medical Research Lab., Fort Knox, Ky.

15,427
The activation of shivering was investigated in 30 lightly nembutalized dogs by surface cooling of the left rear leg amputated at the hip, excepting the bone, the femoral and sciatic-peroneal nerves and the femoral artery and vein. Temperatures, both internal and external, of the body and of the blood were taken continuously along with determination of oxygen consumption at ten-minute intervals. Shivering was monitored visually. Six dogs served as controls for the procedure without cooling. The data were analyzed for relation of onset of shivering to skin, deep body and/or brain temperatures.
T. G. R 30

15,428
Brissenden, R.F., Alford, W.L. & Mallick, D.L. FLIGHT INVESTIGATION OF PILOT'S ABILITY TO CONTROL AN AIRPLANE HAVING POSITIVE AND NEGATIVE STATIC LONGITUDINAL STABILITY COUPLED WITH VARIOUS EFFECTIVE LIFT-CURVE SLOPES. NASA TN D 211, Feb. 1960, 20pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

15,428
This study included the determination of the ranges of possible human-pilot control of the variable-stability airplane at various stability levels coupled with various reduced effective lift-curve slopes. Conclusions were based on analysis of flight data and pilot opinions.
T. G. I. R 6

15,429
Brown, R.H. SOME METHODOLOGICAL CONSIDERATIONS IN MEASURING VISUAL THRESHOLDS FOR VELOCITY. Projs. A W 102 002(AV 53001), NE 091 600 2(S 1893) & W 1164, NRL Rep. 5477, April 1960, 12pp. USN Research Lab., Washington, D.C.

15,429
This paper presents a theoretical analysis and review of literature data on methodology for measurement of thresholds involving speed of motion as a variable. Three assumptions are examined: 1) that the distribution of responses reported in different experiments as a function of speed involved the effects of random variables; 2) that the distribution function of speed in logarithmic units is normal; and 3) that the logarithmic-normal distribution function of speed provides for homogeneity of variance when an additional variable is introduced.
G. R 49

15,430
Biersdorf, W.R. & Armington, J.C. LEVEL OF LIGHT ADAPTATION AND THE HUMAN ELECTRORETINOGRAM. J. opt. Soc. Amer., Jan. 1960, 50(1), 78-82. (Walter Reed Army Institute of Research, Washington, D.C.).

15,430
The effects of two adaptational variables upon the human ERG were investigated: 1) temporal increase in ERG amplitude during light adaptation was studied both with white and red flashes; 2) the effects of constant luminance test flashes upon a wide range of adaptation levels were investigated. In both investigations an attempt was made to separate photopic and scotopic components of the ERG. The results were considered in relation to the duplicity theory and to the resting potential of the eye.
G. I. R 19

15,433
Coleman, H.J. A HUMAN FACTORS STUDY OF THE INTEGRATED VISUAL APPROACH AND LANDING AIDS (IVALA) SYSTEM. APGC TR 59 52, Dec. 1959, 96pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

15,433
This report presents the results of a human factors study of the visual approach and landing aids system installed at Dow Air Force Base, Maine. An evaluation is reported of the following components for their capability in providing pilots with sufficient visual guidance to complete a landing under any visibility conditions: Narrow Gauge Lighting System, Configuration "A" Approach Lighting System, Centerline Runout Lighting System, and Transverse Roll Guidance Bars. A comparative evaluation of Configuration "A" Approach Lighting System with the system installed at Westover Air Force Base, Massachusetts, is also reported. Recommendations are included.
T. I. R 24

15,438
Dearnaley, E.J. CHANGES IN ESTIMATES OF PERFORMANCE INDUCED BY THE THREAT OF RECEIVING AN ELECTRIC SHOCK IF THE ESTIMATES ARE NOT ACHEIVED. FPRC Memo 125, Oct. 1959, 5pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

15,438

To investigate how estimates of time for which it is possible to continue a difficult task would be affected by some element of danger if estimated performance was not achieved, 18 male subjects each made three attempts, separated by five-minute intervals, to maintain a tension of ten kilograms (± five per cent) on a double handled isometric myograph for as long as they could. Before his second and third attempt, each subject was asked to estimate his performance in time units; the threat of electric shock for failure to achieve the estimate was made for one of the last two trials. Estimates, expressed as percentage of previous performance, were studied for condition of threat of punishment vs. no threat.
T. R 6

15,439

Dzendolet, E. MANUAL APPLICATION OF IMPULSES WHILE TRACTIONLESS. Proj. 7184, Task 71586, WADD TR 60 129, Feb. 1960, 12pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

15,439

To determine what types of impulses can be applied manually by a man under tractionless conditions, 20 subjects were required to push in or pull out a plunger in one motion while anchored by one hand hold. Various frictional forces and travel distances were used under two friction conditions: normal and tractionless. Scores consisted of the percentage of subjects who could perform the push or pull in one continuous motion and duration in seconds. Observations of techniques used by subjects were made. The data were analyzed in terms of number of correct responses as a function of force and travel distance, duration of an effective impulse for various forces and distances, and shape of the impulse.
T. G. I. R 3

15,440

Eggleston, J.M., Baron, S. & Cheatham, D.C. FIXED-BASE SIMULATION STUDY OF A PILOT'S ABILITY TO CONTROL A WINGED-SATELLITE VEHICLE DURING HIGH-DRAG VARIABLE-LIFT ENTRIES. NASA TN D 228, April 1960, 60pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langely Field, Va.).

15,440

A winged-satellite vehicle which enters the atmosphere at high (approaching 90 degrees) angles of attack was simulated in five degrees of freedom by using a fixed-base simulator. The task of controlling the vehicle and the vehicle's trajectory during the entry was performed by a human pilot. Variations of the pilot's task, the static and dynamic stability, control effectiveness, and the effects of adverse coupling of aerodynamic control movements were investigated.
G. I. R 8

15,441

Ellis, J.P., Jr., Clark, R.T., Jr., Rambach, W.A. & Pickering, J.E. PROMPT EFFECTS OF HIGH-LEVEL IRRADIATION ON ANIMAL METABOLISM. Rep. 60 17, Jan. 1960, 9pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

15,441

To obtain information about early effects of radiation, monkeys were given whole-body exposures of 500 to 30,000 roentgens and sacrificed within two hours. Blood acid-base related components and free amino acids in plasma, spinal fluid, and five tissues were measured. All samples were collected within four hours following radiation.
T. I. R 12

15,442

Federman, P. & Siegel, A.I. WORK SPACE, VISUAL FIELD, AND CERTAIN CONTROL REQUIREMENTS FOR THE SEATED PILOT IN THE MARK III LIGHTWEIGHT FULL PRESSURE SUIT. Contract N156 34553, Feb. 1960, 56pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

15,442

Three separate but related studies were performed in order to describe for the aircraft cabin designer the maximal work space area and certain control requirements for the seated pilot wearing the MARK III light weight full pressure suit. Measurements were made on an anthropometrically representative sample of flight personnel under three suit pressurization conditions: 0, 0.5, and 2.0 lbs. per square inch. Maximal distances from the sea reference point that controls may be placed were determined; the rotary torque that could be exerted on a control at maximal reach distance was measured; and the limits of the visual field were determined.
T. G. I. R 5

15,444

Fried, C. STUDIES ON THE KINETIC DEPTH EFFECT AS A MEANS FOR PRESENTING THREE DIMENSIONAL INFORMATION I. METHODOLOGY AND SELECTION OF FORMS FOR STUDY. Proj. TB1 1000, Tech. Memo. 2 60, March 1960, 37pp. USA Ordnance Human Engineering Lab., Aberdeen Proving Ground, Md.

15,444

In an introductory study on the Kinetic Depth Effect, 12 stationary shadow projections of each of nine forms were presented to ten Ss to determine which forms appeared flat or two-dimensional and which appeared three-dimensional. An historical account of the Kinetic Depth Effect illusion and its pertinence for three-dimensional radar displays was presented.
T. G. I. R 28

16,000

Kelley, C.R. DEVELOPING AND TESTING THE EFFECTIVENESS OF THE "PREDICTOR INSTRUMENT." Contract NONR 2822(00), Tech. Rep. 252 60 1, March 1960, 28pp. Dunlap and Associates, Inc., Stamford, Conn.

16,000

The predictor instrument was designed to give the operator of a control system information about the future of the variable he is controlling (e.g., plane or ship). The purpose of the paper was to further develop the instrument and to test the instrument as an aid to manual control. Research had been concentrated on vehicular control systems and "limited to cathode ray tube display configurations in which one or more traces are shown to represent predicted system output from present time continuously to a point in the future." Effects of simplifying the fast-time simulation, of changes in the time span for which a prediction is made, of changing the "program" of the predictor, and determination of ways of coding three dimensions of information into the display were discussed. G. I. R 3

16,001

Peters, G.A. & Glassner, H.F. TRENDS IN APPLIED BIO-ELECTRONICS. Engng. Paper 972, Feb. 1960, 26pp. Equipment and Safety Research, Douglas Aircraft Company, Inc., El Segundo, Calif.

16,001

This paper described technological advances which permit miniaturization of bio-electronic equipment designed to monitor and analyze human physiological responses, e.g., of the electrocardiograph or the electroencephalogram. The usefulness of computers, high-speed printers, and other message readout equipment to data processing was discussed, and development trends in this area were presented. Problems of cost, reliability, fidelity, and meaningfulness of obtained measurements were also raised.
I. R 11

16,002
Morris, Ailene & Horne E.P. (Eds.). VISUAL SEARCH TECHNIQUES. Proceedings of a Symposium Sponsored by the Armed Forces - NRC Committee on Vision Held in the Smithsonian Auditorium, Washington, D.C., April 7 and 8, 1959, Publ. 712, 1960, 256pp. National Academy of Sciences - National Research Council, Washington, D.C.

16,002
In addition to an invited address, this Symposium included 22 papers, given in five sessions: I. Military Doctrine, Equipment, and Practice (e.g. Visual Search Techniques for Aerial Surveillance and Coast Guard; Visual Aspects of Collision Avoidance; Search for Submarines). II. Search Strategies and Probability Functions. III. Basic Eye Characteristics Related to Search. IV. Visual Performance in the Search Situation (e.g. Theory of Vigilance, Visual Search of a Complex Display, Automatic Scanning of Aerial Photographs. Discussion which followed each session is included. V. Optimal Visual Search Techniques--Summary and discussion panel.
T. G. I. R 156 (approx.)

16,003
Hauser, H.F. VISUAL SEARCH TECHNIQUES FOR AERIAL SURVEILLANCE. From: "Visual Search Techniques," Publ. 712, 1960, 10-22. National Academy of Sciences - National Research Council, Washington, D.C.

16,003
The place of visual air surveillance is discussed first in relation to other sources of intelligence of enemy disposition and movements and then in its application to target acquisition. Present capabilities of visual surveillance, types of missions, types of targets, effective altitude of missions, and limitations on this intelligence source are then set forth. Finally visual observer skills and search techniques are presented. A hypothetical situation is presented and an analysis made of how a good visual observer might apply himself in the performance of his task. A parallel is drawn between the tasks of the visual aerial observers and the photo-imagery interpreters.

16,004
Fischl, M.A. PROBLEMS OF VISUAL SEARCH IN THE RECOVERY OF SPACE VEHICLES. From: "Visual Search Techniques," Publ. 712, 1960, 41-43. National Academy of Sciences - National Research Council, Washington, D.C.

16,004
This paper describes some visual search operational experiences in the recovery of space vehicles. Objects of search were basketball size capsules and larger vehicles. Steps which were taken to increase detectability are discussed. Field test experiences are reported, and suggestions for future research are made.

16,005
Brody, Hilda R., Corbin, H.H. & Volkmann, J. STIMULUS RELATIONS AND METHODS OF VISUAL SEARCH. From: "Visual Search Techniques," Publ. 712, 1960, 44-49. National Academy of Sciences - National Research Council, Washington, D.C.

16,005
This paper describes two experimental situations, one dealing with horizon search, and the other with search in a rectangular matrix. Conditions for horizon search were simulated. The experiments included both paced and continuous search. Results are shown as curves of group median search time plotted for two rates of search. Relations between search-time and matrix size found in the second experiment are discussed.
G. I. R 1

16,006
McGill, W.J. SEARCH DISTRIBUTIONS IN MAGNIFIED TIME. From: "Visual Search Techniques," Publ. 712, 1960, 50-58. National Academy of Sciences - National Research Council, Washington, D.C.

16,006
The purpose of this paper is to describe changes that take place in the distribution of search times in a relatively simple visual search problem as the number of alternatives is changed. A statistical scheme for amplifying small differences, which depends for the most part on statistics "inside the organism," is presented.
T. G. R 5

16,007
Harris, J.L. FACTORS TO BE CONSIDERED IN DEVELOPING OPTIMUM VISUAL SEARCH. From: "Visual Search Techniques," Publ. 712, 1960, 69-93. National Academy of Sciences - National Research Council, Washington, D.C.

16,007
Starting with the concept of the visual detection lobe, a target was placed along the axis of the fixational center of the eye and psychophysical experiments were performed. Relations were obtained between probability of detection and target contrast. Some factors which determine size and shape of the visual detection lobe are listed and discussed. Factors which determine search patterns which optimize detection probability for a given search time are presented. Further research which is needed is listed.
G. I.

16,008
Smith, S.W. & Louttit, R.T. SOME EFFECTS OF TARGET MICROSTRUCTURE ON VISUAL DETECTION. From: "Visual Search Techniques," Publ. 712, 1960, 94-98. National Academy of Sciences - National Research Council, Washington, D.C.

16,008
To investigate the possibility that visual detection would be aided if the visual elements of the target were highly ordered, a set of four targets, each containing the same number of elements but varying from a highly ordered arrangement (grid, checkerboard) to random arrangements, was constructed. Detectability of the various target patterns was compared for very different values of 1) background luminances, 2) element size, 3) figure orientation, and 4) duration of exposure. Detection thresholds were determined and analyzed for differences attributable to target pattern.
T. I.

16,009
Harcum, E.R. DETECTION VS. LOCALIZATION ERRORS ON VARIOUS RADII OF THE VISUAL FIELD. From: "Visual Search Techniques," Publ. 712, 1960, 99-111. National Academy of Sciences - National Research Council, Washington, D.C.

16,009
This paper distinguishes between two factors affecting accuracy of reporting the location of a target which may appear tachistoscopically on a radius of a visual field eccentric to fixation: 1) detection sensitivity or the ability to detect the presence of the target, and 2) localization accuracy or the ability to localize the target. Differences in performance among the various radial areas of the human retina eccentric from fixation representing corresponding areas of the visual field are discussed first in relation to experimental data from the literature and then in relation to the data of two investigations described in detail.
G. R 18

16,010
Henneman, R.H. FACTORS DETERMINING THE IDENTIFICATION OF AMBIGUOUS VISUAL STIMULI. From: "Visual Search Techniques," Publ. 712, 1960, 112-118. National Academy of Sciences - National Research Council, Washington, D.C.

16,010
This research was undertaken to determine "whether, in identifying distorted visual patterns, subjects can be increasingly influenced by differential frequencies of stimulus presentation, as the pattern becomes progressively more distorted" (ambiguous), and to determine whether performance could be improved with practice. Six experimental sequences (160 presentations each) were presented, one each to six male subjects. Errors were analyzed for effects of subjects, distortion, kind of error, and frequency of presentation. Generalizations suggested by the results are listed.
T. G. I. R 6

16,011
Cohen, W. FORM RECOGNITION, SPATIAL ORIENTATION, PERCEPTION OF MOVEMENT IN THE UNIFORM VISUAL FIELD. From: "Visual Search Techniques," Publ. 712, 1960, 119-123. National Academy of Sciences - National Research Council, Washington, D.C.

16,011
To investigate the problems encountered in perception in a uniform visual field, an apparatus was developed which produced a completely uniform textureless field. A study was designed to investigate the effects of these variables on accuracy of form recognition: 1) structure of the visual field, 2) structure of the target, and 3) duration of the exposure to the uniform field. Results were discussed as they related to such variables as accuracy of recognition, difficulty of recognition, and effects of prolonged exposure to the uniform field. Some implications for further research were given.
R 3

16,012
Mackworth, N.H., Thomas, E.L. & Holmquist, S. THE TELEVISION EYE MARKER ON A CHANGING VISUAL WORLD. From: "Visual Search Techniques," Publ. 712, 1960, 133-143. National Academy of Sciences - National Research Council, Washington, D.C.

16,012
The basic need for recording continuously the altering position of the line of sight in relation to the moving and changing visual world is discussed in relation to practical problems of visual search. Following an analysis of the spatial and temporal factors in searching, some existing methods and techniques for running records are discussed followed by a more detailed description of the development of a television eye-marking technique which may satisfy the basic need as set forth above.
I. R 21

16,013
Gottsdanker, R.M. THE RELATION BETWEEN THE NATURE OF THE SEARCH SITUATION AND THE EFFECTIVENESS OF ALTERNATIVE STRATEGIES OF SEARCH. From: "Visual Search Techniques," Publ. 712, 1960, 181-186. National Academy of Sciences - National Research Council, Washington, D.C.

16,013
Six search determinants are listed, and two main search goals (finding a specific object or reporting anything which is out of the ordinary) are discussed as these may relate to alternative search techniques. An experiment is described which used two search situations: 1) a search situation characterized by competition, and 2) a situation characterized by imbededness. Forty college students served as subjects. Results are discussed in terms of the relations between relative effectiveness of a search strategy and the determinants which necessitated the search. Implications are presented for the assignment of observers.
G. I.

16,014
Enoch, J.M. NATURAL TENDENCIES IN VISUAL SEARCH OF A COMPLEX DISPLAY. From: "Visual Search Techniques," Publ. 712, 1960, 187-193. National Academy of Sciences National Research Council, Washington, D.C.

16,014
This report presents some of the more general findings obtained in a series of eight experiments on visual search. These dealt with the general organization of the search, distribution of coverage during search task, and a discussion of levels at which various phases of search are mediated. Two classes of observers and two types of observation material were used in this study: trained photointerpreters viewed aerial photographs, and non-trained observers viewed aerial maps which simulated aerial photographs.
G. R 11

16,015
Devoe, D.B. & Duva, J.S. DISPLAY SHARING THROUGH COLOR FILTERING. Proj. 9674, AFCCDD TN 60 60, Dec. 1960, 7pp. USAF Operational Applications Office, AFCCDD, Bedford, Mass.

16,015
A method of display sharing through the projection of several different displays onto the same screen and selecting the desired display by viewing through an appropriately colored filter is described. Several applications of the technique are discussed.
T. I.

16,016
Celent, C. HUMAN FACTORS - NEWEST ENGINEERING DISCIPLINE. Electronic Industries, Feb. 1960, 86-100.

16,016
The author pointed out that technological advances have generated problems of man-machine compatability calling for an exhaustive knowledge of human behavior. The paper discussed the need for human engineering and described human engineering activity in a variety of fields, e.g., in space travel, industry, etc. The need for the human engineer was pointed out. Finally, representatives of some consulting firms in the field of human engineering were asked to predict the future of the field.
T. I. R 33

16,017
Raben, Margaret W. A SURVEY OF OPERATIONS AND SYSTEMS RESEARCH LITERATURE. Contract NONR 494(13), Jan. 1960, 123pp. Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.

16,017
This comprehensive report of unclassified publications on operations and systems research is organized as follows to permit individuals with various needs to readily find needed information: 1) Introduction, definition and description of the field; 2) Methods, experimental and engineering psychology, operations and systems research, communication and information theory, game or decision theory, computer simulation, queueing theory; 3) Problems, man as a system component, groups as system components, communication, transportation, production, maintenance and supply problems, and air traffic control.
R 977 (approx.)

16,018
Buckner, D.N., Harabedian, A. & McGrath, J.J. A STUDY OF INDIVIDUAL DIFFERENCES IN VIGILANCE PERFORMANCE. Contract NONR 2649(00), NR 153 199, Tech. Rep. 2, Jan. 1960, 44pp. Human Factors Research, Incorporated, Los Angeles, Calif.

16,018

To 1) determine statistical and practical significance of individual differences in vigilance performance, 2) determine the reliability of individual differences within a watch and from watch to watch, 3) investigate relationships between performance on visual and auditory vigilance tasks, and 4) investigate relations between performance under ordinary or alerted watch-standing conditions, 54 subjects stood watch under varying conditions required by the investigation. Results were analyzed in terms of mean and variability of detection performance, relations of individual differences in performance under alerted and non-alerted conditions. Analysis of variance was made of detections and of responses within mode by quarter hour watch. Results were discussed in terms of their implications for sonar.
T. G. R 15

16,019

Blatteis, C.M. & Tucker, E.F. CONSTRUCTION OF A LOW-COST TEMPERATURE-CONTROLLED ALTITUDE CHAMBER. USAMRL Proj. 6X64 12 001 08, Task 08, Rep. 420, Feb. 1960, 19pp. USA Medical Research Lab., Fort Knox, Ky.

16,019

The growing interest in the adaptive mechanisms of experimental animals to environmental stress, especially temperature and altitude, has led to extensive study of these variables. This report describes a "simple, inexpensive temperature controlled altitude chamber" for use with rats or other small animals. The authors state that it "has been used continuously with satisfaction for many hundreds of hours." Construction of the chamber is described in some detail.
I. R 5

16,020

Cook, K.G. & Armsby, D.H. DESIGN STANDARDS FOR MAN-MACHINE TASKS IN SIGNAL CORPS SYSTEMS. THIRD QUARTERLY PROGRESS REPORT 1 DECEMBER 1959 - 1 MARCH 1960. Contract DA 36 039 SC 78328, DA Proj. 3 99 00 110, March 1960, 52pp. Applied Psychology Corporation, Arlington, Va.

16,020

The purpose of this study was to develop a methodology for defining and classifying human functions in man-machine systems in order to provide a basis for standardization of tasks associated with Signal Corps equipment. A survey was made of equipments, training films, technical manuals, and installations. A sample of engineers was surveyed to determine design methods and principles in use and possible acceptance of human engineering checklists. Further problems in need of investigation were outlined. As a result of the interviews and review, the application of systems demands analysis in the design process was revised.
T. I.

16,021

Harabedian, A., McGrath, J.J. & Buckner, D.N. THE PROBABILITY OF SIGNAL DETECTION IN A VIGILANCE TASK AS A FUNCTION OF INTERSIGNAL INTERVAL. Contract NONR 2649(00), NR 153 199, Tech. Rep. 3, Feb. 1960, 30pp. Human Factors Research, Incorporated, Los Angeles, Calif.

16,021

To investigate the influence of the time interval between signals on detection proficiency, and to compare two ways of identifying the intersignal interval, 54 subjects were required to detect small intensity changes in an intermittent light or tone with the changes occurring at varying time intervals. Three ways were used to identify the intersignal interval, and results achieved under the different methods for identifying the intersignal interval were compared. The importance of the way in which the intersignal interval is identified to studies evaluating the effects of intersignal interval on probability of signal detection was discussed.
G. I. R 20

16,022

Hayes, J.R. & Smith, E.C. DECISION-MAKING STUDIES PART I - THE TRADE-OFF OF VARIABLES IN DECISION-MAKING. Proj. NR 401 000, Task NR 401 001, NRL Prob. Y02 03, Jan. 1960, 7pp. USN Research Lab., Washington, D.C.

16,022

To determine whether or not regularities appear in the behavior of Ss making realistic decisions which require the trade-off of variables and which do not require the use of economic theory for their description, 16 Ss were required to make tactical decisions based on three variables--speed, distance, and number of airplanes--in a simulated air-defense situation. The amount of trade-off required for decision, the adequacy of forces available to the decision-maker, and the arrangement in which the information was displayed were varied. Decision time was the dependent variable.
T. I. R 13

16,023

Horst, P. THE EFFECT OF LIMITING THE NUMBER OF ITERATIONS ON A PRINCIPAL AXES FACTOR ANALYSIS SOLUTION. Contract NONR 477(08), Public Health Research Grant M 743(04), Feb. 1960, 54pp. University of Washington, Seattle, Washington.

16,023

The flexibility and usefulness of the factor analytic method in areas where "basic concepts are not clearly formulated and when crucial experiments have not yet been set up" was pointed out. The lack of uniqueness of factors (which are arbitrary as located by the primary procedures in use) is a severe limitation. The present paper reported an empirical study "designed to measure some of the effects of setting various limits on the number of iterations completed in finding the arbitrary factor loading matrices using Horsts' Modification of Hotelling's...procedures." Advantages and limitations of the method were pointed out.
T. R 18

16,024

Peters, G.A. HUMAN RELIABILITY IN SPACE FLIGHT. Engng. Paper 791, Human Factors Data Sheet AAAS 12-1, Jan. 1960, 2pp. Equipment and Safety Research, Douglas Aircraft Company, Inc., El Segundo, Calif.

16,024

This is an illustrated and descriptive data sheet which specifies human factors in space technology. Man's role and function in space travel is defined. Roles assigned to the human crew and a guide to specific task allocation are presented. Values are computed for pilot reaction time, and estimated human response-lag for complex displays is presented.
T. I. R 9

16,025

Peters, G.A. & Dendle, H.J. PERSONNEL REQUIREMENTS IN MANNED SPACE VEHICLES. Engng. Paper 931, Feb. 1960, 15pp. Missiles & Space Systems Engineering, Douglas Aircraft Company, Incorporated, Santa Monica, Calif.

16,025

This paper describes some basic considerations involved in making estimates of personnel requirements for manned space systems. A preliminary approach to determining optimum scheduling of space crews, consideration of work periods, rest, feeding, etc., is presented. Topics discussed include: customary temporal patterns, sleep-wakefulness cycles, sustenance, off-duty time, human work performance, other constraints, and work schedules. A reference list is available but not included.
G. I.

16,026
McGrath, J.J., Harabedian, A. & Buckner, D.N. AN EXPLORATORY STUDY OF THE CORRELATES OF VIGILANCE PERFORMANCE. Contract NONR 2649(00), NR 153 199, Tech. Rep. 4, Feb. 1960, 54pp. Human Factors Research, Incorporated, Los Angeles, Calif.

16,026
This was an exploratory study to investigate relationships between behavioral measures and criteria of performance on vigilance tasks; the objective was to identify types of behavioral measures that would be promising predictors of vigilance performance. A concomitant study was made of individual differences in vigilance performance. Psychological tests, threshold measures, and subjective reports were used as measures of variables hypothesized to be important in the performance of vigilance tasks. Correlations between performance on the various tests and vigilance performance were reported, and recommendations for further research were made.
T. G. R 16

16,027
McGrath, J.E. & Nordlie, P.G. SYNTHESIS AND COMPARISON OF SYSTEM RESEARCH METHODS. Contract NONR 2525 (00), HSR RR 60/1 SM, Rep. 9, Feb. 1960, 150pp. Human Sciences Research Inc., Arlington, Va.

16,027
This is a report of Phase II of a program designed to review and integrate methods which have been employed in studies of man-machine systems and to compare alternative methods and procedures. Phase II emphasizes integration of methods for establishing of system and subsystem requirements. The report summarizes purposes, procedures, and results of Phases I and II and describes key problems in systems research method. A tactical framework for weapon systems studies is developed. Methods for systematic projections are given. The problem of translation of requirements into design guides is discussed. Theories of allocation of functions to man and machines and for systems evaluation are given. A bibliography of systems research literature and a glossary of usage of key systems research terms are included. I. R 520

16,028
Kolers, P.A. SOME ASPECTS OF PROBLEM-SOLVING: I. METHOD AND MATERIALS. Proj. 7183, Task 71618, WADD TR 60 2, Jan. 1960, 16pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,028
Traditional studies in problem-solving have suffered from poor methodology. The present paper reported the attempt to establish a set of controlled conditions to permit the investigator to obtain quantitative measures of problem-solving ability. The stimuli used were hidden figures made in a systematic way and presented tachistoscopically. Forty-eight Ss were divided into six groups. Each group was presented with a different permutation of three decks of cards. Data were analyzed in terms of "Correct Answers per Trial," "Trials to Criterion," and "Number of Problems Solved." Differences between problems were investigated. Results were discussed as they demonstrated a method which would permit rigorous control of conditions in experiments in this area.
G. I. R 8

16,029
Iampietro, P.F., Buskirk, E.R. & Vaughan, J.A. EFFECTS OF HIGH AND LOW HUMIDITY ON HEAT EXCHANGES OF LIGHTLY CLOTHED MEN. Proj. Ref. 7 83 01 006, Tech. Rep. EP 131, April 1960, 6pp. USA Quartermaster Research & Engineering Command, Natick, Mass.

16,029
To determine whether lightly clothed men would exhibit differences in their physiological responses when exposed to cold with low and high humidities, six healthy young men (lightly clothed) were exposed in a chamber to various combinations of wind (ten and less than one mph), temperature (40 and 50 degrees F), and relative humidity (30 and 100 percent). Skin and rectal temperatures and oxygen consumption were recorded. The findings were compared to previous studies of nude men to see whether there was an interaction between clothing and humidity to account for cold-wet "chill." The importance of considering radiation in any comparison of cold-wet and cold-dry environments was discussed.
G. R 4

16,030
Wright, G.O. A GENERAL PROCEDURE FOR SYSTEMS STUDY. Proj. 7183, Task 71619, WADD TN 60 18, Jan. 1960, 13pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,030
An abstract systems model is developed "around the concepts of process, data input, system output, function, data transformation, mediation and operation, outcomes and output criteria, feedback control, and data flow." The thesis is developed that a man-machine system is a cultural system, limited by culture. A methodology for a system study is proposed and a set of principles developed to assist in choice of place to intervene and kinds of variables to manipulate in evaluating system performance.
T. I. R 2

16,031
Pickering, W.H. (Dir.). RESEARCH SUMMARY NO. 36-2 VOLUME I, PART ONE FOR THE PERIOD FEBRUARY 1, 1960 TO APRIL 1, 1960. Contract NASW 6, April 1960, 64pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,031
This is Part I of a bimonthly periodical, and contains unclassified information concerning: 1) Deep Space Instrumentation Facility: Goldstone Station Transmitter and Receiver Sites, and Mobile Tracking Station; 2) Spacecraft Communications: Communications System Components, Analysis of Coherent Two-Way Doppler Communication System, and Deep Space Range Measurement; 3) Systems Analyses: Trajectory Analysis, Orbit Determination, Systems Analysis Research, Space Flight Studies and Powered Flight Studies; and 4) Spacecraft Guidance and Control Techniques: Spacecraft Attitude Sensing Techniques, Low-Noise Amplifier Studies, Molecular Aggregate Devices, Gas Bearing, and Parasol Solar Panel and Antenna.
T. G. I. R 4

16,032
McAbee, W.H. & Lathrop, R.G. THE BALANCE OF MAN AND MACHINE. 1960, 37pp. USAF Research & Development Command, Eglin AFB, Fla.

16,032
This is a guide which contains information on 1) the Weapon System Project Office concept; 2) sources of background research which includes sources of information; 3) Human Factors research areas, including Human Engineering, personnel selection, training, publication, performance evaluation, and morale; and 4) a discussion and outline of planning, testing, and report writing. There are suggestions for improving management.
I. R 19

16,033
Johansson, G. & Backlund, F. AN EYE MOVEMENT RECORDER. Rep. 8, March 1960, 13pp. Psychological Lab., University of Uppsala, Uppsala, Sweden.

16,033

This paper describes a small eye movement recorder which is capable of registering eye movements which range from the smallest voluntary movements up to movement of 20 degrees of arc. There is a discussion of earlier methods for recording eye movements. One advantage of the present recorder is its light weight.
I. R 4

16,034

Siegel, A.I., Richlin, M. & Federman, P. A COMPARATIVE STUDY OF "TRANSFER THROUGH GENERALIZATION" AND "TRANSFER THROUGH IDENTICAL ELEMENTS" IN TECHNICAL TRAINING. J. appl. Psychol., Feb. 1960, 44(1), 27-30. (Applied Psychological Services, Wayne, Penn.).

16,034

To compare the technical effectiveness of naval aviation technicians given specific training with the efficiency of trainees given a more general background knowledge, the performance of 231 subjects (air controlmen, parachute riggers, and aviation motor machinists) who were graduates of the two kinds of training programs was compared. Technical Behavior Check Lists (TBCLs) were developed and used for assessing fleet effectiveness. Effects of the different kinds of training on tasks involving mechanical manipulation was compared with the effect on abstract conceptual tasks.
T.

16,035

Steedman, W.C. & Baker, C.A. TARGET SIZE AND VISUAL RECOGNITION. Proj. 7184, Task 71580, WADD TR 60 93, Feb. 1960, 18pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,035

To investigate the ability of Ss to recognize a particular target form on a display containing irrelevant forms as a function of the visual angle and the amount of detail resolution, four groups of 16 Ss each were required to locate given targets on problem displays. Dependent variables, search time, and errors were investigated as they related to viewing distance and size of target. Applications of the findings to radar or infrared displays were discussed, with restrictions pointed out. Implications of the findings for equipment design were discussed.
T. G. I. R 2

16,036

Dunlap and Associates, Inc. AN INVESTIGATION OF SPEED AND ACCURACY IN READING MULTISCALE METERS. FINAL REPORT. Contract DA 36 039 SC 78921, Proj. 3 99 00 110, Task .03D, April 1960, 28pp. Dunlap and Associates, Inc., Stamford, Conn.

16,036

This investigation was undertaken to provide guidance in the design of multiscale meters. A survey of the literature was followed by an experiment to investigate time and error penalties involved in reading one-, two-, four- and six-scale meters. Recommendations were made for design of multiscale meters on the basis of findings.
T. G. I. R 8

16,037

Shapero, A., Cooper, J.I., Rappaport, M., Schaeffer, K.H., et al. HUMAN ENGINEERING TESTING AND MALFUNCTION DATA COLLECTION IN WEAPON SYSTEM TEST PROGRAMS. Contract AF 33(616) 5688, Proj. 8(8 7193), Task 71602, WADD TR 60 36, Feb. 1960, 47pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,037

The test portion of a developmental program must measure "agreement between actual performance characteristics being achieved by the system and the design objectives established for the system." This report examines specifically the kinds of data relevant to design of missile weapon systems from the viewpoint of human factors. After surveying current practices in human engineering, testing approaches are suggested to human factors engineering testing and to human-initiated malfunction data collection. A glossary of terms important to this field is included.
T. G. I. R 5

16,038

Chapanis, A. ON SOME RELATIONS BETWEEN HUMAN ENGINEERING, OPERATIONS RESEARCH AND SYSTEMS ENGINEERING. Contract NONR 248(55), Rep. 8, May 1960, 73pp. Psychological Lab., Johns Hopkins University, Baltimore, Md.

16,038

The author differentiates the basic tasks of human engineering, operations research, and systems engineering. Contributions made by the human engineer to the design of systems are discussed both generally and as they relate to some specific systems. These contributions involve: 1) the allocation of functions to human and machine components, 2) the human engineering of systems components, and 3) the evaluation of man-machine systems. Important work which has been accomplished in these areas is cited, and need for further work and research is pointed out.
T. G. I. R 24

16,040

Chapanis, A. HUMAN ENGINEERING. Operat. Res. Sys. Engng., 1960, 534-582.

16,040

This chapter covers some human factors involved in the design of automatic and semiautomatic systems. The importance of carefully considering the role of human operators in such systems is stressed. Relative advantages and disadvantages of both men and machines to such systems are listed and discussed. Additional ways in which the human factors specialist can and should contribute to the work of systems design are pointed out.
T. G. I. R 33

16,041

California Institute of Technology. ASTRONAUTICS INFORMATION. ABSTRACTS, VOLUME II, NO. 4 (ABSTRACTS 2,186 - 2,335). Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,041

The coverage of these abstracts is, in general, restricted to the subject of space flight although directly applicable techniques from other fields are included. This issue includes 149 reports abstracted during April, 1960.
R 149

16,042

Pickering, W.H. (Dir.). RESEARCH SUMMARY NO. 36-2 VOLUME I, PART TWO FOR THE PERIOD FEBRUARY 1, 1960 TO APRIL 1, 1960. NASA Contract NASW 6, April 1960, 64pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,042

This summary reports supporting research and development activities of the Jet Propulsion Laboratory and contains unclassified information on instrumentation, computers, materials, propulsion techniques, gas dynamics, physics and mathematics.
T. G. I. R 31

16,043
Mendelson, J., Kubzansky, P., Leiderman, P.H., Wexler, D., et al. CATECHOL AMINE EXCRETION AND BEHAVIOR DURING SENSORY DEPRIVATION. A.M.A. Arch. gen. Psychiat., Feb. 1960, 2, 147-155. (Psychiatric Lab., Boston City Hospital, Boston, Mass., Chemistry Lab., Massachusetts General Hospital, Boston, Mass. & Psychiatry Dept., Harvard Medical School, Boston, Mass.).

16,043
To investigate the effects of sensory deprivation on urinary epinephrine and norepinephrine excretion, ten subjects were placed in a tank type respirator but allowed to breathe for themselves. The experiment was designed to last up to 36 hours but subjects could terminate at any time. Behavioral measures taken during the experiment included length of stay in the experiment, motor activity, amount of verbalization, somatic responses, judgment of passage of time, and mental experiences. The relevance of findings to those from previous studies was discussed. The complexity of problems involved in attempting to relate biochemical to behavioral indices was pointed out.
T. I. R 21

16,044
Sargent, M.C. & Griswold, Victoria S. (Eds.). EUROPEAN SCIENTIFIC NOTES. June 1960, 14(6), 85-101. USN Office of Naval Research, London, England.

16,044
These notes cover reports of research in the areas of mathematical and physical sciences (e.g., information theory, physical chemistry, combustion and propulsion), biological sciences, and earth sciences. Notes and news of interest are also included.

16,045
Stevens, S.S. MEASUREMENT, PSYCHOPHYSICS, AND UTILITY. Reprinted from: "Measurement: Definitions and Theories," 1959, 18-63. John Wiley and Sons, New York, N.Y. (Psychological Lab., Harvard University, Cambridge, Mass.).

16,045
The author discusses problems in the definition of measurement and reviews the classical view. Five kinds of scales of measurement are discussed and statistical measures appropriate to measurements made on the various classes of scales presented. The problem of measurement of subjective magnitude is raised and various psychophysical methods are presented. Problems involved in the measurement of utility are raised, and three approaches to the problem of measuring utility are considered. Objections to each approach are discussed.
T. G. R 46

16,046
Stevens, S.S. ON THE NEW PSYCHOPHYSICS. Scand. J. Psychol., 1960, 1, 27-35. (Psychological Lab., Harvard University, Cambridge, Mass.).

16,046
The author discusses problems and methods in modern psychophysics. Two types of continua, prothetic and metathetic, are distinguished. Three kinds of scales, ratio, category, and "confusion", are differentiated and discussed as they relate to the problem of quantifying sensation. New principles of psychophysics have led to experimental tests of predictions; this is illustrated by work on cross-modality comparisons.
T. G. R 20

16,047
Glassner, H.F. & Peters, G.A. BIO-ELECTRONIC ANALYSIS OF PERFORMANCE. DAC Engng. Paper 897, March 1960, 36pp. Equipment & Safety Research Section, Douglas Aircraft Company, Inc., El Segundo, Calif.

16,047
This report presents recent conceptual and experimental work dealing with methods of recording, analyzing, and interpreting multiple physiologic responses. The possible use of bio-electronically monitored phenomena as criteria for human performance is discussed. Data on physiological changes during performance of complex psychological tasks are presented. Results are presented which relate to response variability, performance criteria, bio-electronic indices, and the calibration of human experimental plug-in units. Implications for analysis and interpretation of bio-electronic data from air and space vehicles are discussed.
G. I. R 22

16,048
Sargent, M.C. & Griswold, Victoria S. (Eds.). EUROPEAN SCIENTIFIC NOTES. May 1960, 14(5), 67-84. USN Office of Naval Research, London, England.

16,048
These notes cover work in the mathematical and physical sciences, (e.g., Correlation-Function Computer, Optics and Thin Films, Electric Analogy Laboratory), Earth Sciences, the Biological Sciences (including chronic exposure to low levels of ionizing radiation), and general notes and news.

16,050
Freedman, S.J. SENSORY DEPRIVATION AND PERCEPTUAL LAG. Contract AF(616) 5663, April 1960, 10pp. Eastern Psychological Association, New York, N.Y. (Massachusetts Mental Health Center, Boston, Mass. & Brandeis University, Waltham, Mass.).

16,050
Difficulties in obtaining precise measures of the effects of sensory deprivation and consequent problems in comparing results of studies from different laboratories are pointed out. The present study was designed to maximize the spatio-temporal variations of visual input to twelve subjects run in experimental sessions which were two to seven days apart. Results were examined for systematic distortion in visual perception over time. Implications for assigning men to monitoring tasks are discussed.
G. I. R 9

16,051
Dvorak, A., Wright, C.E. & Burket, G.R. A MODIFIED IBM TYPE 650 PROGRAM FOR A NON-SYMMETRIC CORRELATION MATRIX WITH SUMMED QUANTITIES. Contract NONR 477(08) & Public Health Research Grant M 743(C4), Feb. 1960, 11pp. Division of Counseling and Testing Services, University of Washington, Seattle, Washington.

16,051
This paper describes further modifications of non-symmetric correlation matrix programs previously presented by Dvorak and Wright (reference in bibliography). The entire program is presented.
R 4

16,052
Horst, P. THE MULTIPLE PREDICTIVE EFFICIENCY OF IPSATIVE AND NORMATIVE PERSONALITY MEASURES. Contract NONR 477(08), Public Health Res. Grant M 743(C3), Feb. 1960, 33pp. University of Washington, Seattle, Wash.

16,052
To compare the efficiency of an ipsative and a normative measure of personality as predictors of grades of college students, two scales were administered to 171 subjects. Data were analyzed on the IBM Type 650 computer. The influence of response set on each kind of personality measure was considered. Results were compared with those from similar studies. A mathematical rationale for testing the difference between multiple correlations was included in the appendix.
T. R 24

16,053
IBM Data Processing Division. IBM DATA PROCESSOR. IBM, June-July 1960, V(3), 1-8. (IBM Data Processing Division, White Plains, N.Y.).

16,053
This brief note describes pretested computer programs to be made available through an IBM library service. The programs are designed to handle various data processing functions common to firms within a specific industry.
I.

16,054
Newman, E.B. & Miller, G.A. FINAL REPORT. Contract AF 33(038) 14343, AFCRC TR 60 50, Dec. 1959, 55pp. Psychological Labs., Harvard University, Cambridge, Mass.

16,054
This final technical report lists all work done and papers published in fulfillment of contracts with the Air Force to investigate the pattern of behavior in a communication system. The report includes a full list of personnel, chronology, a list of the 12 projects which were supported, and a list of publications (18 plus 19 status reports). Appendix A contains reports of experiments which were conducted to study quantitatively the information that a brief exposure makes available to an observer.
T. G. I. R 94

16,055
Newman, E.B. MEN AND INFORMATION: A PSYCHOLOGIST'S VIEW. Nuovo Cimento, 1959, 13(X), 539-559. (Psychology Dept., Harvard University, Cambridge, Mass.). (AFCRC TR 6051).

16,055
When man is viewed as a communication system, certain questions regarding his capabilities as compared with those of channels such as the telephone or TV arise. Problems which arise when an informational analysis of human behavior is attempted are discussed, and findings are presented concerning: 1) human limitations and capacities for obtaining information from single perceptual displays, 2) perceptual capacity in real time, 3) channel capacity in motor output, 4) memory, and 5) learning.
G. I. R 20

16,056
Layman, R.S. & Christner, Charlotte A. HUMAN ENGINEERING. Battelle Tech. Rev., Jan. 1957, 1-5. (Battelle Memorial Institute, Columbus, Ohio).

16,056
This brief survey of human engineering discusses the history of problems of man-machine relationships, the nature of human engineering, human engineering and psychology, industrial applications of human engineering, contributions of human engineering to human welfare, and problems of automation.
I.

16,057
USN Office of Naval Research. NAVAL HUMAN ENGINEERING BULLETIN. No. 39, Oct. 1959, 10pp. USN Office of Naval Research, Washington, D.C.

16,057
This publication includes a brief report of the Human Engineering Conference, with notes from the keynote address on future roles of human factors in electronics. Thirty-one unclassified ONR code 455 reports are listed, covering all reports received since publication of the last bulletin. The reports cover a wide variety of human engineering problems, including surveillance and manned space flight studies.
R 31

16,058
Bond, G.F. SUMMARIES OF RESEARCH REPORTED ON DURING CALENDAR YEAR 1959. Dec. 1959, 19pp. USN Medical Research Lab., New London Submarine Base, Conn.

16,058
Twenty summaries of research conducted at the Naval Medical Research Laboratory during the calendar year 1959 are presented in this report. Titles of three reports issued as memorandums are also given. Reports of research in the following areas are among those included: audition, vision, submarine and space cabin atmosphere, and patterns of reaction to stress.
R 23

16,061
Ritchie, M.L. & Hanes, L.F. MANUAL ATTITUDE CONTROL IN SPACE--ARRANGEMENT OF CONTROLS. Paper 60 SA 34, April 1960, 7pp. American Society of Mechanical Engineers, New York, N.Y. (Ritchie and Associates, Inc., Dayton, Ohio).

16,061
The possibility that a human may need to exercise manual control over the attitude of an orbiting vehicle raises the problem of optimum arrangement of controls used for this purpose. A simulation chamber was used to compare three different control configurations. Four subjects were used who had participated in previous similar experiments. Analysis of variance was used to compare time and control action scores for the different configurations used.
T. I. R 1

16,062
Ritchie, M.L., Hanes, L.F. & Hainsworth, T.E. SOME CONTROL-DISPLAY ASPECTS OF MANUAL ATTITUDE CONTROL IN SPACE. Contract AF 33(616) 5901, Proj. 6190, Preprint 60 14, Jan. 1960, 30pp. American Astronautical Society, New York, N.Y. (Ritchie and Associates, Inc., Dayton, Ohio & Lear, Inc., Santa Monica, Calif.).

16,062
This investigation was conducted to determine the ability of a human operator to control the attitude of a simulated orbiting vehicle. The different combinations of displays, controllers, and control systems included a three-axis moving sphere type attitude indicator with and without body-axis rate indicators, three different controller arrangements, and proportional and on and off controls used with the integrated controller. Subjects were required to 1) stop the attitude spin or 2) stop the spin at a particular attitude. Detailed suggestions were made for further experimentation.
T. G. I.

16,063
German Science Bulletin. MAX PLANCK SOCIETY FORMS WORKING GROUP FOR SPACE RESEARCH. German Sci. Bull., May 1960, 50, 32-33. (Science Office, American Consulate General, Frankfurt/Main, Germany).

16,063
This bulletin contains articles, abstracts, and miscellaneous news of German scientific work which is of interest to the agencies of the United States Government and scientific agencies, institutes, and other organizations affiliated or under contract to the Government. Titles of the articles are: "The Institute of Physics of the University of Bonn" and "The Botanical Institute of the Agricultural University in Stuttgart/Hohenheim." The abstracts pertain to the field of physics and chemistry as do most of the miscellaneous news items.
T. R 14

16,064
Freedman, S.J., Grunebaum, H.U. & Greenblatt, M. PERCEPTUAL AND COGNITIVE CHANGES IN SENSORY DEPRIVATION. Contract AF 33(616) 5663, National Institute of Mental Health Research Grant M 1863, June 1958, 17pp. Dept. of Psychiatry, Harvard Medical School, Boston, Mass. & Brandeis University, Waltham, Mass.

16,064
To compare the effects of visual and auditory "non-patterning" under social isolation conditions with social isolation alone, 26 subjects were subjected to an eight-hour experimental session. Subjects were divided into two groups, one of which received continuous non-patterned visual and auditory stimulation and one which was socially isolated but with vision, audition and touch remaining unimpaired. Differences in performance scores were analyzed for significance of these variables on perceptual distortion, visual input, auditory input, motility, and social interaction. A theoretical formulation was proposed for the understanding of distortion.
T. I. R 16

16,065
Davis, T.R.A. MAN ALIVE IN OUTER SPACE. The Atlantic Monthly, March 1960, 205(3), 41-44.

16,065
This is a second review of engineering psychology by this author. The emphasis is on identification of human performance functions relevant to the design of equipment components of man-machine systems and to the determination of operational procedures and work environments. The review covers "normal publication media" plus publications from government laboratories. Publications by industry are excluded. Topics discussed include professional activities, man in space, stress, information display variables, control variables, feedback variables, skilled performance, monitoring and vigilance, decision-making, multi-man-machine systems, and an overview.
R 151

16,066
Melton, A.W. & Briggs, G.E. EXPERIMENTAL PSYCHOLOGY. Ann. Rev. Psychol., 1960, 11, [illegible]. (University of Michigan, Ann Arbor, Mich. & Ohio State University, Columbus, Ohio).

16,066
This review of engineering psychology covers the period from June, 1957, through May, 1959. The following topics are covered: professional activities; man in space; stress--physiological, psychological, and task induced; information display variables--legibility and visibility, coding maps and charts, scales, tracking and prediction; control variables--wearing gloves, characteristics of controls, display-control compatibility; feedback variables--quickening, feedback specificity, augmented feedback; skilled performance; monitoring and vigilance; decision-making; multi-man-machine systems; and an overview.
R 158

16,067
Plankeel, F.H. AUTOMATION IN DOCUMENTATION. Amer. Documentation, April 1960, XI(2), 128-134.

16,067
The author describes in detail a proposed mechanised and automated coordinate index system designed to overcome the difficulties involved in searching for documents when the collection of documents grows in size to the point that visual inspection of five-figure numbers becomes necessary. The system substitutes punched tape for term cards, and a film, coordinated with the tape, shows a greatly reduced image of the reference to the document. The system makes all documents readily available for which a particular term is characteristic.
I. R 1

16,068
Stiassny, S. MATHEMATICAL ANALYSIS OF VARIOUS SUPERIMPOSED CODING METHODS. Amer. Documentation, April 1960, XI(2), 155-169. (IBM Corporation Research Center, N.Y.).

16,068
The author describes the chain-spelling and random number superimposed coding methods together with their variants. The two methods are compared for the probability that a match will prove false. A formula is given which describes the optimum number of punches per word. The staggered superimposed coding method also is described and analyzed. Charts are included which show the probabilities that a match will be false for various vocabulary sizes, field sizes, and number of words punched. Tables are given which extend these figures to multi-word inquiries. Usefulness of the coding method to information retrieval is discussed.
T. G. I. R 9

16,069
Hicks, F.A., Jr. FUNCTIONAL SEQUENCE DIAGRAMS. IRE Transactions, March 1960, HFE 1(1), 33-34. (Dunlap and Associates, Inc., Stamford, Conn.).

16,069
The technique presented consists of a schematic diagram of the essential interactions among operators, displays, equipments, and time in complex weapons systems. A schematic is first constructed from a flow chart of operational sequence diagram, [illegible] time. Then for each instrument and all signals,

16,070
[illegible] Institute of Technology. PROCEEDINGS OF FIRST SYMPOSIUM ON [illegible] APRIL 26, 27, 28, 1960. April 1960, 467pp. Systems Research Center, Case Institute of Technology, Cleveland, Ohio.

16,070
Paper [illegible] by [illegible] in the following [illegible] of large-scale digital computer [illegible]; 2) interrelations [illegible] of system science and system engineering [illegible]; 3) evolutionary design of complex systems; 4) relations between human engineering, operations research, and systems engineering; 5) transfer dynamics of physical systems; 7) quantifiable parameters of group performance; 8) reliability and system concept; 9) systems, organizations, and interdisciplinary research; 10) methodology of systems; 11) a decision model for a fourth-level system; 12) choice of objectives in systems studies; 13) impedence matching problems; and 14) systems engineering from an industrial viewpoint.
T. G. I. R 103 (approx.)

16,071
California Institute of Technology. ASTRONAUTICS INFORMATION. OPEN LITERATURE SURVEY, VOLUME II, NO. 4, (ENTRIES 21,128-21,590). Contract NASW 6, April 1960, 71pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,071
This annotated bibliography of 462 titles is designed to survey the literature dealing with astronautics, and covers the period of April, 1960. The material is arranged alphabetically according to subject.
R 462

16,072
Massachusetts Institute of Technology. INFORMATION PROCESSING. QUARTERLY PROGRESS REPORT. Contract AF 19(604) 5200, AFCRC TN 60 1006, May 1960, 63pp. Lincoln Lab., Massachusetts Institute of Technology, Cambridge, Mass.

16,072

This progress report covering the period from 1 December 1959 through 29 February 1960 includes a list of reports (15) issued, a report of work done on digital computer design, a description of work accomplished in magnetic core research, work done on computer components (magnetic materials, magnetic films, etc.), work accomplished in the area of pattern recognition, reports of studies in communication routing in networks, on the global asymptotic behavior of nonlinear systems of differential equations, of the representation of vector-valued random processes, of dual codes, and a report of work accomplished by the psychology group in such areas as man-machine communications, visual flicker in CRT phosphors, human information processing, etc.
T. G. I. R

16,074
Naval Research Reviews. NAVY SCIENTISTS REPORT ON SPACE DISCOVERIES. Naval Res. Rev., Feb. 1960, 11-13.

16,074

This was a brief report of discovery of a quantity of relatively cool hydrogen between the earth and the sun. The discoveries were made as a result of the analysis of photographs of the sun made when a rocket was fired from New Mexico as part of the United States effort in the International Geophysical Cooperation.
I

16,075
McKendry, J.M., Grant, G., Corso, J.F. & Brubaker, R. MAINTAINABILITY HANDBOOK FOR ELECTRONIC EQUIPMENT DESIGN SUPPLEMENT IV TO NAVTRADEVCEN 330 1 DESIGN FOR MAINTAINABILITY. Contract N61339 330, NAVTRADEVCEN 330 1 4, April 1960, 387pp. USN Training Device Center, Port Washington, N.Y.

16,075

This section of a series of reports on maintenance problems 1) lists a number of possible solutions to the maintenance problem and specifies which have been employed in the handbook, 2) describes the material presented in the handbook, 3) specifies the approach used by the authors in presenting the material, and 4) describes the layout of the chapters. Problems discussed in the chapters include equipment maintainability, technological advances as they affect maintainability, description of the maintenance man, of work environment and maintenance aids, use and design of test equipment, maintainability in the design sequence, circuit specifications, components, connections and housings, and function controls and monitors.
T. G. I. R 784

16,076
Peterson, R.O., Lewandowski, L.J. & Daily, A.D. PRINCIPLES AND PRELIMINARY RECOMMENDATIONS FOR A CORE SYSTEM OF NAVY RADAR OPERATOR TRAINING DEVICES. Contract N61339 348, NAVTRADEVCEN 348 1, March 1960, 107pp. USN Training Device Center, Port Washington, N.Y. (American Institute for Research, Pittsburgh, Penn.).

16,076

A core of skill and knowledge requirements basic to many radar operator jobs was obtained by analysis of naval radar operator jobs to determine common job content. Equipment design principles for the design of radar operator training devices were derived from rational analysis of skill and knowledge data plus data about equipment and training practices in use. Preliminary recommendations are made for developing a core of radar operator training devices which would be useful in training in a multiplicity of specific skills.
T. G. R 84 (approx.)

16,077
Meister, D. HUMAN ENGINEERING IN THE FIELD THE ROLE OF HUMAN ENGINEERING IN THE TEST AND OPERATIONAL PHASES OF SYSTEM DEVELOPMENT. July 1960, 16pp. Convair-Astronautics, General Dynamics Corporation, San Diego, Calif.

16,077

This paper is an analysis of human engineering in the field which emphasizes "the concern for totality"—i.e., to examine the system as a totality rather than as separate units. The use of human engineering field studies for purposes of evaluation of human engineering recommendations for design and equipment, to uncover new problems, to locate special problems arising out of the particular new environment, and to measure adequacy of the system is discussed. Differences between test and operational environments are pointed out, together with some of the problems inherent in each. Recommendations are made for future field studies.
R 11

16,078
California Institute of Technology. ASTRONAUTICS INFORMATION. ABSTRACTS, VOLUME II, NO. 5, (ABSTRACTS 2,336-2,431). Contract NASW 6, May 1960, 44pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,078

This bibliography of material related to space flight included reports abstracted during the month of May, 1960. There is an index of titles accumulated to the publication date. The material is arranged alphabetically according to subject.
R 95

16,079
Wherry, R.J., Jr. A TEST OF NEW RATIONALE AND METHODOLOGY FOR THE FORCED-CHOICE TECHNIQUE. Proj. MR005.13 5001, Subtask 1, Rep. 21, March 1960, 64pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

16,079

Objections have been raised concerning the validity of the forced-choice technique under experimental conditions of maximum bias. The problem of controlling "answer bias" under such conditions is the topic of this report. A series of theorems are stated and tested in order to corroborate a proposed set of rationale to underlie the forced-choice technique. An index of "attractiveness" on which to match forced-choice items is given and new methods for predicting the validity of forced-choice items under no-bias, selection set, and maximum-bias conditions are suggested.
T. G. R 30

16,080
Documentation Incorporated. MAN-MACHINE INFORMATION CENTER. Contract NONR 2718(00), 1960, 13pp. Documentation Incorporated, Washington, D.C.

16,080

This pamphlet describes a Center organized by a group of scientists, engineers, and information specialists to "provide a high level information capability for other scientists and engineers working in the Army-Navy Instrumentation Program, the Submarine Integrated Advisory Control, and the Surface Integrated Control Program." The Center includes the latest storage and retrieval techniques to enable it to fulfill information requirements of the programs listed above.
I.

16,081
California Institute of Technology. ASTRONAUTICS INFORMATION. *OPEN LITERATURE SURVEY, VOLUME II, NO. 5,* (ENTRIES 21,591-21,870). Contract NASW 6, May 1960, 55pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,081
This annotated bibliography is a survey of literature dealing with astronautics, and covers the period of May, 1960. The material is organized alphabetically according to subject.
R 279

16,083
Cheatham, P.G. HUMAN ENGINEERING IN THE NAVY - 1959. Naval Res. Rev., April 1960, 21-26. (USN Office of Naval Research, Washington, D.C.).

16,083
The purpose of the study reported in this article was to bring a previous investigation of the efficiency of the Navy human engineering program up to date. Specifically, the purpose was to discover how effectively human engineering principles were being applied to major weapon systems design. Information was obtained by visiting and talking with in-service and contract personnel. Topics reported include adequacy of coverage, level of effort, consideration of man during systems design, research, acceptance (of human engineers), training, human engineers and company organization, coordination and communication, and availability of trained Human Engineers.
R 1

16,084
Forsyth, D.M. USE OF A FOURIER MODEL IN DESCRIBING THE FUSION OF COMPLEX VISUAL STIMULI. J. opt. Soc. Amer., April 1960, 50(4), 337-341. (Johns Hopkins University, Baltimore, Md.).

16,084
To determine whether the response of the eye at fusion is adequately described by a Fourier analysis of the stimulus, six observers were presented with various stimulus trains composed of pulses of alternating duration and required to make a series of adjustments at each of several fusion points. Data were subjected to a Fourier analysis in which the first eight harmonics were computed. Adequacy of the model to handle the experimental data is discussed.
T. G. R 9

16,085
Baker, C.H. FACTORS AFFECTING RADAR OPERATOR EFFICIENCY. J. Instit. Navig., April 1960, XIII(2), 148-163. (Defence Research Medical Labs., Toronto, Ontario, Canada).

16,085
This paper reviews research findings with respect to factors which affect the efficiency of radar operation. Topics discussed include the setting of optimum scope brightness, visual search habits as these relate to design of radar displays, design factors which determine accuracy with which target range and bearing are reported, fatigue factors, and illusions on radar displays.
G. I. R 54

16,086
Shriver, E.L. DETERMINING TRAINING REQUIREMENTS FOR ELECTRONIC SYSTEM MAINTENANCE; DEVELOPMENT AND TEST OF A NEW METHOD OF SKILL AND KNOWLEDGE ANALYSIS. Task FORECAST 1, Tech. Rep. 63, June 1960, 114pp. Human Resources Research Office, George Washington University, Washington, D.C.

16,086
The purpose of this project was to develop and test methods of deriving an effective, economical set of skills and knowledges for operating and maintaining a weapon system. A 12-week training program was administered to a group of students whose performance later was compared with that of a control group. The performance tested included approximately the same number and type of problems that would be encountered by an average repairman (MOS 232.1) during his first eight to twelve months in the field. Recommendations were made for Army schools teaching electrical and electronic courses. The master training schedule for the experimental course and sample lesson plans were included in the appendices.
T. G. I. R 4

16,087
Tanner, W.P., Jr., Birdsall, T.G. & Clarke, F.R. THE CONCEPT OF THE IDEAL OBSERVER IN PSYCHOPHYSICS. Contract AF 19(604) 2277, Rep. 2659 6 T, Tech. Rep. 98 & AFCRC TR 59 54, April 1960, 41pp. Dept. of Electrical Engineering, University of Michigan, Ann Arbor, Mich.

16,087
The purpose of this report was to present the concept of the ideal observer. This model was compared with the descriptive type of model usually used in psychophysics. Usefulness of the model as a tool for developing descriptive models of sensory systems was pointed out. A specific instance of an ideal observer was analyzed in some detail, a detailed analysis was made of the case of a signal specified exactly presented in a background of white Gaussian noise, and a broad model for the ideal observer was developed. Measures which may be used in the study of less-than-ideal observers were presented.
G. I. R 3

16,088
Creelman, C.D. APPLICATIONS OF SIGNAL DETECTABILITY THEORY TO PSYCHOPHYSICAL RESEARCH: A BIBLIOGRAPHY. Contract AF 19(604) 2277, Rep. 2659 10 T, Tech. Memo. 79, & AFCCDD TN 60 14, June 1960, 12pp. Dept. of Electrical Engineering, University of Michigan, Ann Arbor, Mich.

16,088
This bibliography is divided into four sections: books, handbook chapters, chapters in symposia concerned with detectability theory, and papers which have appeared in technical journals. Both empirical and theoretical contributions are included. An additional section contains references to abstracts of papers presented at professional meetings. Although the attempt was made to include complete coverage of psychophysical studies related to signal detectability, complete coverage of references dealing with background material in mathematical and statistical theory was not attempted.
R 149

16,089
Tanner, W.P., Jr. THE THEORY OF SIGNAL DETECTABILITY AS AN INTERPRETIVE TOOL FOR PSYCHOPHYSICAL DATA. Contract AF 19(604) 2277, Rep. 2659 T, Tech. Memo. 78, & AFCCDD TN 60 13, May 1960, 27pp. Dept. of Electrical Engineering, University of Michigan, Ann Arbor, Mich.

16,089
Criticisms of the applications of the theory of signal detectability to the study of psychophysics led the author to write this paper to clarify the philosophy underlying the theory. The theory is examined from the standpoint of determining a set of satisfactory assumptions for the purpose of developing an interpretative tool for use in psychophysical experiments. The assumption that the observer attempts to maximize the expected value of the outcome of the experiment and the proposition that a set of physical conditions can be established which justify computation of the detectability of a signal in noise are examined for this purpose.
I. R 12

16,091
Ramo, S. ICBM: GIANT STEP INTO SPACE. Astronautics, Aug. 1957, 34-41, 83-88. (Ramo-Wooldridge Corp., Los Angeles, Calif.).

16,091
The long range ballistic missile program is described. Past and future developments are discussed in terms of technical know-how and of management. The history of guided missile development is summarized. Both intercontinental and intermediate-range ballistics are discussed.
I.

16,092
US Government Printing Office. SECOND SEMIANNUAL REPORT OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION COVERING THE PERIOD APRIL 1, 1959, THROUGH SEPTEMBER 30, 1959. March 1960, 164pp. US Government Printing Office, Washington, D.C.

16,092
This report covers the period April 1 through September 30, 1959. Activities are listed and described chronologically and include the descriptions of activities in the following areas: 1) the space flight program--operational missions, space vehicle program, manned flight, research, satellite applications, sounding rocket development, international cooperation, and tracking and data systems; 2) advanced aeronautics and space research--propulsion and power generation, control and guidance of craft, materials and structures, fluid mechanics, space and aircraft aerodynamics, and operations and environment; 3) organizations and supporting activities. Publications prepared during this period are listed.
T. I. R 140 (approx.)

16,093
Pollack, I. ASSIMILATION OF SEQUENTIALLY ENCODED INFORMATION. Amer. J. Psychol., July 1953, 66(3), 421-435.

16,093
This paper presents a methodology for use in studying verbal learning which is based on the theory of information. The approach allows an objective quantification, in units not specific to the particular experimental operations considered, of 1) the learning materials used (the informational input), 2) the information lost (the error output), and 3) the information gained (the difference between 1 and 2). It is contended that by using such units comparisons can be made of the results of a diversity of experiments. An illustrative experiment in learning designed to fulfill the methodological requirements is reported and the results considered briefly.
G. I. R 20

16,094
Egan, J.P., Greenberg, G.Z. & Schulman, A.I. OPERATING CHARACTERISTICS. SIGNAL DETECTABILITY, AND THE METHOD OF FREE RESPONSE. Contract AF 19(604) 1962, AFCRC TR 59 58, Dec. 1959, 54pp. Hearing and Communication Lab., Indiana University, Bloomington, Ind.

16,094
This paper reports experiments concerned with the detection of signals presented at random times. Using the method of free response, it was assumed that the listener divides time into a succession of subjective temporal intervals and that these implicitly define a trial. The further assumption was made that the listener's criterion is associated with a particular point on a particular operating characteristic. The problem was to establish a relation between measures of the number of responses per signal and the assumed critical probabilities. Data were obtained from seven listeners in one experiment and from four in a second. Limitations in the method of analysis are discussed. An additional analysis was made of the data in which only the first response made after each signal was tabulated. T. G. R 7

16,095
Egan, J.P. RECOGNITION MEMORY AND THE OPERATING CHARACTERISTIC. Contract AF 19(604) 1962, AFCRC TN 58 51, June 1958, 32pp. Hearing and Communication Lab., Indiana University, Bloomington, Ind.

16,095
The problem of locating and defining the role of a criterion in the behavior of the individual is troublesome. Confidence ratings in judgments are related to *a posteriori* probability of the occurrence of a particular stimulus, given a particular response. The operating characteristic can be used to display the degree to which the subject can partition the stimuli by his ratings. The present study attempts to show how the operating characteristic may be applied in the study of recognition memory. The purpose of the experiments was to determine the form of the operating characteristic for recognition memory. Forty-eight subjects participated in two experiments. The shape of the operating characteristic for recognition was analyzed for individuals and averaged for subjects with similar performance. T. G. R 11

16,096
Egan, J.P., Schulman, A.I. & Greenberg, G.Z. OPERATING CHARACTERISTICS DETERMINED BY BINARY DECISIONS AND BY RATINGS. J. acoust. Soc. Amer., June 1959, 31(6), 768-773. (Indiana University, Bloomington, Ind.).

16,096
The theory of signal detectability is discussed as it relates to the study of the detectability of a signal by listeners. A measure of performance is derived which is relatively independent of the procedure employed and which is also unaffected by circumstances which can influence the criterion adopted by the listener. Two psychophysical experiments were performed in which the performance of listeners using multiple criteria was compared with performance in which a single criterion was required. In the second experiment, using the rating method alone, the relation between the measure of performance and the ratio of signal energy to noise power per unit bandwidth was investigated.
T. G. I. R 11

16,097
Bishop, A.B. A MODEL FOR OPTIMUM CONTROL OF STOCHASTIC SAMPLED-DATA SYSTEMS. Reprint 4, Nov. 1957. Engineering Experiment Station, Ohio State University, Columbus, Ohio. (Reprinted from: Operat. Res., Aug. 1957, 5(4), 546-550).

16,097
This paper reports a model developed for a "sampled-data feedback control system for processes having randomly-distributed outputs or involving measurement techniques that introduce a significant component of variance in the measured values of the controlled variable. ...The method of derivation involves successive operations on the normal probability density function. The effects on system response..., oscillatory tendencies and system variance of various values of the constant...are discussed." Two classes of criterion function are also mentioned from which optimum values of the proportionality constant can be determined.
T. R 2

16,098
Howland, D. THE HUMAN AS A MONITOR IN A MAN-MACHINE SYSTEM. Reprint 7, Oct. 1958. Engineering Experiment Station, Ohio State University, Columbus, Ohio. (Reprinted from: News in Engng., Oct. 1958, 23-29).

16,098

This study investigated 1) the gradual decrease in performance as measured by failure to detect signals over long-time intervals and 2) development of a better understanding of the process by which a decision is made as to whether some aspect of a situation has changed or not. Two groups of 12 subjects observed sequences of reading with minimum time lag for a four-hour period. To investigate the hypothesis that log-keeping would reduce error, one group was required to maintain a written record of readings. The data were discussed within the framework of a feedback control model.
G. I. R 9

16,099
Howell, W.C. & Briggs, G.E. INFORMATION INPUT AND PROCESSING VARIABLES IN MAN-MACHINE SYSTEMS: A REVIEW OF THE LITERATURE. Contract N61339 508, NAVTRADEVCEN 508 1, Oct. 1959, 71pp. USN Training Device Center, Port Washington, N.Y. (Ohio State University, Columbus, Ohio).

16,099
This survey was undertaken for the purpose of providing recommendations for the handling of information by various sensory systems. The report covers: 1) sensory input variables--comparison of human sensory mechanisms, variables involving realistic distortion of input information, and problems in the detection of visual signals; 2) information-processing variables--amount and distribution of input information, prediction and extrapolation of input information, and the quantifying of human information processing; and 3) display-control relationships.
R 245

16,100
Wilson, W.S. MAN-MACHINE SPACE COMPLEX. Aircraft & Missiles, July 1960, 3(7), 22-26.

16,100
This brief article discusses some problems which confront the designer of space vehicles when requirements of the human organism must be met. The design of body couches, the development of bioelectric means for obtaining records of physiological variables, tolerance for acceleration, effects of extreme temperature, composition of an ideal atmosphere, radiation dangers, and the problem of weightlessness are discussed.
I. R 15

16,101
California Institute of Technology. ASTRONAUTICS INFORMATION. ABSTRACTS, VOLUME II, NO. 6, (ABSTRACTS 2,432-2,529). Contract NASW 6, June 1960, 45pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,101
This series of abstracts is restricted to the subject of space flight and to applicable data and techniques. It includes reports abstracted during June, 1960, and an index cummulated to publication date.
R 97

16,102
Sanders, A.F. & Ferrari, G. A NEGLECTED FACTOR IN VIGILANCE. Rep. IZF 1960 4, March 1960, 9pp. Institute for Perception RVO-TNO, Soesterberg, The Netherlands.

16,102
The present investigation was conducted after failure to find expected change in performance at a task in which present evidence indicated deterioration should have occurred. A total of 17 subjects were given a paced task requiring them to detect a critical signal of reduced brightness. Three different types of critical signal were used under one of two conditions, or both. Increased difficulty of the task had failed to produce performance decrement; the present experiment varied lengths of task--one hour versus two hours. Data were analyzed by analysis of variance for Latin square designs applied to differences between first and second half-hour periods. The effect of motivational factors such as knowledge of lengths of task were considered. Complexity of factors involved was pointed out. T. R 6

16,105
Tufts University. BIBLIOGRAPHY ON KEY SET DESIGN. TECHNICAL REPORT. 16.18.082.010, March 1960, 22pp. Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.

16,105
The plan of the Bibliographic Search on Key Set Design was set forth in detail with all sources consulted listed. Each item included a citation, type of article (e.g., bibliography, experimental study), the kind of original data presented, whether equipment was used, whether recommendations for design were made, and numbers of items in the bibliography. A few citations only are included in cases where the article appeared to be relevant but was not available for examination.
R 115

16,107
Drazin, D.H. THE 'HILO' INDICATOR AN EXPERIMENTAL INVESTIGATION OF HUMAN FACTORS RELEVANT TO THE DESIGN OF A LONG-RANGE CARRIER-BORNE ANGLE OF APPROACH INDICATOR. FPRC Memo 127, Nov. 1959, 16pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,107
It is doubtful whether mirror and projector sights now in use will prove adequate for use with carrier-borne aircraft. The split-beam indicator (Hilo) described here would be effective at distances of between 1000 and 4000 yards from the carrier. An experimental investigation into human factors relevant to the detailed design of this indicator was concerned with these questions: Is there any advantage in interposing a band of neutral filter between the red and green segments of the component filter system? What shades of red and green would provide the clearest Hilo indication? Specific recommendations are made for design of the indicator.
T. G. I. R 2

16,108
Douvillier, J.G., Jr., Turner, H.L., McLean, J.D. & Heinle, D.R. EFFECTS OF FLIGHT SIMULATOR MOTION ON PILOTS' PERFORMANCE OF TRACKING TASKS. NASA TN D 143, Feb. 1960, 34pp. National Aeronautics and Space Administration, Washington, D.C. (Ames Research Center, Moffett Field, Calif.).

16,108
The air-to-air tracking performance of two pilots in flight, on a motionless flight simulator and on a flight simulator free to roll and pitch, were compared in order to investigate the effect of motion of a flight simulator on pilots' performance. The two subjects (pilots) used both the circle-dot and drone displays in lead-collision attacks against a nonmaneuvering target and in pursuit attacks against both a nonmaneuvering target and one executing a level, 1.5g turn. Implications of results for the use of motionless simulators are discussed. Comparative usefulness of the two types of display also was discussed.
T. G. I. R 8

16,109
Cameron, C. & Corkindale, K.G. THE PSYCHOLOGIST'S ROLE IN THE DEVELOPMENT OF AIR DEFENCE SYSTEMS. FPRC Memo 103, Oct. 1959, 7pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,109
This report consists of a series of propositions or statements, some of them definitions, under the following topics: 1) Systems and systems design, 2) Air defence systems, 3) The systems design team, 4) Stages of systems design, and 5) The psychologist as member of the design team.
R 17

16,110
Cheatham, P.G. HUMAN ENGINEERING IN THE NAVY - 1959. ONR Rep. ACR 46, March 1960, 10pp. USN Office of Naval Research, Washington, D.C.

16,110
This study was initiated to bring the 1953 report of human engineering in the Navy up to date and to show what changes had taken place. Information was gathered on how effectively human engineering principles are being applied to major weapon systems design, and an estimate of the amount and level of human engineering research being conducted was made. Sources of information used were listed. Significant developments which have occurred in the last five years and remaining urgent needs were noted.
T.

16,111
Brown, B.P., Johnson, H.I. & Mungall, R.G. SIMULATOR MOTION EFFECTS ON A PILOT'S ABILITY TO PERFORM A PRECISE LONGITUDINAL FLYING TASK. NASA TN D 367, May 1960, 10pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

16,111
To determine the effect that body-motion cues have on the pilot's ability to perform a precision close-coupled tracking task, two pilots performed the task in both a fixed cockpit and in a moving cockpit with both pitch and vertical motion. Performance under the two conditions was compared, and the usefulness of motion cues was discussed.
G. I. R 1

16,112
Brebner, J. & Burrows, A.A. THE EVALUATION OF AIRCREW INFORMATION SYSTEMS. FPRC Memo 108, Feb. 1959, 9pp. Flying Personnel Research Committee, London, England.

16,112
The purpose of this paper was to examine methods and criteria for evaluations of aircrew information systems and to make recommendations for such evaluations where this was possible. The problems inherent in the evaluation of such systems were raised in historical perspective. Aircrew Information Systems were defined, various approaches to evaluation explored, a list of principles for use in developing checklists was given, an analysis of operations to be performed upon the information presented to the operator was made, performance measures used in the evaluation of aircrew information systems were discussed, and certain recommendations were made.
T. R 6

16,113
Llewellyn-Thomas, E. & Mackworth, N.H. CONTROL OF INFORMATION INPUT BY THE TELEVISION EYE MARKER. Reprinted from the 12th Annual Conference on Electrical Techniques in Medicine and Biology, Nov. 1959, 1p. Defense Research Medical Labs., Toronto, Ontario, Canada.

16,113
This brief note describes an apparatus for recording eye movements which permits the investigator to follow the eye movements of the viewer superimposed on the object or scene which is being viewed or scanned. Various uses of the technique are pointed out.
I. R 3

16,115
Toothman, H.L. A TABLE OF PROBABILITY DISTRIBUTIONS USEFUL IN WAR GAMES AND OTHER COMPETITIVE SITUATIONS. Subproj. RF 005 01 41 4302, NRL Rep. 5480, May 1960, 91pp. USN Research Lab., Washington, D.C.

16,115
This report contains a formula and computer program developed as part of an air defense model. The formula gives "the probability of t successes, if each of m players making r successive plays has probability p_1 of success in each play, and probability p_2 of being eliminated from subsequent play." A number of interceptor-bomber duels which involve a group of unescorted bombers is part of the tactical situation described. The formulation, however, is given in general rather than air-combat terms in order to facilitate its use in other instances.
T. R 1

16,116
Story, Anne W. THE EFFECT OF STIMULUS VARIABILITY ON PREDICTION OF MAGNITUDE. AFCCDD TN 60 20, June 1960, 16pp. USAF Operational Applications Office, Bedford, Mass.

16,116
To investigate basic human mechanisms for the assessment of magnitude, 16 Ss were instructed to predict the number of dots which would appear in squares to be projected. It was hypothesized that the more variable the alternative, the smaller would be its predicted magnitude. The methodology used was "probability matching." The median number of dots predicted by each S was predicted for every six exposures; random patterns of dots, with density varied in different parts of a field, were presented. Findings were believed to have implications for human threat assessment and for the establishment of computerized threat evaluation systems.
T. R 9

16,117
Seltzer, L.J. & McRuer, D.T. SURVEY OF ANALOG CROSS-SPECTRAL ANALYZERS. Contract AF 33(616) 5822, Proj. 7184, Task 71581, WADC TR 59 241, Dec. 1959, 72pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (Systems Technology, Inc., Inglewood, Calif.).

16,117
This is a survey of analog devices which have been used to compute cross-spectra in the processing of data from human response experiments. The report includes 1) general background on correlation and spectral measurement, 2) measurement fundamentals for closed-loop situation found in human response tests, 3) a discussion of the theoretical measurement of cross-spectra, 4) a survey of analyzers, 5) a discussion of the approximate behavior of analyzers with real physical components, 6) a discussion of the accuracy of spectral estimates, and 7) an appendix which contains derivation of the more pertinent equations found in the report.
T. G. I. R 28

16,119
Eason, R.G. AN ELECTROMYOGRAPHIC STUDY OF IMPAIRMENT AND ESTIMATES OF SUBJECTIVE EFFORT ASSOCIATED WITH VOLUNTARY MUSCULAR CONTRACTION. PO 06401, NE 091300 3 (NEL N4 2), Rep. 898, May 1959, 27pp. USN Electronics Lab., San Diego, Calif.

16,119

To study the feasibility of using the surface electromyogram (EMG) as an index of muscular fatigue and subjective effort, a behavioral task was employed, restricted to voluntary contractions of certain muscles of the arm (hand dynamometer). The measurements were of changes occurring in the EMG as a function of the magnitude and duration of isometric contraction. The first experiment investigated relationships between EMG and degree and duration of voluntarily sustained contractions; the second dealt with rate of acquisition and amount of local and generalized impairement during sustained contraction; and the third tested the hypothesis that surface EMG reflects amount of effort required to maintain a sustained contraction.
T. G. I. R 36

16,120

Holt, R.R. & Goldberger, L. RESEARCH ON THE EFFECTS OF ISOLATION ON COGNITIVE FUNCTIONING. Contract AF 33(616) 6103, Proj. 7222, Task 71745, WADD TR 60 260, March 1960, 22pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio. (Research Center for Mental Health, New York University, New York, N.Y.)

16,120

To compare the effects of 100 gamma LSD-25 with those of eight hours of perceptual isolation, 15 subjects who had participated in an investigation on LSD were asked to participate in a one-day isolation experiment. Extensive testing and interviewing had been a part of selective procedures and of the first experiment. Nine cognitive tests and a questionnaire designed to elicit reports of the main symptoms of the drug were used.
T. R 4

16,121

Tiffin, J. & Bromer, J. ANALYSIS OF EYE FIXATIONS AND PATTERNS OF EYE-MOVEMENT IN LANDING A PIPER CUB J-3 AIRPLANE. Rep. 10, Feb. 1943, 24pp. Division of Research, US Civil Aeronautics Administration, Washington, D.C. (Purdue University, Lafayette, Ind.).

16,121

To study the different types of eye fixations and eye-movement patterns that occur during the landing of an airplane by pilots with varying degrees of skill, photographs were taken of the pilot's eyes during the last five to ten seconds before landing at the rate of 16 frames per second with a camera specially mounted in a Piper Cub J-3. Pictures of 177 landings made by 33 pilots (ranging from the elementary stage of dual instruction to over 200 hours flying experience) were analyzed frame-by-frame. Graphs of the eye movements show the different visual fields used and are separated into four groups according to flight experience of the pilot. A supplement contains two pertinent reports of progress on a later study of visual depth perception in aviation.
G. I.

16,122

Tinker, M.A. & Carlson, W.S. SENSITIVITY OF PERIPHERAL VISION IN RELATION TO SKILL IN LANDING AN AIRPLANE. Rep. 14, April 1943, 15pp. Division of Research, US Civil Aeronautics Administration, Washington, D.C. (University of Minnesota, Minneapolis, Minn.).

16,122

This document sets forth the same experimental study of response time to peripherally presented stimuli as related to skill in landing an airplane as given in 16,123. However, there is a more adequate presentation of the data and analyses in this document than in 16,123.
T. I. R 9

16,123

Tinker, M.A. TESTS FOR THE SENSITIVITY OF PERIPHERAL VISION. Jan. 1941, 28pp. Division of Anthropology and Psychology, National Research Council, Washington, D.C. (University of Minnesota, Minneapolis, Minn.).

16,123

To test the hypothesis that response time to peripherally presented visual stimuli might be related to skill in landing an airplane, a disjunctive reaction time experiment was performed. The subject was required to indicate, by pressing an appropriate lever, in which quadrant the break in an illuminated ring appeared; the ring surrounded a central fixation spot of light. Three sizes of ring, three sizes of break, and three levels of illumination were used. On the basis of instructor ratings of landing skill, ten pilots were selected from the top and ten from the low ratings. Several comparisons were made in an effort to evaluate the visual reaction time data as related to landing skill.
T.

16,124

Kelly, E.L. THE DEVELOPMENT OF "A SCALE FOR RATING PILOT COMPETENCY." Rep. 18, July 1943, 21pp. Division of Research, US Civil Aeronautics Administration, Washington, D.C. (Purdue University, Lafayette, Ind.).

16,124

This study describes the development of a scale for rating pilot efficiency. On the basis of preliminary trials, a 14-item graphic scale was devised and subjected to experimental study. Instructor ratings of the best and the poorest students were secured from 91 flight instructors in the Civilian Pilot Training program connected with various colleges. The 91 pairs of rating scales were scored on a 20-point scale and studied graphically. Additional ratings were secured on a roughly random sampling of students. A factor analysis of the intercorrelations was made and the resultant factors described. An appendix provides weights for the various items which permit more accurate scoring of the scale.
T. G. I. R I

16,125

Campbell, F.W. & Westheimer, G. DYNAMICS OF ACCOMMODATION RESPONSES OF THE HUMAN EYE. Proj. 654, Tech. Rep. 6, Aug. 1960, 11pp. Ohio State University Research Foundation, Columbus, Ohio. (Reprinted from: J. Physiol., 1960, 151, 285-295).

16,125

Accommodation measurements were obtained with a high-resolution, continuously recording infra-red optometer on six young emmetropic subjects when various focusing tasks were presented to them monocularly. Reaction time of the accommodation response to a focusing stimulus was established; time elapsing between onset of stimulus and beginning of reasonably steady accommodation level was also measured. Other aspects of the accommodation response were studied.
T. G. I. R 9

16,126

Butler, R.A. & Galloway, F.T. FACTORAL ANALYSIS OF THE DELAYED SPEECH FEEDBACK PHENOMENON. J. acoust. Soc. Amer., May 1957, 29(5), 632-635. (Audiology and Speech Center, USA Walter Reed Army Hospital, Washington, D.C.).

16,126

Two experiments designed to investigate the interaction between delay times and intensities of the delayed speech signal were reported. In the first experiment, 144 persons served as subjects. Delayed speech feedback was given at various sensation levels. In the second experiment, 240 subjects were asked to respond under each of two different presentation rates and two intensity levels. Four delay conditions were incorporated into this study. Summaries of analysis of variance for error scores were presented for each experiment. Interactions among the several variables were discussed.
T. G. I. R 8

16,127

Peckham, R.H. & Hart, W.M. BINOCULAR SUMMATION OF SUBLIMINAL REPETITIVE VISUAL STIMULATION. Amer. J. Ophthal., May 1960, 49(5), Part II, 36-39. (Eye Research Foundation, Bethesda, Md.).

16,127

The authors report results from the measurement of contrast thresholds for the probability of seeing for various uniformly repeated exposure times. The stimulus was alternated above and below apparent brightness of the background, and times of the stimuli were varied in predetermined random order. Seventy-eight subjects were studied, using right, left, and both eyes, yielding 11,340 trials. Results are presented in frequency of seeing curves for each condition. Binocular responses were computed from recorded probability curves for each single eye, and compared with the actual binocular response. Possible neurological correlates of the response obtained were discussed.
G. R 10

16,128

Thompson, R.W. & Bartley, S.H. APPARENT DISTANCE OF MATERIAL IN PICTURES ASSOCIATED WITH HIGHER ORDER MEANINGS. J. Psychol., 1959, 48, 353-358. (Dept. of Psychology, Michigan State University, East Lansing, Mich.).

16,128

To test the assertion that the figure of a man when in the left rather than the right hand part of the picture and with back turned toward the viewer is phenomenally nearer than when facing him, 18 observers were asked to match various sized prints of two scenes for apparent distance of the crucial element. Data were subjected to analysis of variance. Results were compared with those obtained in other similar studies.
T. R 6

16,129

Bartley, S.H. & DeHardt, Doris C. A FURTHER FACTOR IN DETERMINING NEARNESS AS A FUNCTION OF LATERAL ORIENTATION IN PICTURES. J. Psychol., 1960, 50, 53-57. (Dept. of Psychology, Michigan State University, East Lansing, Mich.).

16,129

Results from previous studies indicated that items in the left hand side of a pictorial scene appear closer than the same items viewed in the right hand side. The present study investigated whether this finding also holds true for background items. Ten observers were asked to adjust the metric distance of a large print so that one of the two specified portions of the scene appeared to be equidistant to the corresponding portion of the scene in a small print, making a total of 96 observations each. Differences in observations made for foreground and background portions of the scene were tested for significance. Results were compared with those obtained in former studies of the same phenomenon.
T. G. R 2

16,130

Heinemann, E.G. & Marill, T. TILT ADAPTATION AND FIGURAL AFTER-EFFECTS. J. exp. Psychol., Dec. 1954, 48(6), 468-472. (Harvard University, Cambridge, Mass. & Massachusetts Institute of Technology, Cambridge, Mass.).

16,130

Three experiments were performed to determine whether changes in apparent tilt of lines after long inspections represent an alignment effect or an adaptation to the norm. Twelve subjects served in one or more of the experiments. Subjects were required to fixate a mark for a period during which only the standard line was exposed, then to judge direction of tilt of a variable line exposed briefly. Measurements were made under four conditions. In some instances the standard line was vertical and the cardboard on which it was presented was tilted; in some, both the standard and the cardboard were tilted. Differences between angular positions of the standard and the variable were tested for significance. Results were compared with those from similar experiments. T. I. R 6

16,131

Garner, W.R. SYMMETRIC UNCERTAINTY ANALYSIS AND REDUNDANCY OF PRINTED ENGLISH. Reprinted from: "Proceedings of the Fifteenth International Congress of Psychology," Brussels, 1957. Contract N5ORI 166, Proj. NR 145 089, Task I, Rep. 166 I 220, 1-7. Johns Hopkins University, Baltimore, Md.

16,131

Information analysis is considered as a technique essentially analogous to analysis of variance. Although the analogy is useful, it may also be restrictive in that variance analysis requires that the criterion must have a metric. In information, or uncertainty analysis, this need not be so, but can use the same property of the criterion variable as of the predictor variables. Equations are developed and are discussed as they apply to sequential data where there are sequential dependencies. Definition of the term "redundancy" is questioned in the light of the above discussion.
R 2

16,132

Eason, R.G. & White, C.T. RELATIONSHIP BETWEEN MUSCULAR TENSION AND PERFORMANCE DURING ROTARY PURSUIT. Percept. Mot. Skills, 1960, 10, 199-210. (USN Electronics Lab., San Diego, Calif.).

16,132

To investigate the relationships that may exist between muscular tension, as reflected in the surface electromyogram (EMG), and performance during rotary pursuit, a two-part experiment was conducted. In Part I, 48 subjects were randomly assigned to four groups which received either 40, 20, 10, or 0 seconds rest between trials; after ten trials, a ten-minute rest was given and then ten more trials. In Part II, 22 subjects were randomly assigned to three groups which had either 0-, 5-, or 10-pound weights suspended from the wrists. EMG activity was recorded from neck, trapezius, deltoid, and biceps muscles and integrated over ten-second intervals within one-minute trials. Percent time-on-target measures were obtained for each ten-second interval. A two-factor hypothesis relating muscular fatigue and motivation is introduced. G. R 9

16,133

McCormack, P.D. PERFORMANCE IN A VIGILANCE TASK AS A FUNCTION OF INTER-STIMULUS INTERVAL AND INTERPOLATED REST. Canad. J. Psychol., 1958, 12(4), 242-246. (Defence Research Medical Labs., Toronto, Ontario, Canada).

16,133
To investigate performance in a vigilance task as a function of task duration, length of inter-stimulus interval, and degree of interpolated rest, 60 subjects were tested. The task lasted 50 minutes with some subjects working the entire period, others resting five minutes or ten minutes before completing the last ten minutes. The task was to depress a switch whenever a light appeared through an aperture (one centimeter in diameter). The light was presented 51 times to each subject, the intervals between stimuli being 30, 45, 60, 75, and 90 seconds. Response times were recorded and analyzed for effects due to the experimental conditions. The results are discussed in relation to the expectancy hypothesis and the hypothesis that inhibition is response-generated.
T. G. R 5

16,134
Baxter, J.R., Day, R.H. & Lane, J.C. THE SENSITIVITY OF THE PRECISION VISUAL GLIDEPATH (P.V.G.) AT LONG RANGE. Note ARL HE 5, Feb. 1960, 39pp. Aeronautical Research Labs., Australian Defence Scientific Service, Melbourne, Australia. (Dept. of Psychology, University of Sidney, Sidney, Australia & Dept. of Civil Aviation, Melbourne, Australia).

16,134
A series of tests was conducted to test the accuracy with which misalignments of the Precision Visual Glidepath display could be judged under a number of viewing conditions by both pilots (10) and non-pilots (35). A full-scale representation of the approach aid was observed from about seven nautical miles in hazy conditions, and a number of additional tests were conducted in a 1/1000 scale laboratory simulator using some of the same observers. Initial laboratory test results were used to study the validity of the simulator with subsequent tests run to study the effect of an added runway pattern, a wet windshield with a wiper with a reduction of normal light intensity.
T. G. I. R 4

16,135
Doughty, J.M. A SIMULATION FACILITY FOR THE EXPERIMENTAL STUDY OF DECISION MAKING IN COMPLEX MILITARY SYSTEMS. AFCCDD TN 60 32, July 1960, 23pp. USAF Operational Applications Office, AFCRC, Bedford, Mass.

16,135
This report describes 1) a simulation facility, 2) a methodology, and 3) an initial experiment on man-machine decision-making in military aerospace surveillance systems The facility is to serve two goals: 1) test and evaluate systems concepts, and 2) provide data on man-machine decision-making. Objectives of the experimentation include exploration of the possibilities of the simulation facility by increasing complexity of programming to the point where experimental control ceases and the conduction of formal experiments. One such experiment which examined the effect of track load on selection of action to counter a threat has been conducted. Results of this study are reported here.
T. I. R 1

16,136
Strasel, H.C., Regan, R.A. & Glaser, R. INVESTIGATION OF MACHINE-ASSIST TO OPERATOR PERFORMANCE: I - LITERATURE ANALYSIS AND EXPERIMENTAL DETAILS. Contract NONR 624(11), Tech. Rep. 1, June 1960, 77pp. Dept. of Psychology, University of Pittsburgh, Pittsburgh, Penn.

16,136
The aim of this project was to investigate behavioral principles which, built into the machine component of a given system, would facilitate performance of the human task in the system. To accomplish this goal 1) a review and analysis of certain basic human engineering literature was undertaken, 2) general principles were developed from these data which could lead to direct applications for machine aiding of human performance, and 3) experimental verification of the applicability of general machine-assist principles was undertaken. Review and analysis of studies in the literature was accomplished in terms of a Task by Task-Variable matrix generated for the purpose. Detailed plans for experimentation were presented, and two studies outlined in detail. I. R 53

16,137
Beckman, E.L. ESCAPE FROM DITCHED AIRCRAFT I. TIME REQUIRED BY AIRCREW FOR ESCAPE FROM A DITCHED AIRCRAFT WHILE USING THE AIRCRAFT OXYGEN EQUIPMENT FOR BREATHING. FPRC 1074, Jan. 1960, 18pp. Flying Personnel Research Committee, London, England. (RAF Institute for Aviation Medicine, Farnborough, Hants, England).

16,137
Tests to evaluate problems of pilot escape from ditched aircraft were carried out using a Meteor MK 9 fuselage with Ss wearing flying clothing and using MK 17D oxygen regulators and oxygen masks. The times required by aircrew Ss to escape from the cockpit in the air were compared with the times required to escape from the cockpit when upright and inverted in eight feet of water. On the basis of the time data and of observations made of the difficulties encountered during the escape, a re-evaluation of escape problems was made with recommendations for procedures to be followed.
T. G. I. R 12

16,138
Jones, G.M. SOME ASPECTS OF LABYRINTHINE INFLUENCE UPON EYE MOVEMENT DURING RAPID ROTATIONAL MANOEUVRES. FPRC Memo 110, Jan. 1960, 4pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,138
To study some aspects of labyrinthine influence upon eye movement during rapid rotational maneuvers in flying, a cine camera carrying a periscope was mounted on a flying helmet with the periscope so arranged that the camera sees a closeup image of one eye. Photographs were taken during rolling and prolonged spin maneuvers. Analysis of the records was made in an effort to find an explanation for the disorientation that followed such maneuvers. Practical considerations of the results are discussed.
G. I.

16,139
Buckhout, R. (Moderator). CONFERENCE ON INTEGRATED AIRCREW TRAINING (MARCH 1960). Proj. 1710, Task 71605, WADD TR 60 320, July 1960, 63pp. USAF Wright Air Development Div., Wright-Patterson AFB, Ohio. (USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio).

16,139
This conference was held "to review information and stimulate discussion on the use of interconnected crew station simulators for aircrew training." Papers read reviewed recent research and discussed specific problems associated with further research on the topic. Early history and theory of integrated crew training were presented. Equipment problems arising with B-52 training were discussed from the operational viewpoint. The role of integrated aircrew training in a flight training program was discussed.
R 19

16,140
Peters, R.W. RESEARCH ON PSYCHOLOGICAL PARAMETERS OF SOUND. Contract AF 33(616) 3644, Proj. 7231, Task 71786, WADD TR 60 249, Feb. 1960, 57pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (Mississippi Southern College, Hattiesburg, Miss.).

16,140
This research is based on the concepts that 1) dimensions of auditory experience account for man's ability to differentiate one auditory stimulus from another; 2) these dimensions relate to capacities of the organism, properties of the stimulus and previous experience, and 3) these dimensions are time variant and not independent of the total organism. The purpose of these studies was to investigate approaches to the determination of psychological dimensions of steady-state complex sounds. The studies involved language of auditory experience, various methods for scaling auditroy experience, and changes in auditory perception under constant stimulation. Relevant studies are summarized.
T. G. R 83

16,141
Contini, R., Drillis, R. & Slote, L. DEVELOPMENT OF TECHNIQUES FOR THE EVALUATION OF HIGH ALTITUDE PRESSURE SUITS. Contract AF 33(616) 3592, Proj. 6333, Task 71516, WADC TR 58 641, Dec. 1959, 121pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (Research Division, College of Engineering, New York University, New York, N.Y.).

16,141
To develop objective criteria to facilitate the selection of that pressure suit or component that permits the operator maximum function and to make available to the designer objective data from which he may improve the design of the item, an extensive study was made of the techniques and methodologies associated with biomechanics for their application to pressure-suited personnel. Physiological and psychological techniques were studied for their usefulness in the overall application. Following this study, a methodology and experimental techniques were devised and used to investigate the basic movements of the upper extremities in terms of the above purposes.
T. G. I. R 115

16,142
Green, D.M. AUDITORY DETECTION OF A NOISE SIGNAL. J. acoust. Soc. Amer., Jan. 1960, 32(1), 121-131. (Dept. of Economics and Social Science, Massachusetts Institute of Technology, Cambridge, Mass.).

16,142
To investigate the way in which the detection of a noise signal in noise depends upon bandwidth, duration and center frequency, a series of experiments were conducted using a two-alternative, forced-choice technique to obtain threshold measurements of detectability. The results are compared with an optimum-detection model and the implications of such a comparison are discussed. Certain conclusions are drawn concerning the critical band concept.
T. G. I. R 15

16,146
Stern, J.A., McDonald, D.G. & Hahn, W.W. THE EFFECT OF METHAMINODIAZEPOXIDE ON ACTIVITY, FOOD AND WATER CONSUMPTION, BODY WEIGHT, HEART RATE, AND RESPONSE TO STIMULATION. Contract NONR 816(06), June 1960, 13pp. USN Office of Naval Research, Washington, D.C. (Washington University School of Medicine, St. Louis, Mo.).

16,146
This document reports on a series of investigations on the acute and chronic effects of methaminodiazepoxide (a new psychosedative) on activity, food and water consumption, body weight, heart rate, and response to stimulation. Subjects were male albino rats, divided into three dosage groups: 1) one centimeter sterile water, 2) 50 milligrams/kilogram, and 3) 150 milligrams/kilogram. Acute effects on the difference variables were measured following subcutaneous injection of the drug. Chronic studies were made on three groups of 12 animals who were given daily injections for four weeks at the same dosage rates as above. The data were studied by analysis of variance techniques.
T. G. R 3

16,147
Educational Research Corporation. DIRECTORY OF INDIVIDUALS AND ORGANIZATIONS IN HUMAN FACTORS OF MANNED SPACE FLIGHT. Contract N61339 294, 102pp. Educational Research Corporation, Cambridge, Mass.

16,147
This directory, an "informal by-product" of the Educational Research Corporation, contains biographical and bibliographical material concerning individuals currently working in this area. Indices include: alphabetical index, academic field index, specific problem areas index, and organizational index.

16,148
Kelly, R.B. THE EFFECT OF DIRECTION OF CONTRAST OF TV LEGIBILITY UNDER VARYING AMBIENT ILLUMINATION. Contract NONR 1076(00), June 1960, 12pp. Dunlap and Associates, Inc., Stamford, Conn.

16,148
To investigate the effect of direction of contrast between characters and background on legibility of television displays, black and white Futura Demibold alphanumeric characters were compared for closed-loop television legibility under three levels of ambient illumination (.026, 186.37, and 638.44 ft.-c). The illumination levels were selected to include night flying conditions as well as those encountered in high altitude day flights. Twelve Ss were required to read aloud the 20 characters on each of nine sets of stimulus materials presented as both positive and negative contrasts under each illumination condition. Reading errors were studied by analysis of variance techniques. Suggestions were given for application of the results to practical situations.
T. G. I. R 7

16,149
Morton, A.S. AVIATORS AND ENVIRONMENTAL CONTROLS. Rep. 60 3, May 1960, 12pp. USN School of Aviation Medicine, Naval Air Station, Fla.

16,149
This study represented a first step in measuring the efficacy of a paper-and-pencil examination as a motivating device for improving the competence of naval aviators in the environmental controls area (equipment and procedures for coping with physiologically unusual environments of aircraft operations). An objective (multiple-choice) examination covering the areas of disorientation, vision, acceleration, oxygen, and pressurization was constructed and given to flight squadrons of three fields. Test papers from 214 aviators were analyzed for group differences in experience, training, and level of motivation. Recommendations for future research were made.
T. R 3

16,151
Wilkinson, R.T. PERFORMANCE AFTER LACK OF SLEEP: THE INFLUENCE OF INCENTIVE, FAMILIARITY WITH THE TASK, AND INDIVIDUAL DIFFERENCES. RNP 60/969, Copy 62, Sept. 1959, 6pp. Royal Naval Personnel Research Committee, MRC, London, England. (Applied Psychology Research Unit, MRC, Cambridge, England).

16,151

Previous studies have been reported in which the loss of one night's sleep can seriously impair the performance of a simple, prolonged mental task (Five Choice Test of Serial Reaction). The experiment reported here investigated three aspects of this problem: 1) effect of knowledge of results, 2) influence of familiarity with task, and 3) consistency among subjects in effect of sleep loss. Twelve subjects were given a test of serial reaction time in which repeated simple choices had to be made quickly and accurately over a period of 30 minutes. Four testing conditions were used: with knowledge of results after normal sleep and after no sleep the previous night, with no knowledge of results after normal sleep and after no sleep. Tests were given twice a week for six consecutive weeks. T. G. R 4

16,152

Wallis, D. (Chm.). HUMAN FACTORS IN DESIGN AND USE OF NAVAL EQUIPMENT. RNP 60/962, Copy 101, Feb. 1960, 73pp. Royal Naval Personnel Research Committee, MRC, London, England.

16,152

This summary of human engineering data was designed to provide data "for specifying the minimum requirement of the human operator in a given working situation." Information was also sought on optimal human performance as related to working conditions. Topics discussed include: human physical dimensions and workspace, physical effort and endurance, temperature and ventilation, mechanical movement and vibration, ambient noise, lighting, environmental hazards, equipment design, choice of system components, voice communications, dials and indicators, controls, layout of equipment, and maintenance. T. I. R 56 (approx.)

16,153

Broadbent, D.E. & Little, E.A.J. EFFECTS OF NOISE IN A WORK SITUATION. RNP 60/965, Copy 64, Sept. 1959, 8pp. Royal Naval Personnel Research Committee, MRC, London, England. (Applied Psychology Research Unit, MRC, Cambridge, England).

16,153

Laboratory experiments have established that high intensity, meaningless, and continuous noise may affect performance of laboratory tasks which are long and require continuous attention. This report describes an investigation to determine whether similar effects apply to men who are accustomed to noise in their working situation. The situation studied involved one stage in the production of one film. Measurements of efficiency were made before and after acoustic treatment of one of two interconnected rooms and were continued over a period of several weeks in the treated and untreated rooms.
R 4

16,154

Creelman, C.D. DETECTION OF SIGNALS OF UNCERTAIN FREQUENCY. Contract AF 19(604) 2277, 2659 5 T, Tech. Memo. 71 & AFCRC TN 59 60, Sept. 1959, 20pp. Dept. of Electrical Engineering, University of Michigan Research Institute, Ann Arbor, Mich.

16,154

Alternative models which characterize ways in which hearing mechanisms of human observers may be extended in frequency sensitivity are discussed. One decision procedure for a multiple filter model is considered in some detail as a general model for decision situations in which each available response specifies a subset of the signal alternatives. Two experiments were conducted in an attempt to choose between a sweeping-filter and a multiple-filter model. Detection in a two-alternative forced-choice situation in which the signal could be one of two possible signals was used as a test of the two models.
G. R 10

16,155

Woodcock, A.H. & Pratt, R.L. VENTILATION OF INSULATED BOOTS. Proj. Ref. 7 83 01 007, Tech. Rep. EP 135, June 1960, 9pp. USA Quartermaster Research and Engineering Center, Natick, Mass.

16,155

A laboratory investigation was made of the feasibility of providing foot cooling and sweat evaporation by means of a foot pump for soldiers wearing insulated boots in a warm environment. No attempt was made to duplicate actual foot pump operation; an external pump with continuous air-flow was used to suck air from the boot. Measurements of exhaust air temperature and humidity were made. The results were judged on the basis of a comparison of sweat accumulated in an unventilated and in a ventilated boot on one foot of a single test volunteer walking on a treadmill at 3.5 mph.
T. R 1

16,156

Adams, O.S. & Chiles, W.D. HUMAN PERFORMANCE AS A FUNCTION OF THE WORK-REST CYCLE. Contract AF 33(616) 6050, Proj. 7184, Task 71582, WADD TR 60 248, March 1960, 24pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (Lockheed Aircraft Corporation, Marietta, Ga.).

16,156

This study was designed to investigate the effect on performance of four different work-rest period schedules (two-, four-, six-, and eight-hour on-off periods) followed over a period of 96 hours. The subject sample consisted of 16 male college students with four subjects assigned to each schedule. Performance was measured by means of a battery of psychomotor tasks involving arithmetic computation, pattern discrimination, monitoring, and vigilance. Additional data were obtained from information recorded in an experimenter's logbook and from responses to a subject questionnaire administered at the end of testing.
T. G. I. R 11

16,157

Abma, J.S. & Laymon, R.S. THE DEVELOPMENT AND EVALUATION OF AN AURAL READING DEVICE FOR THE BLIND. No date, 13pp. Battelle Memorial Institute, Columbus, Ohio.

16,157

The need for a method by which the blind could read ordinary printed material is discussed and recent reading machine developments sponsored by the Veterans Administration's Prosthetic and Sensory Aids Service are discussed briefly. The Battelle Aural Reading Device--a direct translating non-integrating machine--is described. Approximately 20 blind people participated in the evaluation of the device. Training methods included both individual and group instruction. The results to date are discussed.
G. I.

16,158

Chase, R.A., Sutton, S., Fowler, E.P., Jr., Fay, T.H., Jr., et al. A NEW METHOD OF TESTING HEARING USING DELAYED AUDITORY FEEDBACK. Oct. 1960, 4pp. Communications Lab., Dept. of Biometrics Research, New York State Department of Mental Hygiene, N.Y.

16,158

To investigate the use of delayed auditory feedback as an objective test of hearing, 20 young adults with normal hearing were tested. Each S's threshold of hearing for a click of 400 μsec. duration containing frequencies from 500 to 2000 cps was determined. The S was then asked to tap repeatedly a pattern of four taps and a pause. Each time he tapped the key a switch was closed, thus triggering presentation of the click described above. The clicks were presented alternately with synchronous or with delayed feedback for runs on subthreshold or above-threshold conditions. Time in seconds from the first tap of one group to the first tap of the next was analyzed for effects of delayed feedback on changes in tapping rate.
I. R 4

16,159

Psychological Research Associates, Inc. INTRODUCTION TO THE TSQ-13 SUBSYSTEM OF THE TACTICAL AIR CONTROL SYSTEM 21 2L. Contract AF 19(604) 5194, PRA Rep. 59 13, May 1959, 33pp. Psychological Research Associates, Inc., Arlington, Va.

16,159

This manual is to serve as an introduction to the TSQ-13 Data Processing Subsystem of the 212 L Tactical Air Control System. The manual deals primarily with personnel, equipment and procedure changes caused by this subsystem. Topics discussed include: system description, missions of the system, equipment in the system, personnel in the system, and operational procedures of the system. There is a glossary of terms and abbreviations common to the system.
T. I.

16,160

Burns, N.M. & Burdick, R.L. BIOASTRONAUTICAL RESEARCH FOR PROJECT MERCURY. 1959, 8pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,160

This paper described experiments designed to obtain measures of performance from Project Mercury astronauts while wearing the Mercury full pressure suit and working on a mock-up of the Mercury capsule panel. Any number of stimuli from 1 to 12 could be presented simultaneously to the subject, who was required to actuate appropriate switches or controls in response. Response times were taken; number of responses, number of errors, and two latencies were recorded. Subjects were tested both under conditions of ventilation air pressure and with the suit inflated. Recommendations were made for modifications in design of Mercury panels and for training procedures as a result of findings.
T. R 3

16,161

Burns, N.M. & Ziegler, R.B. ENVIRONMENTAL REQUIREMENTS OF SEALED CABINS FOR SPACE AND ORBITAL FLIGHTS - A SECOND STUDY PART 3: EFFECTS OF LONG TERM CONFINEMENT ON PERSONALITY AND PERCEPTION. Proj. TED NAM AE 1403, Rep. NAMC ACEL 415, July 1960, 36pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,161

This report, third of a series, is concerned with personality and perceptual changes which accompany long term confinement. Six men participated in an eight day confinement study during which they lived in a specially constructed chamber. A description of selection tests and of the subject population is given. Data obtained in an informal manner are reported and examined, and responses obtained on personality and perceptual tests are analyzed. Perceptual and personality changes which were obtained were discussed in detail. Relevance of the study to existing literature is discussed.
T. G. I. R 72

16,162

Ziegler, R. & Lazo, J. MEDICAL AND HUMAN ENGINEERING ASPECTS OF FLIGHT IN NON-CONVENTIONAL AIRCRAFT. Oct. 1959, 15pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,162

This paper lists and discusses factors which must be taken into consideration by the human engineer when investigating human functioning in high altitude or space flight. The role of the human operator, unusual problems regarding both operator responses and aircraft design, specific principles to be followed in the development of consoles and panels, and problems of illumination are discussed.
R 22

16,163

Newell, A. & Simon, H.A. THE SIMULATION OF HUMAN THOUGHT. P 1734, June 1959, 41pp. Rand Corporation, Santa Monica, Calif.

16,163

A method of studying human problem-solving was described and an example was given of application of the method. A theory of the central processes was constructed in the form of a program. The theory was tested against human processes by comparing the trace generated by the program with the tape-recorded protocol of a human subject. The application described consists of a "general problem-solving program capable of solving problems in logic and other domains." The theory consisted of a program constructed of elementary information processes for reasoning in terms of goals and methods for attaining these goals.
I. R 17

16,164

Baker, C.A. TARGET RECOGNITION AS A FUNCTION OF RESOLUTION. 3pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,164

This very brief note describes a study to determine speed and accuracy of target form recognition as a function of 1) the amount of distortion between target form shown in briefing and as it appeared on a search area with irrelevant forms, 2) the number of irrelevant forms on the search area, and 3) the quantitatively described properties of the target forms involved. Thirty-two subjects were used. Criterion measures were search time and number of incorrect identifications.
G. I.

16,165

Irvin, H.D. SIBYL: A LARGE, GENERALIZED ELECTRO-MECHANICAL MACHINE FOR LABORATORY INSTRUMENTATION IN ENGINEERING PSYCHOLOGY. Sept. 1959, 12pp. Bell Telephone Laboratories, Inc., Murray Hill, N.J.

16,165

This paper describes the application of a general-purpose relay machine of modular construction to some kinds of psychological studies. The hardware described was developed to 1) reduce time required to set up a given experimental apparatus and 2) reduce cost of experimentation. This machine is being applied to two principle kinds of studies: those concerning communications services and devices, and studies of man-machine systems under normal environmental conditions for the subject. Further applications are discussed and advantages and disadvantages of the method are pointed out.
I.

16,167

Terauds, Anita, Altman, I. & McGrath, J.E. A BIBLIOGRAPHY OF SMALL GROUP RESEARCH. Contract AF 49(638) 256, HSR RR 60/2 GN, AFOSR TN 60 365, April 1960; 220pp. Human Sciences Research Inc., Arlington, Va.

16,167
This is a comprehensive bibliography of small group research studies from 1950 and current through 1959. Existing bibliographies are listed and described. The main sources of research reports are listed. Articles are alphabetized according to authors name and numbered consecutively.
R 2155

16,170
Christner, Charlotte A., Schutz, H.G. & Ray, H.W. SOME FACTORS AFFECTING VISUAL SEARCH TIME FOR SYMBOLS ON A LARGE VISUAL DISPLAY. Contract AF 30(602) 1766, 1959, 17pp. Battelle Memorial Institute, Columbus, Ohio.

16,170
The present study "grew out of the need for information on some of the factors which had to be considered when placing a large number of symbols on a visual display on both a clear and cluttered background, such as needed for large global display." The variable to be investigated was visual search time. Factors chosen to be studied for effect on visual search time included: 1) symbol density, total number of symbols on display; 2) symbol types, number; and 3) type of surface symbols displayed upon, i.e., clear or a map. Ten Ss were used and the three factors were employed in a factorial design. Data were analyzed by analysis of variance and multiple regression techniques.
T. G. I. R 8

16,171
Smith, K.U. AUDIOVISUMATIC TEACHING: A NEW DIMENSION IN EDUCATION AND RESEARCH. Audiovisual Communication Rev., 1960, 85-103.

16,171
This paper describes the theory, development, and application of audiovisuomatic teaching machines. The term refers to "the interrelated recording and playback of illustrated lectures and student control of programmed tutoring materials." A series of studies are reported which relate to relative effectiveness of the method and student attitudes toward them. Applicability of the machine to a wide variety of teaching situations is reported. The "perceptual-geometric theory of symbol learning" which served as guide for development of the machine is discussed.
T. I. R 2

16,172
Domey, R.G., McFarland, R.A. & Chadwick, E. DARK ADAPTATION AS A FUNCTION OF AGE AND TIME: II. A DERIVATION. J. Geront., July 1960, 15(3), 267-279, (Harvard School of Public Health, Cambridge, Mass.).

16,172
This paper presents a mathematical derivation of a model for representing dark adaptation as a function of age and time. A family of dark adaptation curves, obtained from an age sample of 240 men ranging from 16 through 89 years, were used to derive a mathematical model. It was found that the model could be generalized as shown by 1) using the model to reconstruct theoretical dark adaptation curves which were then compared with the original data and 2) demonstrating that the model predicted performance of other independent samples. The findings are discussed in reference to the hypothesis that thresholds and rate of dark adaptation depend upon basic underlying physiological processes that change with age.
T. G. R 15

16,173
Archibald, E.R. & Simons, D.G. SEALED CABIN ATMOSPHERE PROBLEMS. Task 78516, AFMDC TR 59 42, Dec. 1959, 15pp. USAF Missile Development Center, Holloman AFB, N.M. (USAF Aeromedical Field Lab., Holloman AFB, N.M.).

16,173
Certain physiological problems encountered in the design and operation of hermetically sealed cabins are discussed. Known parameters that limit human performance are presented along with a discussion of atmospheric environmental factors as to upper and lower limits for a flight of 24 hours duration where conditions of "no performance decrement" are desired. The parameters presented include inspired carbon dioxide partial pressure, alveolar oxygen partial pressure, and total cabin pressure.
T. G. I. R 6

16,174
Altman, I., Jenkins, J.P. & McGrath, J.E. THE TRANSLATION OF SMALL GROUP RESEARCH INFORMATION FOR COMPUTER ANALYSIS. Contract AF 49(698) 256, Supp. Agreement 1(58 446), HSR TN 59/9 GN, Oct. 1959, 61pp. Human Sciences Research, Inc., Arlington, Va.

16,174
Relationship coding forms (RCF) developed to classify "information about individual variables and the nature, e.g., significance, directionality, etc., of their relationship with other variables" provided raw data for the present study. To prepare data for key punching for electronic data processing, a data translation form was used to code 1) identifying information concerning the study, 2) information about variables, and 3) information about the relational term. Types of questions to be asked of the data were descriptive or actuarial, and questions involving the integration of knowledge in the small group field. The Data Translation System is described in detail. Rules and procedures for application of the classification systems are contained in an appendix.
I. R 2

16,175
Blyth, C.S. INFLUENCE OF PHYSICAL CHARACTERISTICS, PSYCHOLOGICAL FACTORS AND DRUGS ON THE CAPACITY OF MAN TO WORK IN THE HEAT. Contract DA 49 007 MD 949, Nov. 1959, 17pp. USA Research and Development Div., Office of the Surgeon General, Washington, D.C. (Laboratory of Applied Physiology, University of North Carolina, Chapel Hill, N.C.).

16,175
To determine the effect of caffeine, dexedrine, dehydration, and superhydration on man's capacity to withstand heat and exercise stress, a total of 90 different experiments was performed on 15 male subjects. Measures used to evaluate the stress were heart gain, heart rate, sweat loss, and mental, psychomotor, strength, and psychological tests. Heat stress was provided in a hot room at 110 degrees F, humidity of 25-30 percent, and air velocity of three to five mph. Exercise stress was provided by a motor-driven treadmill, moving at four mph at zero grade. Three acclimitization and six experimental periods, each of three-hours duration, were utilized. The difference between performance before entering the hot room and after some time in the heat was used to appraise the influence of the various conditions. T. R 5

16,176
Deininger, R.L. HUMAN FACTORS ENGINEERING STUDIES OF THE DESIGN AND USE OF PUSHBUTTON TELEPHONE SETS. Bell Sys. Tech. J., July 1960, XXXIX(4), 995-1012.

16,176
To investigate the effects of pushbutton design for 500-type telephone sets on user speed, accuracy, and preference, a series of studies were conducted both in the laboratory and in the field. Four categories of design features were tested: key arrangement, force-displacement characteristics, button-top design, and central office factors. An additional question of how people process information when keying telephone numbers was also investigated. The results indicated that considerable latitude exists for key set design in terms of user performance with preference judgments showing more selectivity. Other factors influencing keying practice were discussed.
G. I. R 4

16,177
Coburn, R. AN EXPERIMENTAL POLAR TRANSPLOT SYSTEM FOR CIC USE. PO 06401, NS 097 100/S R006 0901 (NEL N5 10), Rep. 969, May 1960, 9pp. USN Electronics Lab., San Diego, Calif.

16,177
An experiment was conducted to compare the effectiveness of polar transplot and telplot systems for Combat Information Center use. In the polar transplot system, the plotter directly transfers to the vertical plot board the positions marked by the radar operator on a similar grid on the reflection plotter. In the conventional telplot system, the plotter receives ranges and bearings by voice over a phone link from the radar operator. Four Ss, each paired with every other one to form teams, were used. Each team was tested on a series of problems under both systems. The speed and accuracy of performance were compared for the two systems. Requirements for implementing the polar transplot system aboard ships were outlined.
T. I.

16,178
Burns, N.M., Ziegler, R.B. & Gifford, E.C. THE EFFECTS OF LONG TERM CONFINEMENT ON PERCEPTION, PERSONALITY, AND PERFORMANCE. May 1960, 14pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,178
This report presents data concerning 1) selection of subjects, 2) responses obtained on personality and perceptual tests, and 3) effects of confinement on certain types of performance. Instruments used included the Taylor Manifest Anxiety Scale, the Cornell Index, the Study of Values, the MMPI, the Bender-Gestalt, and the Rorschach. Subjects also were required to keep log books and to write essays. Pre- and post-confinement (eight days in a simulated space vehicle) performance measures were obtained from routine tasks to be performed in the space station. Tasks included time estimation, multiple solution problem-solving, and auditory tracking. Subjects in the experimental group numbered six, in the control group, four.
T. G. R 7

16,179
Burns, N.M. EFFECTS OF LONG TERM CONFINEMENT ON PERFORMANCE. 1960, 16pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,179
This paper lists problem areas chosen for study in the isolation chamber: rigidity (perseveration), time estimation, suggestibility, group cohesiveness, visual-motor tracking, and vigilance. Illustrative material, tests used, and results obtained in three of these areas--rigidity, time estimation, and tracking--are presented.
T. G. I. R 7

16,180
Ziegler, R.B. THE EFFECTS OF LONG TERM CONFINEMENT ON PERSONALITY AND PERCEPTION. 1960, 10pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,180
This paper reported effects of group confinement on personality and perception. The measures of personality used were described and results presented. Tests included the MMPI, used as a means for preliminary categorization; the Rorschach; the Bender-Gestalt; and the Personality Orientation Device (to measure perceptual organization). All were administered both before and after confinement. A summary of perception and personality changes were presented.
T. G. I.

16,181
Walker, P.G., Pool, E.T., Parker, J.F., Kelly, P.J., et al. HUMAN FACTORS SUPPORT PROGRAM FOR OPERATOR PERSONNEL AN/TSQ-13 DATA PROCESSING SUBSYSTEM (SYSTEM 412L). Contract AF 19(604) 5194, AFCRC TR 59 57, PRA Rep. 59 30, Dec. 1959, 15pp. Psychological Research Associates, Inc., Arlington, Va.

16,181
Purposes of this program were to 1) provide operator manuals to be used in training operator personnel for manning TSQ-13 equipment, 2) conduct a training program, and 3) develop proficiency measures for evaluation of operator performance after training. The training manual include both equipment operation and system operation. Proficiency measures were developed for Cartrac operators Auxiliary Data Panel operators, Weapons Controller positions, MIO, and SIO positions. Proficiency tests were pretested before being used as measures of performance.
T. R 1

16,182
Moler, C.G. & Brown, G.L. CLOSED CIRCUIT TELEVISION VEHICLE DRIVING: I. A PRELIMINARY INVESTIGATION. DA Proj. 5W45 07 035, Tech. Memo. 10 60, Aug. 1960, 17pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

16,182
To determine the feasibility of driving a vehicle using television for visual contact with the outside, four experienced drivers were to drive the Army Mechanical Mule (M274) over a variety of courses. The vehicle was modified to permit normal vision during familiarization and to permit "seeing" for the camera only; controls were also modified. Following one and one-quarter hours of practice, the drivers were required to drive 1) the practice course, 2) a precision course marked by flag-tipped stakes, and 3) a cross-country course. Speeds were recorded, stalls counted, accuracy rated, and drivers rated; interviews were held with the drivers. Problem areas were discussed and the need for future studies indicated.
T. I.

16,183
Lit, A. THE EFFECT OF FIXATION CONDITIONS ON DEPTH DISCRIMINATION THRESHOLDS AT SCOTOPIC AND PHOTOPIC ILLUMINANCE LEVELS. J. exp. Psychol., Dec. 1959, 58(6), 476-481. (Vision Research Labs., University of Michigan, Ann Arbor, Mich.).

16,183
The effects of systematic variations in conditions of fixation on depth discrimination thresholds were investigated. The methods of fixation were: 1) steady fixation on the movable comparison rod, 2) steady fixation on the immovable standard rod, and 3) fixation on either of the rods at will. A two-rod test apparatus involving real-depth cues was used. The rods were viewed under conditions of equal binocular retinal illuminances ranging from a low scotopic to a high photopic level. Threshold data were based on equidistant (equality) settings of the stimulus rods. The results were discussed in reference to photochemical theories of vision and the current controversy on the role of convergence cues in stereoscopic acuity.
T. G. R 8

16,184
Livingstone, R.E. & Weems, B.F. (Proj. Officers). TEST AND EVALUATION OF THE NAVY HELICOPTER RESCUE SEAT. Proj. J28 3/1 17, Sept. 1958, 20pp. USCG Testing and Development Div., Office of Engineering, Washington, D.C. (USCG Air Station, Miami, Fla.).

16,184

The grapnel-type helicopter rescue seat as developed by the U.S. Navy was tested and evaluated for Coast Guard use. In flight tests, comparisons were made among three types of rescue equipment: the seat, the sling, and the Erickson Rescue Basket. Following the tests, the seat was redesigned to reduce the possibility of its hanging up or fouling in rigging or overlaps of small boats and ships. During redesign, padding of the seat to reduce possible injury to survivors was accomplished. Further evaluation was made of the padded grapnel seat and three prototype redesigns. Following further modifications, a wheel-type and grapnel-type seat were evaluated.
T. I.

16,185

Landahl, H.D. MATHEMATICAL BIOPHYSICS OF COLOR VISION: III. COLOR CONSTANCY. Bull. Math. Biophysics, 1959, 21, 395-402. (AFOSR TN 59 904). (University of Chicago, Chicago, Ill.).

16,185

A mechanism involving interaction between a given region and the remaining field was introduced to account for certain aspects of the phenomena of color constancy. The trichromatic, symmetric mechanism was introduced and a number of examples were discussed and illustrated numerically.
G. I. R 8

16,186

Jones, L.V. & Jeffrey, T.E. DEVELOPMENT OF SUITABLE RATING SCALES FOR MEASURING THE SUBJECTIVE REACTIONS OF TROOPS USING QM ITEMS UNDER ACTUAL FIELD TEST CONDITIONS. Contract DA 19 129 QM 1291, FEA MRS 5902, MRS 59 7T, Tech. Rep. R 5, Nov. 1959, 87pp. USA Quartermaster Field Evaluation Agency, Fort Lee, Va. (Psychometric Lab., University of North Carolina, Chapel Hill, N.C.).

16,186

An investigation was conducted to determine those aspects or characteristics of issue clothing and equipment that are primary determiners of soldier acceptance and to develop suitable scales for measuring acceptance. A questionnaire was devised composed of statements representing some feature of the article to be judged and administered to 400 soldiers. Four issue items were judged. The data were analyzed for the features that best predicted acceptance for each item and for common factors running through all four items. Two additional rating scales were then developed and used to judge other articles. An optimal design for such questionnaires was discussed and their generality to a variety of items was suggested.
T. I. R 4

16,187

Hawkes, G.R. AN EVALUATION OF THE MAGNITUDE ESTIMATION TECHNIQUE UTILIZING ELECTRICAL STIMULATION OF THE SKIN. Proj. 6X95 25 001, Task 05, Rep. 428, July 1960, 15pp. USA Medical Research Lab., Fort Knox, Ky.

16,187

The sensitivity of electrical cutaneous magnitude estimations to variations in experimental techniques was studied. The variables studied were set (instructions to subject), area of stimulation, duration of stimulation, density of innervation, and the momentary sensitivity of the receptors. Changes in slope of lines fitted to median estimates in log-log plots were used to evaluate the influence of the above variables.
G. R 12

16,188

Hoger, D.T. & Plutzrath, F.L. DESIGN AND STUDY OF CORRELATION INSTRUMENTATION FOR SPEECH ANALYSIS AND SYNTHESIS. Contract AF 19(604) 4128, AFCRC TN 59 566, Rep. 2, July 1959, 48pp. Radio Corporation of America, Camden, N.J.

16,188

This is one of several papers reporting research on a system of speech processing and covers studies leading to selection of an optimum analog instrumentation for processing output signal of a Vocoder. The operations involved are first defined, then the system is treated in detail. Estimated size, weight, power consumption, and cost are included. Preliminary research on an optical system is also presented.
G. I.

16,189

Herrick, R.M., Kydd, G.H. & Fenichel, R.L. BEHAVIORAL AND PHYSIOLOGICAL EFFECTS OF EXPOSURE TO A SIMULATED JUNO II ACCELERATION PATTERN. Proj. TED.ADC AE 1412.2, Task MR 005.15 0002.16, NADC MA 5913, Rep. 1, Sept. 1959, 11pp. USN Air Development Center, Johnsville, Penn.

16,189

The purpose of this study was to determine how exposure to the acceleration pattern created by the missile system in establishing an orbit influences a) the physiological state of rats and b) subsequent behavior of rats. Twenty-five rats were used in the two phases of the study, physiological and behavioral. The animals were exposed to a simulated Juno II acceleration pattern. The R waves of the EKG's were examined after exposure for animals tested in the physiological phase. In the behavioral phase rats were put on a "variable-interval schedule of reinforcement" and performance on lever-pressing in a Skinner box used as a measure of behavioral adequacy.
G. I. R 4

16,190

Gaylord, R.H., Farina, A.J. & Spector, P. OPERATIONAL ANALYSES OF THE NAVAL PERSONNEL SYSTEM: PART I. DEVELOPMENT OF A PERSONNEL SYSTEM MODEL. FINAL REPORT. Contract NONR 2872(00), AIR 33 59 FR 218, Dec. 1959, 55pp. American Institute for Research, Pittsburgh, Penn.

16,190

This paper reports the first of a series of analyses of the Navy Personnel System and was concerned with the development of a Personnel System model consisting of both a functional analysis of the system and a conceptualization of the system's major processing elements. The report contains 1) a discussion of a functional analysis and of the basic approach of the study, 2) a presentation of a conceptual model of Personnel Processing in detail, and 3) details of a mathematical model of the Personnel System. Long-range research plans for extending the analysis of the Personnel System were included in the appendix.
I. R 5

16,191

Stapp, J.P. (Chm.). CLOSED CIRCUIT RESPIRATORY SYSTEMS SYMPOSIUM. Proj. 6373, Task 63120, WADD TR 60 574, Aug. 1960, 475pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

16,191

This report presents various papers concerning closed circuit respiratory systems which were either presented or submitted by various contractors and governmental agencies for a symposium dealing with the topic. The specific areas dealt with were: 1) concentration of expired oxygen gas; 2) concentration of expired water vapor; 3) decomposition of carbon dioxide recovering all useful fractions, especially all useable oxygen for breathing purposes; 4) decomposition of water yielding breathing oxygen and useful hydrogen; and 5) complete and continuous miniaturized instrumentation for a closed circuit breathing system.
T. G. I. R 31

16,192
Pecoraro, J.N. STUDY AND EXPERIMENTAL MODEL OF INTERNAL ENVIRONMENT SIMULATOR OF SPACE CREWS. Report presented in: "Closed Circuit Respiratory Systems Symposium," Proj. 6373, Task 63120, WADD TR 60 574, Aug. 1960, 221-224. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (USN Training Device Center, Port Washington, N.Y.).

16,192
This paper emphasizes the point of view that future space vehicles which utilize closed life-support systems and especially a closed respiratory support system can be more economically and quickly developed if training devices are employed well in advance of actual vehicle design. Based on this philosophy, the Naval Training Device Center has begun the development of an advanced training device for simulating the internal environmental conditions anticipated during manned extraterrestrial travel in the next five to ten years. The first phase of the project, a field survey of present and future state of space ecology, is nearing completion. Some tentative conclusions are presented.

16,193
McConnaughey, W.E. SUBMARINE ATMOSPHERE CONTROL. Report presented in: "Closed Circuit Respiratory Systems Symposium," Proj. 6373, Task 63120, WADD TR 60 574, Aug. 1960, 225-232. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (USN Bureau of Ships, Washington, D.C.).

16,193
This paper discusses the methods and equipment used to provide a suitable synthetic substitute for natural air in the nuclear powered submarine. The differences between the needs in submarine-type and space-type vehicles are pointed out. The specific topics discussed at some length are carbon dioxide concentration, concentration of water vapor, water decomposition, and instrumentation.
I.

16,194
Anderson, W.L. ATMOSPHERE CONTROL IN CONFINED SPACES. Report presented in: "Closed Circuit Respiratory Systems Symposium," Proj. 6373, Task 63120, WADD TR 60 574, Aug. 1960, 233-237. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (USN Research Lab., Washington, D.C.).

16,194
The problems involved in maintaining a satisfactory atmosphere that is free from harmful contaminants in the nuclear-powered submarine are discussed. The way in which these problems are presently being met and the research that is being conducted to find better solutions are detailed. While there are differences between submarines and space vehicles which require different solutions, it is maintained that the principles of atmospheric control are identical.
I.

16,195
Bursack, W.W. METABOLIC AND RESPIRATORY RELATIONSHIPS IN THE CLOSED RESPIRATORY SYSTEM. Report presented in: "Closed Circuit Respiratory Systems Symposium," Proj. 6373, Task 63120, WADD TR 60 574, Aug. 1960, 441-447. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (Minneapolis-Honeywell Regulator Company, Minneapolis, Minn.).

6,195
This paper considers the diet content of the astro-
aut in relation to systems design for the closed respira-
ory system. The water content of the diet is discussed
n relation to water and oxygen stores and recovery equip-
ent, and the diet composition is considered as it re-
lects upon foodstuff weight as well as oxygen storage and
arbon dioxide material. A suggested diet which offers
dequate nourishment and minimum food storage weight is
resented. Some speculative possibilities are advanced
n the uses of waste products which become the raw ma-
erials for the regenerative processes in the closed
cological cycle.
G. I. R 1

16,196
Vaccaro, J., Jr. DESIGN REPORT ON HORIZONTAL DISPLAY. Proj. TED ADC AE 73002.2, Rep. NADC AI 5950, July 1959, 18pp. USN Air Development Center, Johnsville, Penn.

16,196
A design concept evaluation of three prototype horizontal displays of the Army-Navy Instrumentation Program (ANIP) is described. The primary purpose of the horizontal display is to provide a visual display that will orient the position of an aircraft with respect to its destination, or target, in a manner easily assimilated by the pilot. Navigational information in pictorial rho-theta form, relative bearing of a fixed geographically oriented radio transmitter, magnetic heading of the aircraft, readout counters for distance-to-go and time-to-go are presented. Results of functional tests and visual inspection tests made in the laboratory are presented.
T. I. R 11

16,197
Wolin, B.R. (Tech. Leader). INFORMATION SORT AND PREDICT. Contract AF 19(604) 2635, SDC Field Note (Lexington) 277, AFCRC TN 59 63, 7pp. USAF Operational Applications Lab., AFCRC, Bedford, Mass.

16,197
This paper describes a computer program being written to make the type of prediction described by Ellson (12,389) in an article suggesting a method for using a computer to sort data and derive a series of events (from observed data) which will give good prediction of a desired event. The method is useful in those situations in which there is no theoretical basis for determining relationships among variables, yet a method of studying data is needed for making predictions.
I. R 1

16,199
Peckham, R.H. & Hart, W.M. NEURAL INTEGRATION AT THE RETINAL LEVEL AS EVIDENCED BY FLICKER FUSION MEASUREMENTS. Amer. J. Ophthal., Nov. 1959, 48(5) Part II, 594-600. (Bethesda, Md.).

16,199
The use of flicker measurements was used in this experiment to assess retinal functions. Flicker stimuli were presented to the right and left eye separately in a constant order which appeared random to the subject. Each change in flicker rate was preceded by a warning signal and the subject responded by sounding or failing to sound a buzzer. Stimuli were presented in two ranges: from 22 to 34 per second and from 30 to 46 per second. Records from 38,000 trials on 334 eyes were obtained. The thresholds of critical fusion frequency for low contrast foveal flicker were established by psychometric methods. The results were described in forms of clearly defined probability functions and used in an analysis of the inferred theoretical behavior of the retina.
G. I. R 5

16,200
Pickering, J.E., Langham, W.H. & Rambach, W.A. THE EFFECTS FROM MASSIVE DOSES OF HIGH DOSE RATE GAMMA RADIATION ON MONKEYS. 60 57, 1960, 413pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,200
This report presents a series of studies on the biological effects on primates from massive doses of high dose rate irradiation. The three major parts of the report are devoted to performance (exposure and behavior), biology (animals and methods; hematology; circulating blood volumes; blood and tissue chemistry; inorganic ions, lipoproteins, and cholesterol; adenosine phosphates and reducing compounds; and physiological studies), and pathology (general, ocular, neuropathology, and hypothalmus).
T. G. I. R 132

16,201
Peters, G.A. A GUIDE TO THE DISPLAY OF INFORMATION. Control Engng., May 1960, 7(5), p.123. (George A. Peters, Consultant, Santa Monica, Calif.).

16,201
For new equipment specifications, this guide may be used to develop the information content and method of presentation that will yield optimum performance from the human component of the system. Four types of displays are distinguished: performance, warning, procedural, and complex. For each display type the following information is given: kind of information that can be conveyed, specific examples, human factors recommendations, and graphic illustrations of typical displays.
T. I.

16,202
Montague, W.E. A COMPARISON OF FIVE INTELLIGIBILITY TESTS FOR VOICE COMMUNICATION SYSTEMS. PO 06401, NE 091200 2(NEL N33), Rep. 977, June 1960, 9pp. USN Electronics Lab., San Diego, Calif.

16,202
Scores obtained on each of five intelligibility tests were compared in a study designed to find the most efficient test for communication system evaluation. Five different speech materials were used. These were recorded against a background of white noise and presented to sixteen listeners. Results were presented in the form of curves showing the mean percentage of words correct for four speech materials for each of five S/N ratios. An analysis of variance was performed, and interactions between variables were discussed.
T. G. R 9

16,203
Woodcock, A.H. & Goldman, R.F. A TECHNIQUE FOR MEASURING CLOTHING INSULATION UNDER DYNAMIC CONDITIONS. Proj. 7 83 01 009, Tech. Rep. EP 137, July 1960, 9pp. USA Quartermaster Research & Engineering Center, Natick, Mass.

16,203
To determine the feasibility of using a heat-flow meter for measuring fluctuations in heat loss from the human skin through clothing, a limited investigation was made using one subject. A Beckman & Whitley Heat-Flow Transducer was successively affixed to various sites on the skin of the subject with heat flow and transduce measurements being made for conditions of standing still and walking at 3.5 mph on a treadmill. Two different types of clothing were compared using the technique. The usefulness of the technique was discussed.
T. I. R 2

16,205
Smith, S.L. HEADING ESTIMATION. Contract AF 33(600) 37882, Tech. Memo. TM 222, July 1959, 16pp. Mitre Corporation, Lexington, Mass.

16,205
In this study ten subjects (airmen and civilians) were required to make heading estimations for simulated radar trails (5/16, 1.0, and 1 1/2 inches in length), using four different response modes (adjusting a dial so that an arrow painted on its surface pointed in the same direction as radar trial—dial was placed to the right and to the left; reading out numerical heading estimates with and without an external reference). Response times and errors were analyzed for effect of response mode on speed and accuracy of heading estimates. Individual differences were pointed out.
T. G. I. R 15

16,206
Hopkins, C.O., Bauerschmidt, D.K. & Anderson, M.J. DISPLAY AND CONTROL REQUIREMENTS FOR MANNED SPACE FLIGHT. Contract AF 33(616) 6033, Proj. 7184, Task 71585, WADD TR 60 197, April 1960, 215pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio. (Hughes Aircraft Company, Culver City, Calif.).

16,206
Display and control requirements for a "space-ferry" type of orbital vehicle were determined for vehicle attitude control while in orbit, orbital plane change, minimum energy transfer between circular orbits at different altitudes, and for de-orbit and re-entry into the earth's atmosphere. Full-scale mockups were constructed of cockpits with two alternate display and control systems.
G. I. R 175

16,207
Chambers, R.M. HUMAN PERFORMANCE CAPABILITIES IN HIGH ENVIRONMENTS. Paper presented at the Sixty-Eighth Annual Convention of the American Psychological Association, Chicago, Ill., Sept. 1-7, 1960, 40pp. USN Aviation Medical Acceleration Lab., NADC, Johnsville, Penn. & School of Medicine, University of Pennsylvania, Philadelphia, Penn.

16,207
The purpose of this paper was to summarize research on performance capabilitites of man in certain high g environments. Research in a) sensation and perception, b) motor behavior, c) higher mental functions, and d) complex task performance is discussed under the following topics: vestibular, kinesthetic, and proprioceptive senses; vision; time perception; performance of simple motor tasks; effects of high g on higher mental functioning; and complex tasks, e.g., simple tracking.
T. G. I. R 5

16,208
Busch, A.C., Trabold, F.W., Jr. & Sklodowski, V.A. BEHAVIORAL RESPONSES TO AUTOMOBILE TRAFFIC LIGHT PATTERNS. Paper presented at the Sixty-Eighth Annual APA Convention, Sept. 1960, 6pp. Crosley Division, AVCO Corporation, Boston, Mass.

16,208
A summary is presented of an experiment conducted to study the behavioral responses of 26 subjects to traffic light patterns. The experimental patterns used included various types of auxiliary cues during the green portion of the traffic cycle and were compared with the standard type in conjunction with an automobile simulator. The task involved driving and stopping the simulator in response to the traffic lights. The data consisted of percentage of subjects stopping and the time in seconds to stop for each pattern.
G. I.

16,209
American Psychological Association. PROCEDURAL FACTORS IN TASK PERFORMANCE. Preliminary statement for American Psychological Association Symposium on "Primary Task Factors in Performance Decrement," Sept. 1960, 11pp. American Psychological Association, Washington, D.C.

16,209

This is a preliminary statement of the purposes and goals of a symposium on primary task factors. Procedural (primary) task factors defined as "those elements of the total task situation which affect performance and which can be changed without changing the nature of the task, the operator, or the environment," are to be defined in operational terms, the relative importance of these effects on performance estimated, the task context in which they are known to apply is to be stated, possible generalizations to other tasks discussed, and factors and hypotheses with greatest promise for future research are to be suggested. The name, personal research background and specific factors to be discussed are given for each participant in the symposium.
I. R 2

16,210
Zyskind, G. & Kempthorne, O. TREATMENT ERRORS IN COMPARATIVE EXPERIMENTS. Contract AF 33(616) 5599, Proj. 7071, Task 70418, WADC TN 59 19, April 1960, 78pp. USAF Aeronautical Research Lab., Wright-Patterson AFB, Ohio. (Iowa State University, Iowa City, Iowa).

16,210
The primary concern of this report is with the investigation of a representative number of alternative experimental schemes in which explicit allowance is made for the fact that application of intended amounts of treatments may be subject to error. It is shown how the question of treatments subject to error may structurally be incorporated into a broader overall approach to experimental designs. When certain sets of structural conditions are satisfied, the expected values of mean squares in the analyses of variance tables have simple and easily specifiable forms. These conditions have been verified to hold in all the examples discussed herein.
T. R 45

16,211
Tukey, J.W. THE PRACTICAL RELATIONSHIP BETWEEN THE COMMON TRANSFORMATIONS OF PERCENTAGES OR FRACTIONS AND OF AMOUNTS. Contract DA 36 034 ORD 2297, DA Proj. 5B 99 01 004, Ordnance R & D Proj. PB2 0001 & OOR Proj. 1715, Tech. Rep. 36, June 1960, 9pp. Dept. of Mathematics, Princeton University, Princeton, N.J.

16,211
The approximate relationship between the common transformations for amounts ($z=(y+c)^n$ and its limiting forms) and the common transformations for percentages (anglits, normits or probits, logits) is investigated. The results are given in tabular and graphic form as well as the equation for approximate transformations.
T. G. R 1

16,212
Taylor, I.M. & Young, D.T. FACTORS CONTRIBUTING TO THE DAMAGING EFFECT OF COLD UPON MAMMALIAN TISSUES. SECOND ANNUAL REPORT 1 JUNE 1959 - 31 MAY 1960. Contract DA 49 007 MD 999, June 1960, 18pp. University of North Carolina, Chapel Hill, N.C.

16,212
Progress in a research study on the damaging effects of cold upon mammalian tissue is reported. The experiments in this work period have dealt with isolated hearts from rats. The hearts have been perfused and incubated and the factors affecting water and electrolyte distribution in the tissue have been studied.
T. G.

16,213
Newell, A. & Simon, H.A. THE SIMULATION OF HUMAN THOUGHT. Contract AF 49(368) 700, Proj. RAND, Res. Memo. 2506, Dec. 1959, 41pp. The Rand Corporation, Santa Monica, Calif.

16,213
The authors describe a method for studying human problem-solving, give an example of its application, and discuss the theory of problem-solving which emerges. A theory of central processes is constructed in the form of a program. The sufficiency of the theory for predicting problem-solving behavior is demonstrated by realizing it in a computer. The theory is tested against human processes by comparing the trace generated by the program with the protocol of a human subject. The theory which emerged is "mediational" encompassing "Gestalt" processes.
R 17

16,214
Sheridan, T.B. TIME-VARIABLE DYNAMICS OF HUMAN OPERATOR SYSTEMS. Contract AF 19(604) 4548, AFCRC TN 60 169, March 1960, 113pp. Dynamic Analysis and Control Lab., Massachusetts Institute of Technology, Cambridge, Mass.

16,214
The author points out the usefulness of a time-variable model to cover the conditions when 1) the human controller "learns" or "adapts" in time and one is interested in this short period before a reasonably "steady state" is reached, and 2) operator performance decays due to "fatigue." An experimental technique is developed "whereby the frequency characteristics of the human operator... are computed in a running fashion as he adapts to sudden changes in parameters of the reference input, the nature of the operator's display, the controlled process, or physical conditions within himself." Experimental results are reported of investigations of time-changes in human operator's transfer characteristics.
T. G. I. R 37

16,215
Olds, E.G. & Lewis, J.S. NOTES ON THE USE OF F IN THE ANALYSIS OF VARIANCE OF ATTRIBUTES DATA AND ON THE TRANSFORMATION OF MEASUREMENTS DATA TO ATTRIBUTES DATA. Contract AF 33(616) 3878, Proj. 7071, Task 70429, ARL TN 60 118, May 1960, 42pp. USAF Aeronautical Research Labs., Wright-Patterson AFB, Ohio. (Carnegie Institute of Technology, Pittsburgh, Penn.).

16,215
The distributions of test statistics, corresponding to F and X^2/df, for single factor experiments when replications are Bernonilli trials, are derived for small-sample cases. The relative advantages of the two statistics are considered when nominal percentage points are to be used. The problem of finding the best method of transforming measurements data from a two-factor experiment to attributes data is discussed and exemplified.
T. R 11

16,216
Odell, T.T., Jr. & Upton, A.C. LATE SOMATIC EFFECTS OF INTERNALLY DEPOSITED RADIOISOTOPES. Rep. 60 12, Jan. 1960, 18pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Oak Ridge National Laboratory, Oak Ridge, Tenn.).

16,216
A review of the literature on the late effects of irradiation from internally deposited radioactivity is presented. The effects discussed include physiologic and anatomic changes, neoplasms, and life shortening. Some of the radioemitters included are radioactive isotopes of elements that occur normally in animals; however, most of the radioisotopes discussed are foreign elements used in medicine or industry. Major topics are: 1) physical and biologic factors influencing the effect of internally deposited radioisotopes, 2) effects of inhaled radioactivity on the respiratory tract, 3) bone-seeking radio-elements, 4) radio-elements deposited predominantly in the soft tissue, 5) radioisotopes in tracer experiments, and 6) exposure to fallout from nuclear detonation.
T. R 110

16,217
Nicholson, J.F. & Naas, D.W. MAGNETIC SHOES FOR HUMAN ORIENTATION IN SPACE. Proj. 7021, Task 70651, WADC TN 59 352, Feb. 1960, 8pp. USAF Aeronautical Research Lab., Wright-Patterson AFB, Ohio.

16,217
Both permanent and electromagnetic shoes for human orientation in a weightless environment are described. The electromagnetic shoes operate on a low voltage power source which may be adjusted to the individual requirements of the wearer. A microswitch which interrupts the magnetic circuit each time the heel is raised reduces walking fatigue and increases the operational life of the batteries. An inertia switch is included in the magnetic circuit as a safety device. When the switch senses any sudden acceleration or deceleration, it shuts off the potentiometer and allows additional current to flow to the electromagnet thereby increasing the holding force.
T. G. I. R 6

16,218
Neisser, U. A PRELIMINARY STUDY OF HUMAN PATTERN RECOGNITION. Contract AF 19(122) 458, Rep. 34 75, May 1960, 19pp. Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, Mass.

16,218
To investigate the processes by which human beings acquire and use hierarchical constructs, artificial languages were developed and learned under conditions designed to test ability to learn the language when 1) letters were taught first, 2) whole words were learned first, or 3) confusion was introduced by making non-words quite similar to words. Performance to criterion under each condition was compared and results discussed as they related to the effect of practice, to individual differences, to the introduction of confusion "languages," and, especially, to the two kinds of training involved: "recognition upward" with preliminary training on letters, and "recognition across," where the introduction had been to words. Additional research in this area is being planned and some future areas for investigation are indicated. G.

16,220
Kryter, K.D. STUDY OF SPEECH COMPRESSION SYSTEM (SPECTRUM SELECTION). Contract DA 36 039 SC 78078, Rep. 745, April 1960, 38pp. Bolt Beranek and Newman Inc., Cambridge, Mass.

16,220
This interim report presents work accomplished during the period February 1959 to January 1960 on an investigation of perceptual and auditory factors underlying the intelligibility of speech that has been filtered into several narrow bands and a development of a method for transmitting speech that would require no more than one-half to one-third the bandwidth normally required to transmit speech of equal intelligibility. These phases of the research are reviewed: equipment development and intelligibility testing for effects of several variables. Factual data are presented.
T. G. I. R 15

16,221
ITTL Avionics Laboratory. INVESTIGATION OF MEDIA AND DESIGN OF A CONSOLE FOR REAL-TIME DATA PRESENTATION PHASE III REPORT. DESIGN OF A REAL-TIME FLIGHT-SAFETY MONITOR CONSOLE. Contract AF 04(611)4574, Nov. 1959, 48pp. ITTL Avionics Laboratory, San Fernando, Calif.

16,221
This report contains the results of design studies and cost analyses of a console for the presentation of real-time inflight telemetered vehicular and physiological data. One section is devoted to details of a redesign of the physiological panel to allow for a more complete evaluation and a reduction or combination of individual parameters. Philosophies and standards to which the console is designed are discussed; some typical system designs which will be incorporated into the panel are presented; and the estimated cost of the console is given. Line drawings, the pre-engineering sketch, and circuit block diagrams are included.
I.

16,222
International Business Machines Corporation. TARGET PATTERN RECOGNITION STUDIES TO ESTABLISH CRITERIA FOR SELECTION AND TRAINING OF TARGET OBSERVERS. Contract AF 33(600) 31315, IBM 60 914 8, WADC TR 59 652, June 1960, 18pp. International Business Machines Corporation, Owego, N.Y.

16,222
This report is a supplement to the final report on the results of investigations at the University of Missouri on the problem of visual pattern perception as applied to target recognition tasks in radar-like displays. Research was conducted under four general tasks: context as a parameter of target recognition, figural emergence, configuration concept learning, and temporal factors. The status of each problem at the close of the extension period is presented along with several new problems not previously submitted.

16,223
Armour Research Foundation of Illinois Institute of Technology. ADVANCED STUDIES OF COMPUTER PROGRAMMING. Contract DA 36 039 SC 78931, Proj. E121, April 1960, 49pp. Armour Research Foundation of Illinois Institute of Technology, Chicago, Ill.

16,223
Flow charts and descriptions of ten subroutines for a comprehensive debugging system being prepared for the MORIDIC family of FIELDATA computers are presented. The flow charts include "search," "transfer," "insert," "trace," and "general interpretation" routines. Output routines for "type," "punch," "print," and "dump" operations using output conversion procedures associated with MODE designators are also described. These charts, together with those appearing in a previous report, comprise the essential routines required by the debugging system. Some studies on the network properties of computer programs are discussed.
T. I.

16,224
USA Arctic Test Board. SERVICE TEST OF BAG, SLEEPING, COLD-WET, T59-4. Proj. NR 7 82 11 001, July 1960, 21pp. USA Arctic Test Board, Fort Greely, Alaska.

16,224
To determine the suitability of the Cold-Wet Sleeping Bag (T59-4) for U.S. Army use under cold-wet winter conditions, service tests were conducted to establish the following features: 1) physical characteristics, 2) functional suitability, 3) rapid exit features, 4) insulating qualities, 5) portability, 6) effects of laundering and dry cleaning, 7) aerial delivery, 8) durability, 9) ease of maintenance and field repair, and 10) military characteristics. A list of discrepancies together with suggested modifications was included.
T. I. R 4

16,225
Bjorksten Research Laboratories, Inc., Madison, Wisc. DEVELOPMENT OF IMPROVED FLIGHT HELMET LINER. Contract AF 33(600) 34149, Proj. 6336, Task 63619, WADC TR 59 435, Oct. 1959, 17pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,225
Various low-density plastic foam systems were evaluated for suitability for a padding helmet liner providing maximum comfort with greatest protection against shock and impact. Means of fabricating uniform and reproducible liners by injection of fluid foam into molds were studied. A liner was developed which meets specification requirements for comfort, protection, ease of application, and durability and which can be produced by techniques adaptable to production processing.
I.

16,226
Burnstein, E. STUDIES IN SELECTION LEARNING II: THE EFFECT OF INFORMATIVE AND UNINFORMATIVE CUES ON THE ACQUISITION AND RETENTION OF INTENTIONAL ITEMS. Grant AF 49(638) 367 & National Science Foundation Grant G 4951, Oct. 1959, 9pp. Research Center for Group Dynamics, University of Michigan, Ann Arbor, Mich.

16,226
To investigate the effectiveness of the selection cue on acquisition and retention under conditions of selection learning, 22 Ss were required to learn certain items preceded by selection cues. Items to be learned were interspersed among items to be ignored, the two differentiated by the selection cue. Performance was compared both for acquisition and for retention of material learned with selection cues relevant to material being learned (informative) and selection cues not relevant (non-informative).
T. G. R 7

16,227
Bushey, T.J. SPECIAL WALKING CANE HANDLE ATTACHMENT. Tech. Rep. 6015, May 1960, 2pp. USA Prosthetics Research Lab., Walter Reed Army Medical Center, Washington, D.C.

16,227
This note describes a special walking cane handle attachment with which a cane can be grasped and held securely by an amputee's Dorrance hooks. This device was developed for a quadrilateral amputee who had been fitted with two Dorrance hooks, a Symes type prothesis on the right leg, and an above knee leg on the left side. The amputee had learned to walk with crutches and wished to attempt walking with canes. A technical drawing is attached which furnishes details on the item.
I.

16,228
Coombs, C.H. & Pruitt, D.G. A STUDY OF DECISION MAKING UNDER RISK. Proj. MICHIGAN, Rep. 2900 33 T, April 1960, 25pp. Willow Run Labs., University of Michigan, Ann Arbor, Mich.

16,228
To determine whether individuals possess any characteristic attitudes other than that of utility or maximum payoff which would influence their decisions in risky situations, a large-scale study was carried out on bets with constant expectation but which varied in skewness or variance with the other variable held constant. The data were analyzed in terms of the adequacy of a concept of variance preference as opposed to a nonlinear utility for money, the existence of a preference for skewness, and the interrelations between the two preferences. Upon the basis of the results a revision of the theory of maximization of expected utility is advanced and implications for computer design are discussed.
T. R 12

16,229
Cope, F.W. DESIGN AND CONSTRUCTION OF PHYSIOLOGICAL ELECTRONIC SYSTEMS USING OPERATIONAL AMPLIFIERS. Proj. TED ADC AE RS 7045, Task MR005.15 0002.7, Rep. 9 & Rep. NADC MA 6010, April 1960, 7pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

16,229
The use of operational amplifiers in the construction of a great variety of physiological electronic systems is discussed. The advantages--minimum cost, minimum knowledge of electronic design, and minimum expenditure of time--are pointed out. An operational amplifier in conjunction with two or three external plug-in resistors of capacitances may be used as a D.C. amplifier, an integrator, or a differentiator. Some of the most useful operational amplifier circuits are described and discussed from the point of view of their physiological applications
I. R 4

16,230
Blackwell, S.A. HUMAN FACTORS ANALYSIS OF 81MM MORTAR INCREMENT BAG HOLDERS. Rep. ORDBB VC6, July 1960, 20pp. USA Human Factors Engineering Concepts & Applications Lab., Picatinny Arsenal, N.J.

16,230
To compare five different holding devices for attaching increment bags onto the 81 mm mortar shell (M362), 80 Ss were required to attach a complete set of eight bags with each of the devices. The measure of performance was the time taken to complete the task with 1) bare hands, and 2) arctic mittens with liners. Four of the holders were similar, spoked, metal devices; the fifth was a commerical nylon hook and loop fabric called "Velcro." Comparisons were made of the mean times and variances for each device.
T. I.

16,231
Bittini, Marcella & Nicoletti, I. BASIC RESEARCH IN THE FIELD OF VISION. PART I. ON THE VARIABILITY OF THE ELECTRICAL RESPONSE OF THE HUMAN EYE TO STIMULI OF DIFFERENT COLOR. Contract AF 61(052) 17, Tech. Note 2 58, April 1958, 8pp. Istituto Nazionale di Ottica, Arcetri, Firenze, Italy.

16,231
In this study, Part I of a two part study, the variability of ERG responses to blue, green, yellow, and red stimuli was studied. The ERG responses were recorded from a silver electrode attached to contact lenses worn by the subject. The subject was dark adapted for one half hour before each experimental session. A discussion and examination of the types of waves elicited by the four stimuli and the variability of the waves followed.
T. G. I. R 3

16,232
Rositani, Lucia R. & Nicoletti, I. BASIC RESEARCH IN THE FIELD OF VISION. PART II. ELECTRORETINOGRAPHIC RESEARCH ON THE PARAMETERS WHICH DEFINE THE EFFICIENCY OF A LIGHT STIMULUS. Contract AF 61(052) 17, Tech.Note 2 58, April 1958, 16pp. Istituto Nazionale di Ottica, Arcetri, Firenze, Italy.

16,232

The aim of this study, Part II of a two-part report, was to investigate whether for a given value of the parameters, duration and total time of variation of illuminance and wavelength, the scotopic b-wave is affected by changes in the derivative of luminance with respect to time. Two stimuli, one characterized by a slow rise of the luminance and the other by a sequence of short flashes, were used. The role of total energy, duration, color, total time of variation of the lumiance, and total time derivative of the luminance were discussed in terms of their relation to the height of the scotopic b-wave at high luminance levels.
T. I. R 8

16,233
Altman, P.L., Gibson, J.F., Jr., Wang, C.C., Dittmer, Dorothy S., et al. HANDBOOK OF RESPIRATION. Contract AF 33(616) 3972, Proj. 7158, Task 71801, WADC TR 58 352, Aug. 1958, 403pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Div. of Biology & Agriculture, National Academy of Sciences-National Research Council, Washington, D.C.).

16,233

Data are presented on respiration for man, other animals, and plants. Tables, graphs, charts, and diagrams are used to present the information. The material is organized into 14 categories. Contents of this report have been made available to and were authenticated by some 400 leading investigators in the fields of biology and medicine.
T. G. I. R many

16,234
Crawford, W.A. THE PERCEPTION OF MOVING OBJECTS. I. ABILITY AND VISUAL ACUITY. FPRC Memo. 150A, July 1960, 10pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,234

This is Part I of a series of three reports whose object was to determine the reasons for the decrement in visual acuity and the effects of changing various relevant parameters. In this investigation, the six factors examined in relation to the ability to perceive the detail in the moving targets were: 1) the basic ability of subjects with randomized target velocities, 2) the relationship of discrimination to latency of eye movement, 3) effect of increasing viewing time, 4) effect of coordinated head and eye movements, 5) effects on ability when the target image first appeared on different areas of the retina, and 6) the effect of training.
T. G. I. R 27

16,235
Crawford, W.A. VISUAL ACUITY AND MOVING OBJECTS. III. THE COORDINATION OF EYE AND HEAD MOVEMENTS. FPRC Memo. 150C, July 1960, 9pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,235

Part III of a series of reports on the perception of moving objects was concerned with physiological actions underlying improvement to discriminate details when the head and eyes are free to move. The subjects (4) were seated near the center of a 36 ft. radius circular dark room and performed a pursuit task. Head position and target position at ten-degree intervals were recorded as were eye movements. EMG recordings were obtained by surface electrodes from the sternomastoid muscle of the neck. The latencies of eye movement, head movement, and EMG activity were measured. The results were examined in terms of neurophysiological aspects of motor activity.
T. G. I. R many

16,236
Crawford, W.A. THE PERCEPTION OF MOVING OBJECTS. II. EYE MOVEMENTS. FPRC Memo. 150B, July 1960, 24pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,236

Part II of the study on eye movement describes the method used in studying corneal-retinal potential and eye movement. The corneal-retinal potential is used for examining general trends in eye movement patterns. Surface electrodes placed at either side of the eye and above and below the eye were used to pick up the potential difference. The potentials were amplified and used to drive conventional pen recorders. Latency of eye movements were recorded at varying velocities under a pursuit task. The effects obtained were examined and discussed in terms of neuroanatomy and neurophysiology of the optic tracts and occulomotor system.
T. G. I. R many

16,237
Christie, A.W. & Harris, A.J. THE LIGHTING OF PEDESTRIAN CROSSINGS. Municipal J., Public Works Engineer & Contractors' Guide, July 1952, 1-4. (Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

16,237

This article deals with some problems and also some experiments on the lighting of pedestrian crossings. Visibility requirements at such crossings are discussed briefly. Experiments using warning signs such as the beacon globe, flashing lights, and various sizes, shapes, and colors of signs are reviewed. Finally, the use of floodlighting--angle of light, color of light and its relation to the "zebra" markings of the crossing--are reviewed.
I.

16,238
Christie, A.W. & Moore, R.L. STREET LIGHTING FROM THE POINT OF VIEW OF TRAFFIC AND SAFETY. Public Lighting, Conf. Issue, 1958, 23(102), 242-257. (Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

16,238

The work of the Road Research Laboratory, Department of Scientific and Industrial Research, England, on street lighting is described. Accident data before and after lighting improvements for 64 sites are analyzed. Some data on changes in both speed of driving and accidents are also given. Investigations carried out to discover whether further changes are desirable in various aspects of the recommended street lighting practice are described. These include a study of the effect of changes in road surface on light distribution, lantern arrangements, and siting of street columns supporting the lanterns. Finally, an experimental low-cost lighting system for use on main traffic routes outside built-up areas is considered.
T. G. I. R 5

16,239
Christie, A.W. THE ROAD SURFACE AND THE LIGHTING ENGINEER. J. Instn. Mun. Engrs., 1957, 84(5), 153-160. (Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

16,239

The effectiveness of street lighting depends not only on the lighting system used but also on the light-reflection characteristics of the road surface. The problem of choosing suitable combinations of road surface and street lighting systems are considered herein with special reference to main road lighting.
G. I.

16,240
Christie, A.W. ROAD SURFACES AS REFLECTORS OF LIGHT, FROM THE POINT OF VIEW OF STREET LIGHTING. Chem. & Ind., 1953, 468, 468-475. (Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

16,240
The progress of research on the reflection properties of road surfaces in relation to the design of street lighting equipment is reviewed, some of the data now available are given, and the various problems which are being investigated are discussed. Major topics treated in the paper are: 1) building up the surface brightness in a complete lighting installation, 2) lighting terms and definitions, 3) complex nature of the luminance factor of a road surface, 4) experimental determination of reflection characteristics, 5) properties of the road surface which affect light areas, 6) dry and wet weather effects, 7) color and lightness of lights, and 8) relations between type of surface and type of lighting.
T. G. I. R 6

16,241
Christie, A.W. "THE ROAD SURFACE AS A FACTOR IN STREET LIGHTING". Presented at: Road Engineering Division Meeting, 20 May 1954, Road Paper 45, Oct. 1954, 506-531. Institution of Civil Engineers, Westminister, London, England.

16,241
The theory of vision in lighted streets is examined in simple terms in order to show that the effectiveness of the lighting is determined to a large extent by the reflecting properties of the road surface. Three main types of lantern light distribution are described and their use is discussed. The results of studies of bright patches on a number of surfaces are shown in relation to estimation of the effectiveness of lighting installations and in improving their design. Some methods used to improve the nonskid properties of roads are related to their effect on lighting. The effect of surface texture on the reflection of light from wet surfaces is also examined.
G. I. R 4

16,242
Beckman, E.L. ESCAPE FROM DITCHED AIRCRAFT. IV. EVALUATION OF THE FACTORS WHICH AFFECT SURVIVAL IN A DITCHING ACCIDENT IN CURRENT OPERATIONAL AIRCRAFT WITH RECOMMENDATIONS FOR INCREASING THE RATE OF SURVIVAL. FPRC 1094, March 1959, 25pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,242
The ditching accident in naval carrier operations is considered in this paper. The Royal Air Force Institute of Aviation Medicine has carried out an extensive series of investigations into the factors which affect survival from a ditching accident. The methods by which these factors limit survival are reviewed and their significance discussed. Manual escape procedures are assessed and the use of an ejection seat to assist escape from a sinking aircraft is evaluated. A research and engineering development program is proposed.
T. G. I. R 11

16,243
Cole, J.N., Von Gierke, H.E., Kyrazis, D.T., Eldred, K.M., et al. NOISE RADIATION FROM FOURTEEN TYPES OF ROCKETS IN THE 1,000 TO 130,000 POUNDS THRUST RANGE. Proj. 7210, Task 71705, WADC TR 57 354, Dec. 1957, 64pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,243
Detailed noise characteristics were measured on 14 types of rockets, with both solid and liquid propellants, in the thrust range from 1,000 to 130,000 lbs. Near field and far field levels on static fired and vertical launched rockets were measured under essentially free field conditions. Measurement and data reduction methods were described. Final results were given as near field sound pressure spectra, far field directivities, acoustic power spectra, and pressure-time histories. This noise environment was studied as a function of nozzle configurations and of flame front action in the jet stream. A formula for over-all acoustic power level output of rockets and an approximate generalized power spectrum dependent upon nozzle diameter and jet flow characteristics were given. G. I. R 9

16,244
Christman, R.J. NOISE REDUCTION IN AIR FORCE CONTROL TOWERS. Proj. 4513, Task 45770, RADC TR 58 123, Oct. 1958, 41pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

16,244
Recommendations are presented for the design of an Air Force Control Tower to provide for reduction of high-level airborne noise. Based upon noise spectra such as might be produced by J-79 equipped aircraft (F-104 or B-58) or rocket engines of the 130,000 lb. thrust class, the recommendations are aimed at providing noise levels low enough to permit satisfactory verbal communications. Specific recommendations are included on the design of such tower features as the roof, windows, walls, doors, and floors.
G. I. R 17

16,245
Buss, W. & Waite, J.V. IMPROVED DEPLOYMENT OF AIR FORCE PERSONNEL PARACHUTES. Proj. 6068, Task 61491, AFFTC TN 58 20, Oct. 1958, 15pp. USAF 6511th Test Group (Parachute) El Centro, Calif.

16,245
To develop a deployment system for Air Force parachutes which will safely deploy and recover a parachutist at high speeds, the performance of six proposed methods was compared with the quarter bag deployment system presently used. Two were eliminated during bench tests; the other four were subjected to drop tests from the whirltower and from aircraft using a 200 lb. torso dummy. Data obtained were airspeeds, opening times, snatch forces, and opening forces.
T. I.

16,246
Brown, J.L. REVIEW OF THE CONE-TO-ROD EFFICIENCY RATIO AS A SPECIFICATION FOR LIGHTING SYSTEMS. Contract AF 33(038) 22616, Proj. 7186, Task 71544, WADC TR 57 448, Aug. 1957, 21pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Columbia University, New York, N.Y.).

16,246
The need for systems of illumination that afford maximum stimulation of the eye at low luminances has led to the widespread use of red light. The theoretical basis for the advantage of red light is reviewed. Several methods for the practical specification of illumination which are based on a cone-to-rod luminous efficiency ratio are analyzed and compared in terms of the actual physical significance of the numerical values which they yield. The general problem of specification is discussed in relation to a number of underlying practical problems, such as the luminance level at which a given system must be used, the nature of visual tasks for which it is provided, and those for which it must be preserved. The use of the cone-to-rod luminous efficiency ratio is recommended for experimental testing. G. R 27

16,247
Brokaw, L.D. SOME STATISTICAL METHODS FOR DETECTION OF NONSTANDARD TEST ADMINISTRATION. WADC TN 59 34, Jan. 1959, 30pp. USAF Personnel Lab., Lackland AFB, Tex.

16,247
This paper was concerned with the improper testing procedures used by the Armed Forces Recruiting Stations. Three statistical methods for detecting falsely derived passing scores on the Army General Classification Test and the Armed Forces Qualification Test were presented. Tests were administered to 1263 airmen and the scores were manipulated to simulate various patterns of false scores. The Kolmogorov-Smirnov Technique, the Sign Test, and a test for significant differences between standard deviations were applied to the test distributions to determine which sample of scores might be rejected due to their distribution in relation to significance levels established by normal chance variation.
T. G. R 11

16,249
Bonner, R.H. THE EFFECTS OF STRESS ON UROPEPSIN EXCRETION. Proj. 7220, Task 71742, WADC TN 57 427, Dec. 1957, 11pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,249
Uropepsin changes under simulated flight stress were studied using 23 subjects under conditions of 120 hours cabin confinement, elevated temperatures, prolonged positive g forces, and visual and auditory stimuli deprivation. Urine samples were obtained at varying schedules for each of the test conditions. The method for analyzing uropepsin was described at length.
T. G. R 15

16,250
Altman, I., Pendleton, Catherine & Terauds, Anita. ANNOTATIONS OF SMALL GROUP RESEARCH STUDIES. Contract AF 49(638) 256, Supp. Agreement 2(59 634), AFOSR TN 60 1208 & Rep. HSR RR 60/5 GN, Oct. 1960, 761pp. Human Sciences Research, Inc., Arlington, Va.

16,250
This report presents systematic annotations of 200 small group studies and 50 annotated studies on measures of individual and group performance effectiveness. The summaries include the author, title, reference, purpose, procedure, results, and variables of the study. The report describes the sampling procedure used, the annotation procedure, the individual study annotations, and a section which includes a list of existing and soon forthcoming reports of the research program of the Human Science Research, Inc.
T. G. R many

16,251
Davidon, R.S. BODY SPACE: TACTILE-KINESTHETIC SCHEMA. Contract AF 46(638) 726, AFOSR TN 60 1355 & Tech. Note 1, Sept. 1960, 9pp. USAF Office of Scientific Research, ARDC, Washington, D.C. (Dept. of Psychology, Bryn Mawr College, Bryn Mawr, Penn.).

16,251
The first of a series of psychophysical studies to define tactile-kinesthetic spatial relationships within and around the body was described. Many observations were made on four Ss. Each S judged when two successive points touched on one arm were phenomenally as far apart as those of a standard on the other arm or different parts of the arm. The effect of changing arm positions and different areas of the body was investigated.
R 6

16,253
Fluhr, F.R. DIGITALIZED PICKOFF DISPLAY CONVERTER. Proj. NE 051 100 824.33, BuShips S 1680, NRL Prob. Y01 04, NRL Rep. 5281, March 1959, 7pp. USN Research Lab., Washington, D.C.

16,253
Due to the increasing complexity of the Naval Data Handling System, a more efficient data processing method is required. Thus, the Pickoff Display Converter, a digitalized machine, which allows the operator to generate derived position coordinates and insert them into the computer memory, has been offered. Mode functions provided are the direct and differential modes of operation. The Digitalized Pickoff Display Converter would also be capable of working with a Fast-Scan type of display.
I. R 3

16,254
Hicks, S.A. THE EFFECTS OF EIGHT HOURS CONFINEMENT IN MOBILE ARMORED PERSONNEL CARRIERS ON SELECTED COMBAT RELEVANT SKILLS: STUDY II. OCO, Research Branch Proj. TB1 1000, Tech. Memo. 17 60, Nov. 1960, 26pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

16,254
To determine changes in performance due to confinement in Armored Personnel Carriers (APC), 48 subjects were tested to determine decrements in performance after eight hour periods of confinement in mobile APCs. Each subject participated in two of the four tasks and acted as his own control. The tasks performed were: Rail Walking Test to test equilibrium; Obstruction-Run Test for stanine and gross motor coordination; Rifle-Fire Test for hand-arm steadiness and eye-arm coordination; and Grenade-Throw Test for eye-arm coordination. In addition, the following variables were also examined: auditory acuity; air composition; subjective reports of individual crew comfort; and incidence of nausea.
T. G. I. R 4

16,255
Hori, S. FEASIBILITY STUDY VIDAT MODIFIED CORE SUBSYSTEM I. Contract AF 29(600) 2484, AFMDC TR 60 34 & ARF Rep. 5143 4, Oct. 1960, 252pp. USAF Aeromedical Field Lab., Holloman AFB, N.M. (Armour Research Foundation of Illinois Institute of Technology, Chicago, Ill.).

16,255
This report concerns the feasibility of portions of a viability data acquisition, handling, storage, reduction, display, and record system (Vidat System I) in dealing with the physiological measures of blood pressure, electrocardiograms, heart rate, respiration, waveform and rate, rectal and skin temperature, and oxygen minute volume consumption. Data handling equipment, analysis of error and reliability, and physiological responses in terms of environment are considered; recommendations and conclusions follow.
T. G. I. R 81

16,256
IBM Research Center. ANNOTATED BIBLIOGRAPHY OF IBM RESEARCH PSYCHOLOGY. July 1960, 6pp. IBM Research Center, Yorktown Heights, N.Y.

16,256
This bibliography summarizes reports published by IBM Research Psychology since its formation July 1, 1958. The general nature of these studies concerns human information handling--input, processing, and output.
R 14

16,257
IBM Research Center. ANNOTATED BIBLIOGRAPHY OF IBM RESEARCH BIOPHYSICS. July 1960, 3pp. IBM Research Center, Yorktown Heights, N.Y.

16,257
This paper contains eight annotated research papers on biophysics by W.R. Uttal. Five of the studies deal with actual experimental work on the somesthetic system; three others present various technical aspects of the IBM Biophysical Research System and computer technology applied to the problems of sensory neurophysiology.
R 8

16,258
Kause, R.H., Woodward, D.P. & Cacioppo, A.J. EFFECT OF ACCELERATIVE FORCES ON ANIMAL PERFORMANCE. GER 9263, March 1959, 21pp. Goodyear Aircraft Corporation, Akron, Ohio.

16,258
To study the behavioral effects of acceleration forces on the performance of ten male albino rats, each S was taught to depress a lever to avoid an electrical shock; the rats were then subjected to positive accelerative g forces and retested in the avoidance conditioning apparatus to check for performance decrement. The experiment consisted to two parts: 1) each animal was subjected to seven-g maximum acceleration for five minutes simulating the escape profile in the firing of a three-stage rocket, 2) each animal was subjected to nine-g maximum acceleration for four minutes simulating the re-entry profile. Explanations of the results were given.
T. G. I. R 6

16,259
Keatinge, W.R. THE EFFECT OF WORK, CLOTHING AND ADAPTATION ON THE MAINTENANCE OF THE BODY TEMPERATURE IN WATER. RNP 60/977, SS 97, Oct. 1959, 8pp. Survival-at-Sea Sub-Committee, RNPRC, London, England.

16,259
To investigate the effects of immersion in water on the human body, studies were made of 12 healthy young men. Immersions were made in a laboratory tank at water temperatures of 15 and 5 degrees C on every second day and at higher temperatures every day for a period of 20 minutes. During immersions the Ss either sat still or worked (rowing movement) and were clothed or naked; the water was either undisturbed or stirred for the sitting condition. The rate at which men lost heat was found by measuring body temperatures. Metabolic rates, alveolar air measurements, and ECG records were obtained. From the data, certain recommendations were made to be given to men about immersion in water after shipwreck.
T. R 8

16,260
Kraft, J.A. APPROACHES TO THE MEASURE OF FLIGHT CREW CONFINEMENT STRESS AND FATIGUE. Presented at: Annual Meeting of the Aero Medical Association, 24-26 March 1958, 24pp. Military Operations Research Engineering Div., Lockheed Aircraft Corporation, Marietta, Ga.

16,260
Briefly reviewed are recent advances in flight systems and the problems of human factors which accompany long endurance flights. The need to study problems associated with the tolerance of humans to high and sustained g forces, tolerance to sustained cosmic, ultraviolet, and x-ray bombardments, as well as others is mentioned and the need for further simulated environmental studies is stressed. Described is the Lockhead Human Factors Research Laboratory which contains a mock-up simulating a space restricted flight station. The experimental program and performance tasks are described and the physiological and clinical measures are discussed.
I. R 19

16,261
Madden, J.M. CONTEXT EFFECTS IN JOB EVALUATION. Proj. 7734, Task 17015, WADD TN 60 220, Oct. 1960, 31pp. USAF Personnel Lab., Lackland AFB, Tex.

16,261
To test various hypotheses about the way in which context effects job-evaluation, the 42 career fields in the Air Force airman job structure were selected for study. A preliminary study was made to obtain criterion or reference scores for each specialty. Aviation cadets rated one specialty from each of the career fields on four factors. The ratings were found to be both reliable and discriminative among specialties. From these ratings 12 lists were obtained composed of high, middle, and low value specialties in all combinations. Raters for these experimental lists were drawn from the same population as in the reference ranking phase. Three types of context effects are discussed: central tendency, unbalanced, and anchorage.
T. G. R 10

16,262
Madden, J.M. A NOTE ON THE RATING OF MULTIDIMENSIONAL FACTORS. Proj. 7734, Task 17015, WADD TN 60 258, Oct. 1960, 7pp. USAF Personnel Lab., Lackland AFB, Tex.

16,262
To determine whether the reliability of ratings may be increased by fractionating a multidimensional rating factor even if only a small number of simpler, presumably unidimensional factors are employed, the complex job-evaluation factor, knowledge, was split into four simpler factors: formal education, special education, on-the-job training, and work experience. Aviation cadets rated a sample of 42 Air Force specialties on either the multidimensional knowledge factor or on the four simpler factors. Reliability of the two types of judgments were computed and compared.
T. R 10

16,263
McRuer, D.T., Ashkenas, I.L. & Guerre, C.L. A SYSTEMS ANALYSIS VIEW OF LONGITUDINAL FLYING QUALITIES. Contract AF 33(616) 5661, Proj. 1365, Task 13553, WADD TR 60 43, Jan. 1960, 108pp. USAF Flight Control Lab., Wright-Patterson AFB, Ohio. (Systems Technology, Inc., Inglewood, Calif.).

16,263
The purpose of this study was to apply mathematical models to vehicle dynamic flying qualities. The pilot as a dynamic element in a man-machine system was reviewed. The subjective pilot opinion ratings were correlated with the dynamic factors used to characterize the pilot's actions.
T. G. R 22

16,264
Moore, R.L. & Christie, A.W. THE DESIGN OF LAMP COLUMNS FOR ROADS WITH FEW PEDESTRIANS. Light & Lighting, Nov. 1960, 53(11), 330-334. (Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

16,264
The problem of collisions between vehicles and lighting columns on high-speed roads is discussed. Following a suggestion that the severity of injuries in such cases could be reduced by using columns that yield on impact, tests were made on concrete, tubular steel, and thin sheet steel columns, all satisfying similar specifications in regard to ability to cope with loads produced by lantern and wind. Nominally identical cars were run head-on into the columns at approximately equal velocities. The following data were recorded and analyzed: velocity of car before impact, position of car body as a function of time, and deceleration of car body as a function of time. Damage to cars and to columns was observed.
G. I. R 3

16,265
Morris, Ailene & Lewis, W.G. VISUAL PERFORMANCE EVALUATION OF A SUBMARINE PERISCOPE AND A CLOSED-CIRCUIT TELEVISION SYSTEM. NEL/Rep. 997, Oct. 1960, 22pp. USN Electronics Lab., San Diego, Calif.

16,265
To determine the relative merits of an optical vs. a closed-circuit television periscope for submarines, comparative visual performance data were collected. Visual performance was defined as the observer's ability to detect stationary targets of various sizes and contrasts. Trials using the unaided eye were performed first and those data used as a basic reference. The periscope had both a 1.5X and 6X power; the monitor screen of the television had a usable area of approximately 10 1/2 by 14 inches and the camera contained a six-inch focal lens. In addition to a comparison of visual performance, the fields of view were compared.
T. G. I.

16,266
Stevens, S.S. INTRODUCTION: A DEFINITION OF COMMUNICATION. J. acoust. Soc. Amer., Nov. 1950, 22(6), 689-690. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.).

16,266
Because the word communication has so many different meanings, a broad, operational, and behavioristic definition is offered. The definition is discussed in relation to information theory.

16,267
Rigal, R.D., Lovell, F.W. & Townsend, F.M. PATHOLOGIC FINDINGS IN THE CARDIOVASCULAR SYSTEMS OF MILITARY FLYING PERSONNEL. Amer. J. Cardiol., July 1960, 6(1), 19-25. (USAF Aerospace Pathology Branch, Armed Forces Institute of Pathology, Washington, D.C.).

16,267
To determine whether or not there is a significant difference between the incidence and severity of coronary artery sclerosis in flying personnel and nonflying personnel, the records of military personnel who were not fliers but who were of the same age group as the aviators were examined. All these men had met with accidental death and had been free from any known clinical illness; at least one adequate section of a major coronary artery was available for study from each man. Pathologic findings were compared with published findings on aviators. A limited study was also conducted on other organs in people with coronary artery disease. Implications of the findings in determining the cause of aircraft accidents were discussed.
T. I. R 6

16,268
Nelms, J.D. ACCLIMATISATION TO COLD IN LAPPS AND ARCTIC INDIANS. FPRC 1087, Feb. 1960, 12pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,268
To compare the effects of night long cold exposure (room temperature of zero degree C with Ss naked inside an approximate 1.5 clo sleeping bag) upon body temperature and metabolism of people consistently cold-exposed and those not so exposed, a group of shepherd Lapps and Arctic Indians were studied along with a control group of Caucasians (Europeans). Rectal temperature, 6 to 8 skin temperatures, metabolic rate, sleep, and muscle movements were measured. In addition, the effect of acute cold exposure upon the hand blood flow of the various groups was studied. The results were discussed in relation to changes of cold acclimatization and to published accounts of similar studies.
T. G. I. R 24

16,269
Wilcox, R.H. A MEASURE OF COHERENCE FOR HUMAN INFORMATION FILTERS. Psychometrika, Sept. 1957, 22(3), 269-274. (USN Research Lab., Washington, D.C.).

16,269
Developed here is a coherence measure which is a quantitative measure of the extent to which a man avoids random activity during filtering operations. Due to the great rate of information a processing system receives, man or machine, only a certain amount can be handled. Filtering as performed by a human being can be coherent or at least in part random. The quantitative method presented here measures the extent to which a human filter avoids random activity in the selection of informational items during periods of overload.
I. R 3

16,270
Weinreb, L. IMPROVED EARCUSHIONS FOR A FLYING HELMET. Contract AF 33(616) 5248, Proj. 7 (77 6336), Task 63619, WADD TR 60 568, Oct. 1960, 27pp. USAF Operational Support Div., Wright-Patterson AFB, Ohio. (Surface Communications Div., Defense Electronic Products, Radio Corporation of America, Camden, N.J.).

16,270
An improved earcushion has been developed for use in flying helmets. This report presents the background and theory underlying the approach to the development and design of the earcushion. Mounting techniques and earcushion materials and their influence on acoustical performance, comfort, fit, durability, and helmet integration are discussed. Psychoacoustic testing and the calculation of articulation index are described and related test data are presented.
G. I. R 6

16,271
SA Electronic Proving Ground. EXPLORATORY TEST OF CAA ICTORIAL POSITION INDICATOR FINAL REPORT. USAEPG SIG 30 100, Task 16 56 0061, June 1959, 43pp. USA Electronic roving Ground, Ft. Huachuca, Ariz.

16,271
To determine the operational characteristics and capabilities of a breadboard model of the CAA Pictorial Position Indicator (an aircraft instrument that projects a continuous display of an aircraft's position and ground track on a map; it receives rho-theta information from the distance and bearing indicators of the Tactical Air Communications and Navigation System; and it may be either lap held or rack mounted), to evaluate it as an airborne navigation aid, and to determine the desirability of a user test, exploratory tests were conducted in fixed-wing and in rotary-wing aircraft. In addition, accuracy, warm up time, continuous use capabilities, and installation and maintenance problems were determined. Recommendations were included.
T. I. R 8

16,272
Tillisch, J.H. & Paris, J. ENDOCRINE DISEASES IN AVIATION MEDICINE. Aerospace Medicine, Dec. 1960, 31, 999-1003. (Section of Medicine, Mayo Clinic & Mayo Foundation, Rochester, Minn.).

16,272
The salient features of endocrine diseases and aviation medicine are covered in this general review. Conditions that disqualify a pilot for flying are discussed along with, in some instances, diagnostic and treatment methods. Such conditions as Addison's disease, Cushing's syndrome, pituitary tumors, and idiopathic diabetes insipidus are merely mentioned. Other conditions that are treated at length are thyroidal disorders, nyxedema, lesions of the pancreas, functional hypoglycemia, and diabetes mellitus.

16,273
Taylor, C.W. (Princ. Investigator). THE SECOND (1957) UNIVERSITY OF UTAH RESEARCH CONFERENCE ON THE IDENTIFICATION OF CREATIVE SCIENTIFIC TALENT. Held at: Alpine Rose Lodge, Brighton, Utah, Aug. 17-20, 1957, 255pp. University of Utah Press, Salt Lake City, Utah.

16,273
As part of a long-range attack on the problem of the nature and identification of creative scientific talent, a conference was held at the University of Utah of persons selected on a national basis. This volume contains the texts of the various papers given at the conference plus discussions pertaining to it. There are 15 papers included in addition to committee reports on predictors and criteria.
T. G. I. R 103

16,274
Callaway, E., III & Yeager, C.L. RELATIONSHIP BETWEEN REACTION TIME AND ELECTROENCEPHALOGRAPHIC ALPHA PHASE. Science, Dec. 1960, 132(3441), 1765-1766. (School of Medicine, University of California, San Francisco, Calif.).

16,274
A technique is described that demonstrates a relation between human 8 to 13/sec. (alpha) electroencephalographic activity and simple visual reaction time which can be obtained at reliable levels of confidence. The technique allows identification of that portion of the alpha cycle most likely to be associated with slow reaction times in advance of statistical evaluation and is applicable to about a third of an unselected adult population by virtue of requiring only moderately dominant alpha activity.
T. R 3

16,275
Rosenberg, I. AIRBLAST TESTS, SEPARABLE BACK PACK. Proj. 6015, AFFTC TN 58 16, Sept. 1958, 15pp. USAF 6511th Test Group (Parachute), El Centro, Calif.

16,275
A separable back pack parachute assembly was designed and was subjected to high speed wind blast to determine the speed, up to 550 knots, at which the pack would prematurely open. The components of the assembly consisted of a packed parachute pack, universal harness, lap belt, and an 1800-cubic-inch survival kit.
T. I.

16,276
Allen, T.H., Krzywicki, H.J., Worth, W.S. & Nims, R.M. HUMAN BODY VOLUMETER BASED ON WATER DISPLACEMENT. Proj. 6X60 11 001, Subproj. 5, USAMRNL Rep. 250, Sept. 1960, 25pp. USA Medical Research & Nutrition Lab., Fitzsimons General Hospital, Denver, Colo.

16,276
Details of construction are described for a new type of human body volumeter which is easy to build and can be used wherever warm water and shelter are available. The principle is based on the displacement of water in a calibrated tank. Less than five minutes are required to note the volume of a man less his vital capacity. If one deducts an average value for the residual volume of the lungs, the total tissue volume is obtained; this volume, together with body weight, permits the calculation of body fat to within a precision of one kg. Fat determinations on 81 men are presented and an illustrative analysis of six body segments is made.
T. G. I. R 12

16,277
Chang, S.H. SPEECH ANALYSIS FINAL SCIENTIFIC REPORT. Contract AF 19(604) 2198, AFCRC TR 58 107, Feb. 1958, 31pp. Electronics Research Lab., Northeastern University, Boston, Mass.

16,277
A summary is presented of studies directed toward the specification of important parameters of speech in speech-band compression systems. In the first chapter, the present status of the Formoder (Forment-Moment Coder) is described. This experimental speech-band compression system makes use of from five to seven narrow-band parametric channels to convey the information of speech. The principal assumptions, the instrumentation, and some results of this approach are discussed. In chapter two a study of the automatic identification of turbulent sounds is described. Experimental results that lead to possible separation of unvoiced stops and fricatives are reported.
T. G. I. R 11

16,278
Headle, H.W. RADAR BEAM CODING TECHNIQUES. Proj. 4506, Task 45163, RADC TN 57 393, Dec. 1957, 11pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

16,278
Discussed here is a radar beam coding technique designed for tracking radar used for landing aircraft. In particular, data transmission using a digital system is considered. The radar coding and transmitter encoding used are explained. The accuracy of the technique is determined by the code which is transmitted. The radar performance determines the number of bits which a system is capable of sending. A Bench test using an AN/APG-30 as a radar transmitter was employed to test the beam coding technique.
G. I.

16,279
Grim, H.L. TEST OF RADIO COMMUNICATIONS DURING RADAR GROUND CONTROLLED APPROACH (GCA). Proj. 4651, WADC TN 57 363, Dec. 1957, 14pp. USAF Directorate of Flight and All-Weather Testing, Wright-Patterson AFB, Ohio.

16,279
The problem of providing the pilot with a means of communicating with the ground communications approach controller (CGA) during final approach was investigated. A method using the standard equipment of the aircraft was devised that allowed the pilot to transmit signals to the CGA controller during the approach. Sixty-six tests were conducted with eight different types of aircraft, jet and reciprocating, on two frequencies, 218.9 and 335.8 MCS, at ranges from 0.2 miles to six miles out on final path approach. Recommendations concerning the use of the system were offered.
I. I.

16,280
Dobyns, R.M. CONSECUTIVE AIRDROP DELIVERY OF PERSONNEL AND EQUIPMENT FROM THE C-123B AIRCRAFT AND SUITABILITY OF THE STATIC LINE RETRIEVER SYSTEM. OPERATIONAL TEST REPORT. Proj. 999HF 30, APGC TR 58 80, June 1958, 16pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

16,280
The results of operational testing of consecutive airdrop delivery of paratroops and A-21 containers with supplies from the C-123B aircraft and of the suitability of the static line retriever system as installed in the aircraft were described. Paratroop jumps and airdrop of personnel dummies were made both preceding and following drop of the A-21 containers. The static line retriever system was found capable of retrieving dummies weighing approximately 400 lbs. Minor modifications to this equipment were suggested.
I. I.

16,281
Christal, R.E. & Madden, J.M. EFFECT OF DEGREE OF FAMILIARITY IN JOB EVALUATION. Proj. 7734, Task 17013, WADD TN 60 263, Nov. 1960, 5pp. USAF Personnel Lab., Lackland AFB, Tex.

16,281

The results of a preliminary study of the effect of various degrees of rater familiarity with a job upon the ratings he assigns to the job were presented. Each of 50 airman specialties at the five skill levels was rated on ten evaluation factors by approximately 100 officers. A one- or two-sentence description of each specialty was used as the basis for evaluations. Each rater indicated his familiarity with the work activities in each specialty on a four-point scale. The ten ratings were added to form an evaluation score and correlations calculated between that score and the familiarity score. Implications of the findings for job evaluations were discussed.
T. R 9

16,282

Matheny, W.G. & Hardt, H.D. THE DISPLAY OF SPATIAL ORIENTATION INFORMATION. Contract NONR 1670(00), Rep. D228 421 001, Aug. 1959, 41pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,282

These experiments are the first of a series aimed at determining the variables making up an effective display for presenting spatial orientation (attitude) information to the pilot of an aircraft. Variables studied were: 1) method of encoding the ground plane (content), 2) size of display, 3) shape of display, and 4) S enclosed or not enclosed within cockpit type of exposure (internal reference). A static display (stimuli projected on a screen) was used in which the S pressed an appropriate button to indicate his judgment of the relationship between plane and ground as seen in each stimulus projection. Response times and errors were recorded and analyzed for differences among the variables.
T. G. I.

16,283

Wilkerson, L.E. A STUDY TO DETERMINE HOW WELL RATE CAN BE DISCRIMINATED AND CONTROLLED. Contract NONR 1670(00), Rep. D228 420 004, Dec. 1958, 35pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,283

To determine how well a person can control and discriminate rates of movement, 16 flight-naive and eight flight-experienced Ss were tested. They were presented with two different symbols, a line and a circle, which could be either expanded or contracted to show rate of change. The task was to control the symbol according to a prescribed pattern of increasing, holding, and decreasing rate of change. Four different control sensitivities were used for each of the symbols. Both position data and rate data were analyzed for accuracy of performance for each condition. The findings were discussed in relation to helicopter pilot performance and ways of encoding rate information in displays.
T. G. I. R 6

16,284

Wilkerson, L.E., Fox, G.A. & Matheny, W.G. THE EFFECT OF SCALE FORM ON THE SPEED AND ACCURACY OF SCALE READING. Contract NONR 1670(00), Rep. D228 420 003, Oct. 1959, 20pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,284

To evaluate three types of displays--circular-moving pointer, linear-fixed pointer, and linear-moving pointer, 36 Ss were given ten presentations of each display and required to record the reading following a one-half second exposure. The size of numbers, graduation mark separation, interval values, and pointer width were the same for all three scales. Frequency of errors in reading each of the scales as well as for segments of the scales were examined. Magnitude of errors was also analyzed. The results were discussed relative to the number of fixations possible with the exposure time used.
T. G. R 10

16,286

Fox, G.A. DETECTION OF ANGULAR CHANGE IN A GRID LINE DISPLAY. Contract NONR 1670(00), Rep. D228 420 001, 1960, 9pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,286

To determine the amount of angular rotation which would be necessary to be noticeable as a change in position of grid lines on a display, 36 Ss were asked to view a standard display and then to judge whether the succeeding display had changed in angle. The display consisted of horizontal lines crossed by vertical perspective lines whose common vanishing point was slightly above the horizon so that there was no common focal point visible. Four standards (0, 10, 20, and 30 degrees) were used with changes in angle of 0, +2, +5, +7, and +10 degrees. The results were expressed as errors and percentages of errors and were analyzed for differences between degree of changes and between the different standards.
T. G. R 1

16,287

Fox, G.A., Hardt, H.D. & Matheny, W.G. DETECTION OF SMALL CHANGES IN THE SIZE OF THE SQUARES IN A GRID LINE DISPLAY. Contract NONR 1670(00), Rep. D228 420 002, Feb. 1959, 22pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,287

To determine how much change in the size of the squares in a grid line display would have to be made to be detected by a human observer, three standard grid patterns of different size were presented and each compared with itself and eight variations in size. Comparisons were made by 36 Ss who reported whether the squares in the second display looked larger, smaller, or the same as the previous display. The results were analyzed using the normal graphic method and were discussed with reference to a proposed altitude display for helicopters.
T. G. I.

16,288

Feddersen, W.E. THE EFFECT OF VARIATIONS IN CONTROL SYSTEM DYNAMICS UPON TRACKING PERFORMANCE. Contract NONR 1670(00), Rep. D228 430 001, Oct. 1958, 28pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,288

Two experiments were performed to illustrate the hypothesis that the "function determining operator performance in a tracking situation is the rate of movement of the display element in response to a control input rather than the value" of the control-display ratio or system lag. Twenty-four Ss served in each of 24 conditions for both studies. Experiment I investigated compensatory tracking of a display along the vertical dimension of a cathode-ray tube (crt); Experiment II studied tracking of angular rotation of the same display (three-inch fluorescent winged-symbol on the face of a 17-inch crt). Voltage difference between Ss' control output and cam output was recorded to measure error amplitude and direction.
T. G. I. R 6

16,289

Armsby, D.H. DESIGN STANDARDS FOR MAN-MACHINE TASKS IN SIGNAL CORPS SYSTEMS. FOURTH QUARTERLY PROGRESS REPORT 1 MARCH 1960 - 30 JUNE 1960. Contract DA 36 039 SC 78328, DA Proj. 3 99 00 110, June 1960, 129pp. Applied Psychology Corporation, Arlington, Va.

16,289

This report is presented in two parts: an interim report and a progress report. The interim summary considers the role of Human Factors in System Design and presents some of the major problems of the human factors specialists in the design of systems. The general and specific goals of the research are analyzed and formulated. Results of research conducted by other organizations were reviewed and a table containing the important questions raised in the source of the project is presented. The progress report discusses the systems demand analysis method which is a method of task analysis. The determinants of behavior, demands, and a specific example of the method are presented.
T. I. R 15

16,290
Frankmann, Judith P. & Adams, J.A. THEORIES OF VIGILANCE. Contract AF 19(604) 5705, AFCCDD TN 60 25, April 1960, 24pp. Aviation Psychology Lab., Dept. of Psychology, University of Illinois, Urbana, Ill.

16,290

Considered here are some contemporary theories of monitoring behavior and an attempt to survey as much of the existing literature in the area as possible. Emphasis is placed on the experimental results rising from studies on vigilance and monitoring in visual and auditory displays. The four principal theories surveyed are: inhibition, attention, expectancy, and sensory variation. These theories are examined and discussed in terms of their effectiveness in accounting for the empirical findings of the studies reviewed. The work of people such as Mackworth, Broadbent, Deese, Baker, Scott, Hebb, et al., is included in this paper.
R many

16,291
Briggs, G.E. & Cosgriff, R.L. ACCOMPLISHMENTS IN HUMAN OPERATOR SIMULATION. Contract AF 30(602) 2107, Reps. ARPA 73 59 & 1000 1, March 1960, 22pp. Antenna Lab., Ohio State University Research Foundation, Columbus, Ohio.

16,291

This report was prepared for presentation at the 1960 Summer Annual Meeting and Aviation Conference of the American Society of Mechanical Engineers. It is an historical view of the events culminating in the present research on man-machine control systems. The authors discuss the reasons for today's theories of human behavior being oriented towards machine analogs and present the three following reasons: the strides made in biological sciences; increased automation and progress made by mathematicians and engineers in this area; and the comprehensive empirical research conducted by psychologists in information processing tasks. Transfer functions for the human operator and control theory and the design of man-machine systems are considered.
R 7

16,292
Losee, J.E. & Buongiorno, J.A. MAINTAINABILITY AND SUPPORTABILITY EVALUATION TECHNIQUE PART I. Contract AF 33 (616) 6495, Proj. 7776, Task 77792, WADD TN 60 82, Part I, March 1960, 83pp. USAF Operational Support Engineering Div., Wright-Patterson AFB, Ohio. (Republic Aviation Corporation, Farmingdale, L.I., N.Y.).

16,292

This report is concerned with the task of developing a procedure for evaluating early design phases of a product for maintainability. The task has been divided into four basic problem areas: 1) defining maintainability, 2) determining and including quantitative maintainability requirements in specifications, 3) complying of contractors with maintainability specifications, and 4) procuring agency measurement of the maintainability achieved by the contractor. Mathematical expressions are derived for operational parameters such as unit task requirements, time scheduling, and programmed resources. Data sheets and forms have been designed and are illustrated. The problems generated by such a system are discussed and considered.
T. G.

16,293
George Washington University. HUMAN RESOURCES RESEARCH OFFICE BIBLIOGRAPHY OF REPORTS 30 JUNE TO 31 DECEMBER 1959. Jan. 1960, 5pp. Human Resources Research Office, George Washington University, Washington, D.C.

16,293

Included here is a bibliography of reports issued by the Human Resources Research Office and covers literature issued during June 30, and December 31, 1959. The bibliography is arranged in two parts with Part I consisting of an annotated list of reports issued by the director's office. Included here are: Development and Evaluation of an Improved Field Radio Repair Course; Some Problems in the Analysis of Trouble Shooting Behavior; and others. Part II consists of reports prepared by HumRRo Divisions and Human Research Units. Some reports included are: An Improved Advanced Individual Training Program for Armor; Improved Training Procedures for Basic Combat Training; and others.
R many

16,294
Dunlap, J.W. THE ANALYSIS AND PREVENTION OF MOTOR VEHICLE ACCIDENTS AMONG AIRMEN. FINAL REPORT. Contract DA 49 007 MD 876, Dec. 1959, 4pp. Dunlap and Associates, Inc., Stamford, Conn.

16,294

A summary report of a study of accident analysis and prevention was given. The results of an interview study of a representative sample of 138 airmen drivers who became involved in personal injury accidents while driving privately-owned motor vehicles and 100 airmen not so involved were presented. The results of the interview study provided the basis for the development and trial of a specially-designed countermeasure to reduce injury-producing accidents among airmen. The countermeasure was described and the results of a year's trial were summarized.

16,295
Margaria, R., Gualtierotti, T. & Spinelli, D. EFFECT OF STRESS ON LOWER NEURON ACTIVITY. Exp. Med. Surg., June-Sept. 1958, 16(2-3), 166-176. (Contract AF 61(514) 637, AFOSR TN 58 537).

16,295

Monosynaptic reflexes were studied to investigate stress. A mixed nerve in the sciatic area was used, thus conduction speed of both motor and sensory fibers and central delay together with the end-plate delay were calculated. The following conditions of stress were studied: hypoxia; hypoglycemia; muscular fatigue due to prolonged physical effort; action of drugs: caffeine, barbituates; alcohol; and lack of sleep. The results obtained fell into two categories which involved the central mechanism and the peripheral part of the reflex. The observations were discussed as well as the action of insulin in stress conditions. The problem of distinguishing stress from fatigue and injury is still apparent.
I. R 12

16,296
Madson, R.A. HIGH ALTITUDE BALLOON DUMMY DROPS. PART I. THE UNSTABILIZED DUMMY DROPS. Proj. 7218, Task 71719, WADC TR 57 477, Part I, Oct. 1957, 40pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,296
As part of a study on high altitude escape problems, the characteristics of instrumented dummies carried aloft to predetermined altitudes were studied during the free fall in unstabilized situations. Altitudes were varied from approximately 90,000 to 30,000 feet. The attitudes assumed by the dummies, type of spin or tumble occurring, and angular velocities recorded on the accelerometers were studied. Further tests to develop a method of stabilizing a man descending from high altitudes were recommended.
T. G. I. R 1

16,297
MacCanon, D.M., Eltzman, D.D. & Chicago Medical School. EFFECTS OF OXYGEN INHALATION ON RESPONSES TO COLD EXPOSURE. Contract DA 49 007 MD 1008, Sept. 1960, 16pp. Chicago Medical School, Chicago, Ill.

16,297
Ten subjects (Ss) were tested before, during, and after exposure to a cold environment to investigate the effects of oxygen inhalation on responses to cold exposure. Skin and rectal temperatures, oxygen consumption, respiratory volume, carbon dioxide production, respiratory quotient, and shivering were determined for 20 experiments. Ten experiments were conducted with Ss breathing air and ten with Ss breathing oxygen. The mean skin temperature, mean body temperature, storage, and heat balance were determined and paired analyses were used to test the null hypothesis. An attempt to explain the results follows with a discussion concerning the role of a neural mechanism in effecting the degree of shivering and discomfort while breathing oxygen in the cold.
T. R 12

16,298
Misrahy, G.A., Shinabarger, E.W. & Hildreth, K.M. STUDIES ON FACTORS AFFECTING THE SUMMATING POTENTIAL. Proj. 7210, WADC TR 57 467, Aug. 1957, 16pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,298
The role that distortion within the cochlea, streaming of endo- or perilymph, and sensitivity of microelectrodes to oxygen play in the genesis of the summating potential was studied. Eighty adult guinea pigs were used in the study. The most important factor appears to be mechanical distortion of the scala media. Any condition tending to increase distortion of the scala media lowers the threshold and increases the amplitude of the summating potential at given sound levels. Conditions preventing distortion have the reverse effect.
G. I. R 9

16,299
Nieset, R.T. (Princ. Investigator). INVESTIGATIONS OF THE BIOLOGICAL EFFECTS OF MICROWAVE RADIATION ANNUAL PROGRESS REPORT - 1958. Contract NONR 475(03), Proj. NR 102 359, 1958, 52pp. Biophysics Program, Tulane University, New Orleans, La.

16,299
This report includes several studies directed toward an improved understanding of physical and physiological aspects of biological microwave absorption. The effects of intermittent two minute exposures to 10 cm microwaves at a power density of 10 mw/cm^2 on the growth rate of mice were studied. Another experiment based on these results was designed to indicate range of the individual weights over a longer period. Further experiments at a level of 45 mw/cm^2 were conducted using 3 cm microwaves. Lizards pre-cooled to 5°C were irradiated, the change in temperature and effects being observed. Bioelectric effects of 3 cm microwave irradiation were also studied using isolated frog skins. A discussion of thermal relationships and recommendations were included.
I. G.

16,301
Shelanski, M.V. & Gabriel, K.L. CUTANEOUS TOXICITY EVALUATION OF AIR FORCE DEVELOPMENT MATERIALS - II. Contract AF 33(616) 5072, Proj. 7159, Task 71802, WADC TR 57 742, Nov. 1957, 16pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Industrial Biology Research and Testing Laboratories, Philadelphia, Penn.).

16,301
To determine the primary irritant effect and the sensitization index of various materials (two hydraulic fluids, two impregnated cloths, three engine oils, one plastic coated natural rubber sheeting, and two synthetic base stocks for high temperature fluids), the prophetic patch test method was used on laboratory animals and volunteer human Ss. The fabrics tested were cotton duck impregnated with copper cellulose complex leaving either 0.88 or 0.35 percent copper in the fabric. These data should serve as criteria for establishing safe handling procedures and limits of application of these materials when utilized by personnel.
T. R 5

16,302
Stanley, J.R. LIGHT INTENSITY LEVEL REQUIRED FOR GROUND PHOTOGRAPHY OF AN AIRBORNE FLASHING LIGHT. Contract ARDCM 80 4, Proj. 5080 50580, APGC TN 58 1, Jan. 1958, 9pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

16,302
To determine the minimum light intensity necessary for photographing ballistic trajectories, a variable intensity flashing-light source was photographed using ground-based cameras. The light source used was a GE FT-118 Edgerton lamp (strobe light) operated from capacitors charged by a 450 volt battery. One ground and two airborne missions were conducted. The ground mission, a functional check of the light unit, was conducted in an altitude chamber at 20,000 feet altitude and -18 degrees temperature. The airborne missions were conducted during clear weather, between darkness and midnight, and at 40,000 feet altitude. Capacitor values tested ranged from 6.2 to 97.0 microfarads.
T. I.

16,304
Lichte, W.H. STUDIES OF THE EFFECT UPON AIMING-POINT IDENTIFICATION OF CERTAIN CHART VARIABLES. DEVELOPMENT REPORT. Contract AF 18(600) 1209, Proj. 7738, Task 27014, AFPTRC TN 58 3, Jan. 1958, 29pp. USAF Operator Lab., Randolph AFB, Tex.

16,304
An exploratory study and three experiments were conducted to determine how scale, amount of information, and aspect-angle information of charts affected navigator performance as measured on use of 0-15 photographs by means of aiming-point identification test and a new city recognition test.
R 15

16,305
Lathrop, R.G. & Berridge, H.L. A HUMAN FACTORS STUDY OF THE TRANSISTORIZED DIGITAL COMPUTER FOR BOMBING AND NAVIGATION (TRADIC). APGC Proj. 5104S1, APGC TN 58 22, Sept. 1958, 33pp. USAF Human Factors Office, APGC, Eglin AFB, Fla.

16,305
This study was designed to obtain data concerning human reaction towards: the TRADIC presentation of in-flight data, the confidence of the operators in the TRADIC presentation, the confidence of the operators in their ability to operate the TRADIC equipment effectively, and the compatability of the man-machine relationships. The TRADIC is a transistorized research model digital computer designed for airborne use. Questionnaires, divided into two types of information, personal information and 30 questions relative to TRADIC, were administered to experienced, qualified navigators. Results were discussed and recommendations were made.
T. I. R 2

16,306
Reza, F.M. AN INTRODUCTION TO PROBABILITY THEORY-CONTINUOUS SCHEMES. Proj. 8505, RADC TN 60 67, July 1960, 93pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

16,306
This report is concerned with modern probability theory. It is presented in three parts which are: Part I, Continuous Probability Distribution and Density; Part II, Statistical Averages; Part III, Normal Distribution and Limit Theorems. Particular emphasis is given to those aspects of theory that are of interest to the electrical engineers.
G. R 8

16,307
Reveal, R., Jr. & Ruch, F.L. AN APPLICATION OF THE CRITICAL-INCIDENT TECHNIQUE TO AIR FORCE COMBAT LEADERSHIP. Contract AF 33(038) 23295, Proj. 7731 (505 039 00 01), Res. Rep. AFPTRC TN 58 8, Feb. 1958, 47pp. USAF Office for Social Science Programs, Lackland AFB, Tex.

16,307
This study reports the use of the critical-incident technique to secure descriptions of specific behaviors associated with effective officer combat leadership as observed by fellow officers. From 562 protocols of standardized interviews with 624 Far Eastern Air Force officers on 15 overseas bases in 1951, 1034 statements describing leadership behavior were extracted by two teams of three analysts each. These statements were classified with adequate reliability (estimated above .80) in 33 categories. These categories may be interpreted as one statement of critical requirements for effective leadership of such combat officers.
I. R 28

16,308
Sturrock, P.E. & Kitzes, G. AN ESTIMATION OF EXPOSURE TO CARBON MONOXIDE BY BREATH ANALYSIS. Proj. 7159, Task 71803, WADC TR 57 291, March 1958, 11pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,308
This study was designed to develop a rapid semiquantitative method of screening subjects for possible carbon monoxide (CO) poisoning. A colorimetric indication gel for carbon monoxide developed by the National Bureau of Standards was used as the indicator in this study. Preliminary investigations yielded a method of obtaining a normal "lungful" of air from the subjects. The correlation between breath-CO concentration determined by the colorimetric indicating method and blood-CO concentration was determined in a series of experiments using 32 smokers and nonsmokers. The blood-CO analysis was performed by the monometric Van Slyke procedure. The advantages and disadvantages of the method were discussed.
T. G. I. R 10

16,309
Suppes, P. COMPARISON OF THE MEANING AND USES OF MODELS IN MATHEMATICS AND THE EMPIRICAL SCIENCES. Contract NONR 225(17), Proj. NR 171 034, Tech. Rep. 33, Aug. 1960, 22pp Institute for Mathematical Studies in the Social Sciences Stanford University, Stanford, Calif.

16,309
Discussed are the various meanings of the word "model' and its use in the various sciences. Several quotations employing the word "model" are presented to illustrate the semantic differences in the various fields such as physics, mathematics, and psychology. The effects of models of empirical theory in areas such as biology and the social sciences are pointed out and the relation between theory and experimental data in the empirical sciences is noted. Several illustrations concerning models of data are presented. In conclusion, the role of set-theoretical concept of model as a useful tool for bringing order into the theory of experimental design and analysis of data is emphasized.
R 17

16,310
Tamas, A. & McElroy, Jane. POSTMORTEM CARBON MONOXIDE ANALYSIS: SIGNIFICANCE OF TISSUE BLOOD CONTENT. Proj. 7159, Task 71803, WADC TR 57 686, Nov. 1957, 15pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,310
Described here is the present technique of extrapolating presumed human in vivo blood carbon monoxide levels from postmortem tissues on the basis of data obtained from rat experimentation. The inadequacies of this method are pointed out. New data are presented and the differences in blood quantities in muscle tissues of rats and humans are illustrated.
I. G. I. R 6

16,311
Talbot, S.A. PHYSICAL PRINCIPLES OF VECTOR BALLISTOCARDIOGRAPHIC MEASUREMENT. FINAL REPORT. Contract AF 18 (600) 1107, ARDC TR 58 72, June 1958, 152pp. Johns Hopkins University, Baltimore, Md.

16,311
The results of a research program designed to clarify the physical problems arising in vector ballistocardiography and to spotlight the kinds of information available are presented. The approaches used were both analytical and experimental, dealing with biophysical rather than physiological aspects of the problem of assessing externally the internal hemodynamics. A first-order theory and experimental method for analyzing cardiovascular vector ballistics are discussed and their development described.
G. I. R 55

16,313
Von Beckh, H.J. & Schock, G.J.D. CENTRIFUGE EXPERIMENTS ON HIGH-G LOADS IN MICE AND THEIR POSSIBLE ALLEVIATION BY MULTIDIRECTIONAL ANTI-G DEVICES. Proj. 7851, AFMDC TN 58 10, Aug. 1958, 14pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

16,313
Using the centrifuge, time-tolerance limits on transversely positioned mice were studied and the results compared with longitudinal g-tolerance values reported by other investigators. The possibilities of a multidirectional g-protection during escape trajectories and the re-entry phase are discussed.
G. I. R 8

16,314
Von Beckh, H.J. PHYSIOLOGY OF LAUNCHING AND RE-ENTRY STRESS IN RODENTS. Proj. 7851, AFMDC TN 58 11, Aug. 1958, 8pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

16,314
An evaluation of all factors that could aggravate the effect of accelerations and decelerations in biosatellite experiments is presented. Centrifuge runs with rodents made by several investigators to establish tolerance limits to accelerations in the longitudinal and transverse directions are reviewed. Other factors such as environmental stresses and the absence of gravity are then considered as they affect tolerance levels. A reliable g-protection for the animal is then proposed.
G. I. R 10

16,315
Westen, R.J. & Peterson, R.O. DEVELOPMENT AND APPLICATION OF METHODS FOR DERIVING GENERALIZABLE COURSE CONTENT FROM ELECTRONIC EQUIPMENT. Contract AF 18(600) 1351, Proj. 7729, Task 37300, AFPTRC TR 58 8, Feb. 1958, 9pp. USAF Maintenance Lab., Lowry AFB, Colo.

16,315
Materials previously reported on this project concerning the development of training courses for maintenance and servicing of Air Force electronic equipment are summarized briefly. On the assumption that various electronic maintenance specialties require common skills and knowledges, various methods to determine this information are tested for two types of aircraft (F-86D and F-102A). From lists of the common skills and knowledges, experimental core-training programs are derived and performance measures devised for evaluation of trainee competence. A job-oriented approach proved more useful than an equipment centered one.
R 6

16,316
Waite, J.V. & Buss, W. MULTI-STAGE PERSONNEL PARACHUTE. Proj. 6068, Task 61496, AFFTC TN 58 19, Oct. 1958, 13pp. USAF 6511th Test Group (Parachute), El Centro, Calif.

16,316
One of the hazards encountered by a parachutist while free falling following a high altitude bailout is uncontrolled tumbling and spinning which may impair his physical and mental capacities. To avoid this it was proposed to use the parachutist's main canopy as a stabilization device to permit rapid descent at high altitude. Several methods of deploying the main canopy in a streaming condition to provide sufficient drag were developed and tested. Modifications were made to the parachute assembly and a method of anchoring the suspension lines within the pack was devised. Tests were made with an articulated dummy.
T. I.

16,317
Zander, A., Wolfe, D.M. & Curtis, T.T. EFFECTS OF AUTHORITY STRUCTURE UPON GROUP ADAPTABILITY AND FLEXIBILITY. FINAL REPORT. Contract AF 41(657) 43, Proj. 7723, Task 77462, AFPTRC TR 58 9, Dec. 1957, 125pp. Research Center for Group Dynamics, Institute for Social Research, University of Michigan, Ann Arbor, Mich.

16,317
This study was designed to explore the effects of authority structure on small group adaptability and flexibility. The study involved 196 high school seniors in 49 groups of four members each. Each group was homogeneous with respect to IQ, height, and age. Five different authority structures were used with ten groups participating in each of the first four and nine groups in the fifth. The experimental method is fully described and the findings are discussed. Included are criticisms and recommendations for further studies in small and large groups.
T. I. R 9

16,318
Stevens, S.S. (Dir.). PERIODIC STATUS REPORT XXIX. PERIOD COVERED: 16 NOVEMBER 1956 - 15 MAY 1957. Contract NONR 1866(15), Proj. NR142 201, Rep. PNM 76, May 1957, 13pp. Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.

16,318
This status report of research conducted by the Harvard University Psycho-Acoustic Laboratory under contract with the Office of Naval Research, USN, covers the period from November 1956 to May 1957. Seven completed research studies are listed in the form of an annotated bibliography and four studies in progress are summarized. The subjects covered are primarily in the areas of either audition or psychophysics. A list of reports, and their Psycho-Acoustic Navy Report numbers, is included at the end of the report.
R 47

16,320
National Science Foundation. QUARTERLY REPORT OF GOVERNMENT SPONSORED RESEARCH PROJECTS IN PSYCHOLOGY, PSYCHIATRY & CLOSELY RELATED AREAS. June, 1953, 48pp. National Science Foundation, Washington, D.C.

16,320
This is the fourth quarterly report of government sponsored projects in psychology and related areas covering the period ending June 30, 1953. The content is as follows: the agency supporting the research, identification of each project, the title of the project, the name of the contractor and of the principal investigator, and the present termination date of the project. A list of the agencies that have contributed project data and the name of the responsible individual for administration of the project are included.

16,321
von Bekesy, G. NEURAL INHIBITORY UNITS OF THE EYE AND SKIN. QUANTITATIVE DESCRIPTION OF CONTRAST PHENOMENA. J. opt. Soc. Amer., Nov. 1960, 50(11), 1060-1070. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.). (Rep. PNR 243).

16,321
To find a quantitative method for describing the properties of the nervous system that lead to contrast phenomena, experiments on the skin show that a "neural unit" can be used for the description of some phenomena of sensation magnitude that have been observed. The neural unit consists of an area of sensation surrounded by a refractory area of inhibition. This paper tries to demonstrate how the numerical values for the unit can be determined for the eye and the skin and thus used in the description of Mach bands. Step functions are described from which it is possible to deduce two simple formulas for the calculation of Mach bands by a procedure similar to that used in telecommunication theory for the calculation of transients.
I. R 16

16,322
von Bekesy, G. HUMAN SKIN PERCEPTION OF TRAVELING WAVES SIMILAR TO THOSE ON THE COCHLEA. J. acoust. Soc. Amer., Sept. 1955, 27(5), 830-841. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.). (Rep. PNR 175).

16,322
A model of the cochlea was devised using a section of the skin (arm of S) as a sense organ. The development and final design were described in detail. The model was then used to study human skin perception of traveling waves; frequency localization, inhibition phenomena; and pitch and place of perception. Differences and likenesses between perception by the skin and by the ear were pointed out.
G. I. R 15

16,323
von Bekesy, G. SIMPLIFIED MODEL TO DEMONSTRATE THE ENERGY FLOW AND FORMATION OF TRAVELING WAVES SIMILAR TO THOSE FOUND IN THE COCHLEA. Proc. nat. Acad. Sci., Wash., Dec. 1956, 42(12), 930-944. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.). (Rep. PNR 187).

16,323
To investigate what happens to sound waves that travel in a direction in which the mechanical properties of the medium are changing continuously, a model was constructed and is described. The model consists of a series of pendulums in which the length of the pendulums is continuously graduated and in which the pendulums may swing completely free or be coupled in varying degrees of strength; this is a simplified model of the cochlea. Energy flow and formation of traveling waves similar to those in the cochlea are demonstrated and discussed. The use of the model for investigating pathological cases of hearing loss is also indicated.
I. R 12

16,324
Bushey, T.J. U.S. APRL MECHANICAL HAND MECHANISM, VOLUNTARY CLOSING AUTOMATIC LOCKING, STRAIGHT TRACK TYPE. Tech. Rep. 6027, Oct. 1960, 2pp. USA Prosthetics Research Lab., Walter Reed Army Medical Center, Washington, D.C.

16,324

This note describes a mechanical band mechanism that was developed for prehension control (by amputees) in the small hand sizes for children. The design is of the voluntary closing type with an automatic locking mechanism in which prehension force may be varied at will from zero to a safe maximum. Prototype models have been evaluated in the laboratory.

16,325

Brown, J.L. ACCELERATION AND MOTOR PERFORMANCE. Hum. Factors, Nov. 1960, 175-185. (Department of Physiology, School of Medicine, University of Pennsylvania, Philadelphia, Penn.).

16,325

Experiments concerning the effects of acceleration on motor performance are discussed in a sequence that illustrates the evolution of research techniques in recent years. In the simplest of these techniques, performance is evaluated during or immediately following exposure to pre-programmed acceleration time histories. A more complex technique involves the study of interaction of S performance with the pattern of acceleration experienced. Accelerations are actually controlled by S performance by means of an analog computer control system. Certain limitations of centrifuge simulations are discussed.
G. I. R 27

16,326

Baker, C.H. & Young, Phyllis. FEEDBACK DURING TRAINING AND RETENTION OF MOTOR SKILLS. Canad. J. Psychol., 1960, 14(4), 257-264. (Defence Research Medical Labs., Toronto, Ontario, Canada). (DRML Rep. 241 2).

16,326

To determine the nature of performance in a simple motor task (which had first been learned with feedback) over relatively long periods of feedback denial, four groups of blindfolded Ss were instructed to draw lines equal in length to a four-inch block of wood held in their left hands. The three experimental groups were each given one pretraining day (200 lines) without feedback and three, four, or five training days with feedback (right or wrong statement after each trial), and an equal number of days with denial of feedback. The control group performed without feedback at any time. In addition a fifth group was studied when feedback was given in written form after every 20 trials during training. Performance data were examined to see if any residue of skill remains after feedback withdrawal. T. G. R 5

16,327

Baxter, J.R., Cumming, R.W., Day, R.H. & Lane, J.C. A COMPARISON OF THREE VISUAL GLIDEPATH SYSTEMS. Note ARL/HE. 8, Oct. 1960, 55pp. Aeronautical Research Labs., Australian Defence Scientific Service, Melbourne, Australia. (University of Sidney, Sidney, Australia & Department of Civil Aviation, Melbourne, Australia).

16,327

The purpose of this investigation was to compare the Visual Glidepath Indicator, the Precision Visual Glidepath, and the 'Tee' Visual Glidepath. Fifteen pilots served as Ss making three approaches by day and two by night on each system. The pilots were briefed, the test approaches were tracked by theodolite recording, and following each approach the Ss were interviewed.
T. G. I. R 9

16,328

Birnbaum, A. ON THE FOUNDATIONS OF STATISTICAL INFERENCE. II. Contract NONR 285(38), Rep. IMM NYU 275, Oct. 1960, 34pp. Institute of Mathematical Sciences, New York University, New York, N.Y.

16,328

Some principal technical developments of Part I of this paper on statistical inference are derived here in more elementary fashion, under the restriction to statistical experiments with discrete sample spaces, but with the more general condition that any finite number of (simple) statistical hypotheses may be represented. For any such experiment it is shown that for typical purposes of informative statistical inference, just the likelihood function should be reported and interpreted. Specific techniques for interpretation of likelihood functions are developed, particularly "intrinsic confidence methods." The relations of such methods to traditional methods based on the "principle of insufficient reason" are discussed. Analogous developments are given for experiments involving translation or scale parameters. R 3

16,329

Breiman, L. ANOTHER APPROACH TO INFORMATION THEORY. Contract NONR 222(53), Series 60, Issue 304, Aug. 1960, 17pp. Electronics Research Lab., Department of Electrical Engineering, University of California, Berkeley, Calif.

16,329

Although the mathematics of information theory seems to be well understood and its theorems well proven, this paper goes back to the elementary concepts in the theory in order to understand better its foundations. The bulk of the paper is devoted to exploring the ideas of noisy channel, capacity, coding, and the like. A formulation is made that is somewhat different from that currently in use but which the author feels is contained implicitly in many studies.
G. R 5

16,330

Crane, E. & Kristal, J. NEW RED, GREEN, AND WHITE COMPOSITIONS FOR HAND-HELD, ROCKET-TYPE SIGNAL FLARES. Ordnance Proj. TS5 5402 & DA Proj. 504 22 016, Tech. Notes 50, June 1960, 16pp. USA Feltman Research & Engineering Labs., Picatinny Arsenal, N.J.

16,330

To meet the need for a new series of red, green, and white flare compositions for use in hand-held ground illumination signals, seven red, four green, and two white compositions were developed and tested. The requirements to be met were that they produce sharply defined, easily distinguishable colors lasting 60 seconds for parachute-type flares and eight seconds for cluster-type flares. Candlepower and burning times were measured with Speedomax and Weston type meters and recorders; visual color was judged by experienced observers; and color values were determined by means of barrier layer cells and Speedomax meters. The compositions most fully meeting the requirements were described.
T. I. R 2

16,331

Doyle, W. RECOGNITION OF SLOPPY, HAND-PRINTED CHARACTERS. Group Rep. 54 12, Dec. 1959, 13pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

16,331

This report describes a pattern recognition scheme particularly intended to handle noisy and distorted data by computing machines. The sample is subjected to tests at the conclusion of which a single decision is made on the basis of experience obtained from prior processing of labelled samples. The method was applied to hand-printed English capitals but it is evidently general. Results are given for some trials made on the IBM 709.
T. I. R 5

16,332
Ehrsam, G.W., Jr. FEASIBILITY STUDY FOR AN ADVANCED DEVICE FOR STUDYING THE EFFECTS OF ACCELERATION ON MAN. Contract AF 33(616) 6484, Proj. 7222, Task 71746, WADD TR 60 187, March 1960, 144pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (American Machine and Foundry Company, Alexandria, Va.).

16,332
This is a feasibility study of a device to simulate adequately the types of acceleration patterns anticipated for future manned vehicles. Realistic simulation requires the production not only of a controlled radial acceleration field but also of superimposed rotational motions of pitch, roll, and yaw and the vibratory translations encountered about these axes as a result of buffeting and other flight disturbances. Therefore, arm radius, inertia, and control problems are complicated by the requirement for oscillations which will permit study of true flight. The analysis of these problems is presented by component areas. Recommendations are made concerning development of such a device.
T. G. R 8

16,333
Folley, J.D., Jr. (Ed.). HUMAN FACTORS METHODS FOR SYSTEMS DESIGN. Contract NONR 2700(00), AIR 290 60 FR 225, 1960, 382pp. American Institute for Research, Pittsburgh, Penn.

16,333
In this book about the design of systems, the primary concern is with a very important part of every system: the man. The assumption is made that the primary goal of human factors engineering is to help design an optimal system. A system is defined as equipment, jobs, and characteristics of the personnel (appropriate selection and training programs). There are four major parts: system analysis for human factors, human engineering in equipment design, development of the personnel subsystem, and a human factors bookshelf.
T. G. I. R 260 approx.

16,334
Bendix Aviation Corporation. DESIGN FOR LEGIBILITY OF VISUAL DISPLAYS. A PRELIMINARY STUDY REPORT. 53pp. Human Factors Group, Bendix Radio Div., Bendix Aviation Corporation, Baltimore, Md.

16,334
This report attempts to arrange presently available data on the legibility in the various characters used for visual displays of information in a form directly usable by specifications writers, design engineers, and others. The language of communication on visual display requirements is clarified. Existing experimental data is analyzed and on this basis alphabetic and numeric designs best suited to higher error-free legibility are recommended. Suggestions for further experimentation are offered.
I. R 2

16,335
Freeman, M.B. MONTE CARLO ESTIMATES OF EXCURSION PROBABILITIES OF A GAUSSIAN PROCESS. Contract NONR 222(53), Series 60, Issue 272, March 1960, 28pp. Dept. of Electrical Engineering, University of California, Berkeley, Calif.

16,335
The probability that a certain Gaussian random process is greater than b throughout a time interval of length t seconds is estimated from observations of a high-speed numerical model. The process studied is that characteristic of a simple harmonic oscillator in Brownian motion.
G. R 20

16,336
Freiberger, W.F. APPROXIMATE METHODS IN THE SPECTRAL ANALYSIS OF RANDOM NOISE. Contract DA 36 039 SC 78130, DA SC 78130/7, Tech. Rep. 7, June 1960, 25pp. Div. of Applied Mathematics, Brown University, Providence, R.I.

16,336
This paper is concerned with digital techniques and indicates some of the approximate methods recently developed for extracting as much information as possible about the spectrum of a random noise from a limited amount of data. The use of power spectra rather than covariance functions is explained briefly. The discussion is limited to measurement of the spectra of individual noises or signals; that is, the concern is with single time-series in which the random variables take on scalar values.
G.

16,337
Parton, L.R., Lauer, J.M. & Smith, D.L. A NEW CHRONIC POLAROGRAPHIC IMPLANT UNIT FOR MEASUREMENT OF CEREBRAL OXYGEN AVAILABILITY. Proj. 7165, Task 71836, WADD TR 60 388, May 1960, 7pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

16,337
This report describes the design and development of a chronic brain polarographic implant unit capable of detecting small changes in cerebral oxygen availability (aO_2). The design and fabrication of this unit provide for integral construction of both an anode and a cathode in a single assembly; the brain probe (cathode) may be changed or replaced without removal of the basic polarographic unit. The result is a simple, rapid, and relatively bloodless operation. Reproducible data can be obtained within five days following postsurgical recovery.
G. I. R 5

16,338
Howell, W.C. & Briggs, G.E. AN INITIAL EVALUATION OF A VIBROTACTILE DISPLAY IN COMPLEX CONTROL TASKS. Contract AF 33(616) 5524, Proj. 9 (610 6190), Task 50786 & OSURF Proj. 813, Tech. Rep. (813) 5, Oct. 1959, 16pp. Ohio State University Research Foundation, Columbus, Ohio.

16,338
Three experiments were completed which explored the accuracy human operators can achieve in both simple and complex control tasks when input and output information are displayed by way of the tactual sense modality. Tracking performance was first compared on three compensatory displays, two visual and one vibratory. The vibratory display was then studied under two levels of aiding in a second-order control system. In the third study a vibratory display was studied in which apparent movement (phi effect) was used to indicate system error. The use of such vibrotactile displays as a substitute for visual displays under conditions where the visual sense is degraded or in periods of high g stress is discussed.
G. I. R 7

16,339
Fry, E.B., Bryan, G.L. & Rigney, J.W. TEACHING MACHINES: AN ANNOTATED BIBLIOGRAPHY. Contract NONR 228(02), Proj. NR 153 093, Tech. Rep. 28, Nov. 1959, 106pp. University of Southern California, Los Angeles, Calif.

16,339
This is the first of two reports concerned with a study of the potentialities of teaching machines for technical training in the navy. The report consists of: 1) an introduction which contains summarizing statements about the references in the bibliography, tables which summarize facts about work in this area (e.g., frequency per year of teaching machine studies, frequency of different categories of articles), and a descriptive summary of devices which have been developed; 2) the annotated bibliography; and 3) a catalogue of commercially developed teaching machines. Included in the references are discussions of programming, developmental and descriptive studies, training experiments, field surveys, and theoretical discussions.
T. R 109 (approx.)

16,340
Guilford, J.P., Christensen, P.R., Merrifield, P.R. & Frick, J.W. AN INVESTIGATION OF SYMBOLIC FACTORS OF COGNITION AND CONVERGENT PRODUCTION. STUDIES OF APTITUDES OF HIGH-LEVEL PERSONNEL. Rep. 23, April 1960, 27pp. Psychological Lab., University of Southern California, Los Angeles, Calif.

16,340
This was the first factor analytic study in which hypotheses to be tested were generated by the structure of intellect concept. Seven factors pertaining to symbolic content, two in need of confirmation and five thought to be potential factors, were studied. A battery of twenty experimental tests and ten marker tests was administered to 240 Ss and data were factor analyzed. The usefulness of the structure of intellect concept as a source of hypotheses of undiscovered factors and as a method for the interpretation of abilities was discussed.
T. I. R 14

16,341
Haverland, E.M. & Fightmaster, W.J. THE REVISION OF NIKE PLATOON LEADER JOB DESCRIPTIONS: AJAX TO HERCULES. Contract DA 49 106 QM 1, DA Proj. 095 50 000, HUMRRO TR 62, May 1960, 23pp. Human Resources Research Office, George Washington University, Washington, D.C.

16,341
The sources of information and the procedures used to revise the job descriptions of the NIKE AJAX integrated fire control platoon leader and launching platoon leader positions to make them applicable to NIKE HERCULES are described. Methods are outlined which were found to be generally useful for revising and developing job descriptions to keep them up to date; their use by training agencies is recommended. The job descriptions developed in this study are included as an appendix to the report.
R 1

16,342
Hodge, J.W., Jr. & Riblett, V.T. EVALUATION OF HOOK NO. 4741. Tech. Rep. 6016, June 1960, 2pp. USA Prosthetics Research Lab., Walter Reed Army Medical Center, Washington, D.C.

16,342
A hook (Number 4741), designed to maintain maximum pinch retention with a minimum of maintenance, was evaluated under amputee wear conditions. The pinch retention of the hook was checked before putting the hook on the amputee. Maintenance was applied only when the hook malfunctioned as a result of mechanical failure or lack of lubrication.
T.

16,343
Gaarder, K. RELATING A COMPONENT OF PHYSIOLOGICAL NYSTAGMUS TO VISUAL DISPLAY. Science, Aug. 1960, 132(3425), 471-472. (Dept. of Psychiatry, University of California School of Medicine, Los Angeles, Calif. & Langley Porter Neuropsychiatric Institute, California Department of Mental Hygiene. San Francisco, Calif.).

16,343
This study was interested in investigating the hypothesis that if the position of the stimulus within the visual display were changed then the saccadic component of the fine eye movements would change. The fixation eye movements of a subject were measured photoelectrically from light reflected by a small mirror mounted on a contact lens worn by the subject. The horizontal and vertical components of the eye movements were recorded under four conditions consisting of a visual stimulus in one of four visual quadrants. Five runs were taken for each quadrant. The results obtained were discussed and interpreted in terms of other studies in the area.
I. R 9

16,344
Selfridge, O.G. & Neisser, U. PATTERN RECOGNITION. Sci. Amer., Aug. 1960, 203(2), 60-68.

16,344
The authors point out that despite impressive accomplishments, computers still are unable to perceive. Recent progress toward enabling machines to recognize meaningful patterns such as letters is presented in this paper. Two examples of mechanical recognition of patterns are discussed and illustrated: the Morse Automatic Decoder and a more complicated program concerned with recognition of hand-printed letters of the alphabet.
T. G. I.

16,345
Kryter, K.D. HUMAN ENGINEERING PRINCIPLES FOR THE DESIGN OF SPEECH COMMUNICATION SYSTEMS. Contract AF 19(604) 4061, AFCCDD TR 60 27, Aug. 1960, 19pp. Bolt Beranek and Newman, Inc., Cambridge, Mass.

16,345
The project reported here attempts to reduce research data in the area of speech and hearing to a form that will be useful in the design of communications equipment, particularly equipment to be used in the military where noise and design restrictions are large factors. The basic model of the Articulation Index is examined to find its limitations. The results of a number of experiments are examined in order to determine what modifications would give a general and useful method of prediction of speech intelligibility under extreme conditions of noise and distortion stresses. New graphs and worksheets for the calculation of the Articulation Index are presented where necessary to simplify calculations.
G. R 8

16,346
Hyman, A. AN APPARATUS FOR DETERMINING CRITICAL FUSION FREQUENCIES AND OTHER PSYCHOPHYSICAL FUNCTIONS IN VISION. Proj. 7184, Task 71580, WADD TN 60 129, March 1960, 8pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,346
An apparatus suitable for studying the critical fusion frequencies of periodic visual stimuli is described. With minor modifications in its design, it may also be used for investigating other visual functions. The apparatus permits independent control of both target and surround for a number of stimulus dimensions. The Maxwellian view is used in the optical system and provides a maximum retinal illuminance of approximately 10^7 trolands.
I.

16,347
Gael, S. & Stackfleth, E.D. A DATA REDUCTION TECHNIQUE APPLIED TO THE DEVELOPMENT OF QUALITATIVE PERSONNEL REQUIREMENTS INFORMATION (QPRI) THE KEYSORT CARD SYSTEM. Proj. 7190, Task 71623, WADD TN 60 133, May 1960, 9pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

16,347
The feasibility of adapting the McBee Automatic Keysort System to Qualitative Personnel Requirements Information development was investigated using an existing Task Equipment Analysis to prepare a test model. Descriptive task statements were written on each card and the following variables were coded and entered on the cards: location, task newness, ground support equipment, skill and knowledge, criticality, task, segment, and position. Various types of analyses were then attempted and the merits of the procedure are discussed.
T. I.

16,348
Comfort, Elizabeth. EFFECTIVE DEAD SPACE IN THE MA-3 HELMET. Proj. 6336, Task 63625, WADD TR 60 362, May 1960, 4pp. USAF Aerospace Medical Division, Wright-Patterson AFB, Ohio.

16,348
The respiratory response of a group of 28 subjects wearing the MA-3 full-head helmet was compared with the response to known dead space volumes. Comparison of these data was made to determine the average effective dead space or volume of rebreathed air when the MA-3 helmet was supplied with oxygen at three to four inches of water positive pressure from a standard pressure suit regulator. The concentration of carbon dioxide was calculated. The value of the technique for evaluating the extent of rebreathing with other altitude helmets is discussed.
G. I. R 3

16,349
Chang, S.S.L. INFORMATION FLOW CRITERIA FOR FEEDBACK CONTROL SYSTEMS. AFOSR TN 59 1328 & Tech. Rep. 400 8, Jan. 1960, 31pp. New York University, New York, N.Y.

16,349
Information capacity in Shannon's sense is suggested as an additional criterion for the control systems and components. This criterion applies equally well to linear and nonlinear systems and enables the designer to determine the tolerable amounts of small signal nonlinearities in components. Equations are derived for calculating required system capacity from given signal properties and allowed error, loss of information rate in system components, required capacities of system components, and calculation of information capacities from the charateristics of system components with either direct or indirect limiting.
G. I. R 5

16,350
Clark, D.L. DETECTION OF SIGNALS IN NON-GAUSSIAN NOISE. Group Rep. 47.36, Dec. 1959, 16pp. Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, Mass.

16,350
This paper considers the problem of detecting signals in highly complicated noise. On the basis of the assumption that the effects of non-Gaussian amplitude densities can be considered separately from the effects of complicated spectral densities, a simple model is introduced that is capable of generating a family of non-Gaussian amplitude density functions with dependence on the spectral density minimized. The model and the parameters by which it is characterized are chosen on an intuitive basis to facilitate calculation of the performance of simple detection schemes and to permit measurement in the laboratory of detectors whose analysis becomes hopelessly involved.
R 6

16,351
Botha, E. A FURTHER APPLICATION OF BEHAVIORAL THEORY TO EXPERIMENTS ON THE ROLE OF PREFERENCE IN PERCEPTION OF SIZE. J. soc. Res., 1957, 51-64. (University of Cape Town, Cape Town, Union of South Africa).

16,351
Certain predictions about behavior and perception, based on the postulate that size perception is a function of specific acquired habits, were tested in experiments with school books, representing liked or disliked subjects, as stimuli. Three different situations were used: 1) free choice, 2) homework, and 3) free time preparation. In both first and third conditions, the Ss were shown, in rapid succession, photographs, of the same size, of a book representing a liked and disliked book; the task was to report the larger of the two. In the second test, one photograph showed a book of invariant size and the second one was varied until the S reported them as identical; questions were asked about homework practices. Mothers' and teachers' reports were studied in relation to the findings. T. R 1

16,352
Baker, D.F. TASK PERFORMANCE WITH THE CRL MODEL 8 MASTER-SLAVE MANIPULATOR AS A FUNCTION OF OBJECT SIZE, ANGLE, AND HEIGHT OF DISPLAY. Proj. 7184, Task 71586, WADD TR 60 167, May 1960, 16pp. USAF Aerospace Medical Division, Wright-Patterson AFB, Ohio.

16,352
To investigate criteria for design of equipment to be handled and tasks to be performed with remote-handling equipment, a CRL Model 8 Master-Slave Manipulator was used for a performance task in which Ss removed hexagonal nuts from a display panel. Three variables were studied: size of nut (diameter), height, and angle of display. Task performance times were analyzed in relation to joint range limitations of shoulder, elbow, forearm, and wrist movements.
T. G. I. R 13

16,353
Bradley, J.V. STUDIES IN RESEARCH METHODOLOGY: II. CONSEQUENCES OF VIOLATING PARAMETRIC ASSUMPTIONS - FACT AND FALLACY. Proj. 7184, Task 71581, WADC TR 58 574 (II), Sept. 1959, 33pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,353
"Methods of investigating the effects of assumption-violation are examined. Particular attention is given to methodological and other bias operating in favor of the conclusion that parametric tests are extremely insensitive to violations of theoretical assumptions. Fallacious arguments advanced in support of this conclusion are discussed. Using a new method, the effect of non-normality upon the probability levels and power of the critical ratio test is investigated."
T. G. R 81

16,354
Black, J.W. VOICE COMMUNICATION STUDIES FINAL REPORT. Contract N6ONR 22525, Rep. 398, Sept. 1959, 15pp. Ohio State University Research Foundation, Columbus, Ohio.

16,354
This report brings together the titles of technical reports (listed in chronological order), names of research personnel, and topics of emphasis for research in voice communications conducted by the Ohio State University Research Foundation over a ten-year period, 1949-1959. The reports are related to seven topics as follows: voice intelligibility, dimensions of voice, problems in listening, hearing oneself (sidetone), the language of voice communication, problems in hearing, and the evaluation of equipment.
R 99

16,355
Atkinson, R.C. THE USE OF MODELS IN EXPERIMENTAL PSYCHOLOGY. Contract NONR 225(17) (NR 171 034), Tech. Rep. 28, May 1960, 14pp. Institute for Mathematical Studies in Social Sciences, Stanford University, Stanford, Calif.

16,355

This paper describes a model of behavior and illustrates the method of application to a complex problem of decision-making. The purpose is to describe the role of mathematical models in "determining programs of psychological research and specifying the types of empirical observations to be made." The axioms presented describe learning in a situation in which the S's task is to win a fixed amount of money as frequently as possible. Variables include 1) strategy by which experimenter made available certain subsets of responses on any trial, 2) schedule by which experimenter determined whether a particular response led to win or loss, and 3) amount of money won or lost on each trial.
T. I. R 9

16,356

Armsby, D.H. & Cook, K.G. DESIGN STANDARDS FOR MAN-MACHINE TASKS IN SIGNAL CORPS SYSTEMS. Contract DA 36 039 SC 78328, Proj. 3 99 00 110, Dec. 1959, 51pp. Applied Psychology Corporation, Arlington, Va.

16,356

This study is concerned with the development of a method whereby the human functions (particularly in non-routine tasks) in man-machine systems can be classified and analyzed. Attempts to derive basic processes through classificatory methods and/or models utilizing concepts from a single theoretical framework are discussed in the first portion of the report. A model utilizing concepts from the theories of symbolic functioning and information was constructed and examined in terms of its ability to specify the demands made upon man in any man-machine system. The next steps in this research study are delineated.
T. I. R 1

16,357

Dunlap and Associates, Inc. HUMAN FACTORS REVIEW OF RADIO SET AN/GRC 53 FINAL REPORT. Contract DA 36 039 SC 73253, Proj. 3 99 00 100, Task 17B, Sept. 1959, 6pp. Dunlap and Associates, Inc., Stamford, Conn.

16,357

The Radio Set AN/GRC-53() is reviewed in terms of the human factors involved in the control panels of the Radio Transmitter T-682()/GRC, the Radio Receiver R-880()/GRC, and the Electrical Filter Assembly F-399()/GRC. General comments are made about the design of these items in relation to their operational aspects and suggestions are made for minor modifications of the present design and more radical changes for future models.

16,358

Glanzer, M. CODING AND USE OF INFORMATION IN PROBLEM-SOLVING. PROGRESS REPORT. Contract DA 49 007 MD 1004, Jan. 1960, 4pp. University of Maryland, College Park, Md.

16,358

This brief report summarizes work begun on the analysis of performance in complex problem-solving (concept formation) when this is regarded as an information-processing system. A series of preliminary tests and a series of seven experiments are reported. Experiments are concerned with analyzing out important aspects of the information-processing sequence; effect of rate of presentation information reduction rate and techniques for handling the information; clarifying the mechanics of information reduction, especially what led to redundancy, in successive presentations; techniques for handling positive and negative instances of a concept; and determining the role of informational variables in "set."
R 2

16,359

Wissler, E.H. THE MATHEMATICAL ANALYSIS OF HEAT TRANSFER AND TEMPERATURE RELATIONS IN THE HUMAN BODY. PROGRESS REPORT NO. 1 1 MARCH 1959 - 15 DECEMBER 1959. Contract DA 49 007 MD 2005, Rep. 3, Dec. 1959, 7pp. University of Texas, Austin, Tex.

16,359

Two mathematical models having many of the characteristic properties of the human thermal system have been developed. One of the models is used for making steady state calculations, the other for transient state calculations. The models are described briefly in expository form in this report. The equations for both models have been coded for the IBM 650 computer to facilitate calculations. Computed results have been compared with experimental data reported in the literature.
I 7

16,360

Tonndorf, J. SHEARING MOTION IN SCALA MEDIA OF COCHLEAR MODELS. Rep. 60 41, April 1960, 10pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (University Hospitals, Iowa City, Iowa).

16,360

The occurrence of shearing motion within the cochlear duct, together with the fact that it is this mode of motion which constitutes the adequate stimulus for hair cells, was first reported by Bekesy in 1953. Two modes of shearing motion were reported: 1) radial, directed in the region proximal to the place of maximal amplitude of the traveling wave patterns; and 2) longitudinal, directed distal to that point. This phenomenon was studied in cochlear models in an attempt to find an explanation for the origin of the two different modes of motion and to compare the envelope over the traveling waves with those over the two modes of shearing motion.
G. I. R 14

16,361

Rahn, H. STUDIES IN PULMONARY PHYSIOLOGY CHEMISTRY, MECHANICS, AND CIRCULATION OF THE LUNG. Contract AF 33(616) 5606, Proj. 7163, Task 71819, WADD TR 60 1, April 1960, 160pp. USAF Aerospace Medical Division, Wright-Patterson AFB, Ohio. (School of Medicine, University of Buffalo, Buffalo, N.Y.).

16,361

The scientific papers compiled in this report on various aspects of pulmonary gas exchange have been divided into the following groups: cardiovascular-pulmonary reactions to pressure breathing, carbon-dioxide stores of the body, gas tension in tissues and biological fluids, alveolar-arterial oxygen difference and theoretical considerations of pulmonary ventilation, perfusion, and diffusion.
T. G. I. R 20

16,362

Raven, B.H. A BIBLIOGRAPHY OF PUBLICATIONS RELATING TO THE SMALL GROUP. Contract NONR 233(54) (NR 171 350), Tech. Rep. 1, Nov. 1959, 128pp. Department of Psychology, University of California, Los Angeles, Calif.

16,362

The bibliography presented here was taken from a bibliographic card system developed by the author to maintain coverage of literature in this area. A punch-card coding system was developed to handle the material and was described in the appendix. The bibliography was presented in alphabetical order followed by an index based on the punched card system used.
R 1451

16,363

Plant, Jane A LOOK AT HUMAN ENGINEERING IN THE SOVIET UNION. Ca. 1959, 21pp. Douglas Aircraft Co., Inc., El Segundo, Calif.

16,363

The author examined some 13 issues of a Russian Journal of Military Aviation published in 1957-1958. Inferences were made concerning Soviet policies and attitudes toward human engineering. Two tentative conclusions were drawn: 1) the Russians seem to place far greater emphasis on the contribution to air safety of the role of thorough, disciplined training than to engineering of the aircraft itself; and 2) the Russians probably are, in fact, directing considerable attention to the relationships between men and the machines with which they work.
R 37

16,364
Paul, L.E. THE CONSTRUCTION OF INTERVAL SCALES FOR MEASURING THE ACCEPTABILITY OF CLOTHING AND EQUIPMENT IN FIELD TESTS. Proj. 07 98 05 001(7), FEA MRS 5901, MRS 58 7J, Tech. Rep. R 4, Jan. 1960, 59pp. USA Quartermaster Field Evaluation Agency, Fort Lee, Va.

16,364

A study was conducted to establish valid and reliable rating scales for Army clothing and equipment that would be simple to administer, easy to score, and would conform to psychological and statistical principles enabling the exact determination of test subject responses. An attempt was also made to determine whether or not attitude towards the Army plays an important role in the rating of items. Five different types of rating scales (nine-point specific, nine-point general, six-point specific, and six-point general) were constructed to evaluate the clothing and equipment characteristics of comfort, protection, durability, fit, and over-all acceptability. The scales were evaluated by having a large number of soldiers use them to rate various items.
T. G. I. R 6

16,365
Miller, I., Simon, G.B. & Cohen, E. A DEVICE AND TESTS FOR MEASURING INTELLECTUAL FUNCTIONS DURING ACCELERATION. Contract AF 33(616) 6467, Proj. 7222, Task 71746, WADD TR 60 366, May 1960, 43pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio. (General Precision, Inc., Binghamton, N.Y.).

16,365

In manned space flights a vehicle operator will be expected to perform control functions or act as a systems monitor under high levels of acceleration. To determine the extent to which man's intellectual functions might be impaired under high g, a device was designed for use with the human centrifuge. This device, the Link Intellectual Functions Tester, can be operated up to 14 g; it features automatic scoring, tabulation of responses, and automatic pacing of stimulus presentation. Three test batteries of 14 one-minute tests were used to evaluate verbal, reasoning, mathematical, and perceptual abilities Reliability data were gathered from three administrations of the tests when no accelerative stress was present. Further testing and refinement are recommended.
T. I. R 28

16,366
Michel, E.L. SPD-21 PARTIAL PRESSURE SUIT HELMET, CO_2 REBREATHING PERCENTAGES: REQUEST FOR TEST OF. Proj. TED NAM AE 51150, Rep. NAMC ACEL 436, June 1960, 11pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,366

An investigation was conducted to determine the effect that mask inlet pressures of 1-2 and 3-4 inches of water have on reducing the physiologically effective dead air space in the SPD-21 partial pressure suit helmet. Measurements were made of carbon dioxide concentration, tidal volume, exhaled volume, and respiratory frequency. Subjective reports on breathing comfort were made. The levels of mask pressure were then studied in terms of maintenance of physiologically acceptable values as well as comfort.
G. R 20

16,367
Leffingwell, T.P., Melville, G.S., Jr. & Hartwig, Q.L. THE EFFECT OF ACUTE DOSES OF NUCLEAR RADIATIONS ON THE PERIPHERAL BLOOD PICTURE OF THE MONKEY (MACACA MULATTA). Rep. 60 43, April 1960, 12pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,367

Male Macaca mulatta monkeys were exposed to three different doses of combined neutron and gamma radiations (410, 462, and 520 rads) which derived from an uncontrolled nuclear reaction. Hematologic changes were followed in these animals. Through comparison with control animals changes in the peripheral blood picture which could be attributed solely to the effects of ionizing radiations to the one percent confidence limit were established. The effects were qualitatively compared with those which result from the acute exposure of monkeys to x-rays.
T. G. R 19

16,368
Kopra, L.L., Fullington, R.W. & Strickland, L.E. RELATIONSHIP BETWEEN ALTERNATE BINAURAL BIFREQUENCY LOUDNESS-BALANCE TEST AND THRESHOLD TONE-DECAY TEST RESPONSES IN NORMAL AND SUBNORMAL EARS. Rep. 60 19, April 1960, 12pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (University of Texas, Austin, Tex.).

16,368

To investigate the relationship between a direct test of recruitment and the threshold tone-decay test, the alternate binaural bifrequency loudness-balance test (500 cps versus 4000 cps) and the threshold tone-decay test were administered to 20 male subjects with bilateral normal hearing and to 14 subjects with significant bilateral high-frequency sensori-neural loss. Comparisons and relationships between responses to the two tests among normal and subnormal hearing individuals are discussed and summarized.
T. G. R 12

16,369
Kasparek, Catherine F. (Ed.) CATALOG OF TRANSLATED MATERIAL IN SPACE PERCEPTION (REVISED). Proj. MR005.13 6001, Subtask 1, Rep. 51, April 1960, 69pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

16,369

This is a revised catalog of bibliographic materials in the area of proprioception, vestibular function, and vision which have been translated from foreign languages. It is arranged in author-alphabetical form. Instructions for obtaining copies of the articles from the Library of Congress, in Washington, D.C., are included.
R 501

16,370
Kelley, C.R., Bowen, H.M., DeGroot, Sybil G., Frank, P., et al. RELATIVE MOTION II: THE NATURE OF RELATIVE MOTION SITUATIONS. Contract N61339 316, Tech. Rep. NAVTRADEV CEN 316 1, Nov. 1959, 107pp. USN Training Device Center, Port Washington, N.Y. (Dunlap and Associates, Inc., Stamford, Conn.).

16,370

This study was undertaken to broaden our knowledge of the nature of relative motion situations from physical-mathematical and psychological standpoints. Relative motion was defined as the change in the relative position of two moving objects which can be perceived or understood in terms of more than one frame of reference. The psycho-perceptual and mathematical aspects of relative motion were delineated and systematized yielding guidelines for selecting a suitable frame of reference for operator tasks. One experiment was carried out to determine whether the shape of an aircraft contributes to the accuracy with which its motion is observed in a relative motion situation. Recommendations are included.
T. G. I. R 36

16,371
Jerger, J.F. & Harford, E.R. THE ALTERNATE AND SIMULTANEOUS BINAURAL BALANCING OF PURE TONES. Rep. 60 30, Jan. 1960, 12pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Northwestern University, Evanston, Ill.).

16,371
The interaural intensity relations producing equal loudness when pure tones were presented alternately and median-plane-localization when they were presented simultaneously to the two ears were studied in normals, monaurally masked normals, and patients with unilateral sensorineural hearing loss, both with and without loudness recruitment. The data were analyzed with reference to similarities and differences in the two types of judgment. The significance of the findings for clinical practices in measuring loudness recruitment is discussed.
G. I. R 18

16,373
Hyman, A. POTENTIAL USES OF ALTERNATE BINOCULAR PRESENTATION IN STUDIES OF VISION AND AS AN INDICATOR OF PHYSIOLOGICAL STRESS. Proj. 7183, Task 71617, WADD TR 60 302, March 1960, 11pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,373
Depth perception under conditions of alternate stimulation of the eyes (stereofusion) has been found to change under conditions of physiological stress. The present author suggests that stereofusion may be an effective means for uncovering depressed neurological states and for indicating physiological stress. An experiment with critical stereofusion frequency (CSF) is presented. The question whether nondisparate binocular stimuli presented periodically would also result in apparent object movement and could provide a measure of eye-movement latency was also discussed. Relevance for these possible measures of physiological stress to space age problems and suggestions for further research are also included.
R 14

16,374
Holland, H.H., Jr. MUZZLE BLAST MEASUREMENTS ON HOWITZER, 105mm, M2A2E2 WITH MUZZLE BRAKE NO. 8. Proj. TB1 1000, Tech. Memo. 12 60, Aug. 1960, 26pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

16,374
As part of a continuing concern with weapons that subject army personnel to harmful blast effects, measurements of muzzle blast in the crew area of the 105 mm Howitzer, M2A2E2, with Muzzle Brake No. 8, were made to determine the peak overpressures produced. Measures of positive impulse and duration of positive phase were also made. The howitzer was fired at elevations of one degree-14 minutes, 35 degrees-0 minutes, and 70 degrees-0 minutes with two propelling charges: Charge Zone Number 10 (7.22 ounces of T34 and 3.75 lbs. of M17) and 115 percent of maximum rated pressure (7.22 ounces of T34 and 4.00 lbs. of M17). Measured over pressures were discussed in relation to hearing and recommendations were made for hearing protection.
T. G. I. R 5

16,375
Hill, J.H. THE EFFECT OF OXYGEN DEPRIVATION ON THE X-WAVE AND B-WAVE OF THE HUMAN ELECTRORETINOGRAM. Proj. NADC MA 6008, Task MR005.13 6002.1, Rep. 13, March 1960, 72pp. Aviation Medical Acceleration Lab., Johnsville, Penn.

16,375
To determine the effects of oxygen deprivation on the X-wave and the B-wave of the human ERG, two male subjects were studied. The ERGs were elicited by ten-second bursts of four-per-second flashes or three-second bursts of twenty-per-second flashes of dark red, light red, green, or blue light at three levels of intensity. A burst of flashes was presented at one-minute intervals while the observer breathed air for 12 minutes, a nine percent oxygen gas mixture for 30 minutes, and then air again for 20 minutes. The amplitude intensity functions of the B-wave and X-wave were analyzed and discussed in relation to visual sensitivity losses estimated from psychophysical data obtained under similar conditions of oxygen deprivation.
T. G. I. R 40

16,376
Henneman, R.H. CONDITIONS INFLUENCING CHOICE BEHAVIOR IN MULTIPLE TASK SITUATIONS SIXTH ANNUAL REPORT (31 JANUARY 1959 - 31 JANUARY 1960). Contract DA 49 007 MD 537, Jan. 1960, 8pp. Psychology Lab., University of Virginia, Charlottesville, Va.

16,376
Research accomplished in the investigation of short-term retention in tasks involving sequentially occurring events led to the concepts of storage load and storage reduction (in human subjects). A second project concerned experimental distinction between two kinds of perceptual response involved in the identification of ambiguous visual form. The effect of variables such as frequency of presentation, degree of distortion, and knowledge of result on subsequent identification of stimuli was investigated. Research in progress, including three experiments of conditions determining short-term retention in sequential tasks and three concerning factors in the perception of ambiguous visual stimuli, was also described.
R 8

16,377
Gustafson, C.E. A METHOD OF ESTIMATING SURFACE COLOR DISCRIMINABILITY FOR CODING TRAINING EQUIPMENT AND PREDICTING LABEL LEGIBILITY. Proj. 1710, Task 71607, WADD TN 60 83, May 1960, 8pp. USAF Aerospace Medical Division, Wright-Patterson AFB, Ohio.

6,377
This paper suggests a method by which designers may .) estimate the relative discriminability of any combina-ions of Federal Standard colors, and b) predict for each ombination of colors the probable percentage of errors in liscrimination that would occur under standard illumina-ion. Specific applications of the method were discussed nd conclusions concerning contrast limitations for opti-al color discriminability and label legibility were given.
. G. I. R 4

16,378
Goldman, D.E. & Von Gierke, H.E. THE EFFECTS OF SHOCK AND VIBRATION ON MAN. Lecture & Review Series 60 3, Jan. 1960, 198pp. USN Medical Research Institute, Bethesda, Md.

16,378
This review deals with three problems: 1) the determination of the structure and properties of the human body considered as a mechanical as well as a biological system; 2) the effects of shock and vibration forces on this system; and 3) the protection required by the system under various exposure conditions and the means by which this protection is to be achieved. Data from many sources are reviewed and, where possible, presented graphically and in tabular form.
T. G. I. R 111

16,379
Gardner, L.A., Jr. STOCHASTIC APPROXIMATION AND "MINI-MAX" PROBLEMS. Tech. Rep. 219, April 1960, 39pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

16,379
Feedback techniques are studied which automatically adjust system parameters to achieve an ideal system performance. An adaptive process that makes system parameter adjustments in accordance with responses at current parameter settings is of particular concern here. A stochastic approximation procedure, based on functional iteration and appropriate to operation at the parameter values that minimize the largest possible error in performance, is developed. The concern is with estimating the minimum or maximum of an extreme value function.
G. R 7

16,380
Furchtgott, E. & Friedman, M.P. EFFECT OF HUNGER AND SATIETY ON ODOR SENSITIVITY. Contract DA19 129 QM 844, Proj. 7 84 15 007, Rep. 13 (Final), July 1959, 17pp. USA Quartermaster Food and Container Institute for the Armed Forces, Chicago, Ill. (University of Tennessee, Knoxville, Tenn.).

16,380
To test the effects of hunger on odor and taste sensitivity, a series of experiments was performed in which the amount of practice in making threshold determinations and the control of food intake on test days were varied. Odor and taste thresholds were determined 1) before and after lunch, 2) after a 1150-calorie lunch on one day and on the following day after a fast since a standard breakfast, and 3) following seven practice trials on each of four days after an 1800-calorie lunch and four more days when lunch was withheld; 20 subjects were used. The effect of the experimental treatments on threshold sensitivity was studied by analysis of variance technique.
T. R 14

16,381
Fried, C. A HUMAN FACTORS EVALUATION OF SEVEN DIGITAL READOUT INDICATORS. Proj. TB1 1000, Tech. Memo. 5 60, July 1960, 35pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

16,381
A human factors product evaluation was made on seven representative types of digital readout indicators chosen from display-type indicators (lights, neon tubes, or luminous devices are used to light up a number, project an image, or form a number) and tube-type indicators. (Either glowing cathodes in gas tubes or electron beams in cathode ray or beam power tubes are used to form or indicate a number.) These digital readouts were compared on the basis of reading speed and increase in errors as the time permitted to read the displays was reduced from 2.0 to 0.05 seconds. Rank order of performance of the displays was calculated.
T. G. I. R 6

16,382
Durkee, W.T., Rubinstein, S. & Swenson, W.A. AN ENGINEERING STUDY OF HUMAN RESCUE EQUIPMENT, CAPSULE TYPE. Contract AF 33(600) 29970, Proj. 6067, Task 61586, WADC TR 56 58, Nov. 1959, 180pp. USAF Aeronautical Accessories Lab., Wright-Patterson AFB, Ohio. (Radioplane, Northrop Aircraft, Inc., Van Nuys, Calif.).

16,382
The problem of human rescue by high-performance aircraft was studied to determine the most feasible capsule-type rescue system for installation in current and projected fixed-wing aircraft. Several types of rescue systems were studied and evaluated. The development history of the proposed rescue system is discussed. Preliminary aerodynamic analysis and a dynamic analysis of the proposed system were presented.
T. G. I. R 24

16,383
Goldiamond, I. (Princ. Investigator). BLOCKED SPEECH COMMUNICATION AND DELAYED FEED-BACK: AN EXPERIMENTAL ANALYSIS. Contract AF 19(604) 6127, Tech. Rep. 1, Feb. 1960, 27pp. Southern Illinois University, Carbondale, Ill.

16,383
This paper reported an experimental analysis of the role of delayed auditory feedback in the control of blocked verbal communication (prolongation of sounds, repetition, and arythmias). Blocking was viewed as learned verbal behavior, social in nature, and controlled in part by the audience of which the speaker himself is a part. The investigator made use of operant conditioning procedures to establish under controlled conditions a steady state of the phenomenon being investigated. The effects upon behavior of variables which were systematically introduced were assessed against the steady state. Four chronic stutterers served as Ss.
G.

16,384
Gordon, B.B., Hitt, W.D., Ray, H.W. & Wetherbee, J.K. THE EFFECTS OF SELECTED COUNTERMEASURE AND COUNTER-COUNTERMEASURE TECHNIQUES ON SYSTEM PERFORMANCE. FINAL REPORT. Contract AF 33(616) 3739, Dec. 1959, 54pp. Battelle Memorial Institute, Columbus, Ohio.

16,384
The primary objective of this study was to determine, by a laboratory method, the effects of two types of electronic countermeasures (ECM) (noise and swept-spot jamming) on air-defense-system performance, both with and without the use of an electronic counter-countermeasure (Dicke fix). It was also wished to ascertain the degree of relation among several criteria potentially useful in ascertaining ECM effectiveness, such as the General Mills measure of receiver-sensitivity degradation. By the use of an analog computer, ECM and radar simulation equipment, human subjects, and a digital-computer intercept model, one sub-system within the total air-defense environment was simulated and 15 different experimental conditions studied and evaluated.
T. G. I.

16,385
Gerathewohl, S.J. PSYCHOLOGICAL PROBLEMS OF SELECTION, HOLDING, AND CARE OF SPACE FLIERS. Nov. 1959, 13pp. USA Medical Services, Washington, D.C.

16,385
This paper presents a discussion of psychological requirements for the selection of space fliers based on an evaluation of selection methods used for somewhat similar jobs. For example, the methods used to select combat pilots were studied for their applicability to the present problem. Problems involved in training and management of the holding or waiting period between time of induction and first flight are discussed. The maintenance of interest and motivation in the astronaut, as well as the importance of personal characteristics such as ability to resist social pressures, are also discussed.
R 22

16,386
Gibbs, C.B. SERVICE PROBLEMS OF SIMULATOR DESIGN. RNP 60/966, OES 342, Sept. 1959, 3pp. Operational Efficiency Sub-Committee, RNPRC, London, England. (Applid Psychology Research Unit, MRC, Cambridge, England).

16,386
The problem of simulator design for command link missiles is analyzed. It is argued that the perceptual and not the motor aspects of control are of critical importance in simulation and current projection techniques are examined in the light of this assumption. The mathematical problems and certain other problems of atmosphere and other effects are analyzed. Some recommendations are presented for the proper use of present trainers.

16,387
Hale, J.K. ON THE METHOD OF AVERAGING. Contract AF 49(638) 382, AFOSR TN 60 270, Tech. Rep. 60 13, May 1960, 11pp. RIAS, Baltimore, Md.

16,387
Van der Pol's method of averaging, devised to obtain periodic and almost periodic solutions of quasi-linear systems of differential equations, is discussed. A theorem is stated for a particular case where this method has been justified mathematically and an example is given to illustrate the results.
R 9

16,388
Johnson, G.E., Serrano, J., Jr. & Levy, E.Z. APPLICATION OF SKIN RESISTANCE IN PSYCHOPHYSIOLOGICAL STUDIES. Proj. 7222, Task 71745, WADC TR 59 688, Dec. 1959, 17pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,388
The usefulness of measuring changes in skin resistance as a device to detect the impairment of consciousness in personnel whose work requires maximum alertness was investigated during isolation, in flight, under acceleration, under the influence of drugs, and other conditions. The methodology of measurement and assessment are discussed and both the promise and limitations are pointed out. Necessary studies are indicated which could lead to the use of this method as an operational tool.
G. I. R 8

16,389
Karlin, L. PSYCHOLOGICAL STUDY OF MOTOR SKILLS: PHASE I. Contract N61339 558, Tech. Rep. NAVTRADEVCEN 558 1, July 1960, 44pp. USN Training Device Center, Port Washington, N.Y. (New York University, New York, N.Y.).

16,389
To determine the effects on the learning and retention of a simple motor skill of 1) various types of cue or feedback (visual, auditory, kinesthetic, verbal), 2) combinations of the cues, 3) intermittent presentation of the cues, and 4) preliminary lecture based on 1) and 2), 13 conditions were studied using independent groups of ten subjects each. The task was to turn a crank at a speed (between 88.75 and 111.25 rotations per minute) which would keep the signal off. The time within the tolerance range for 25 learning trials with feedback, ten retention trials without feedback, and ten relearning trials with feedback was analyzed with reference to the various experimental conditions. Implications of the findings for training are discussed.
T. G. I. R 15

16,390
Morris, Ailene. PATTERN TARGET ANALYSIS PART I. A THEORY PART II. A PSYCHOPHYSICAL EXPERIMENT. Contract NOBS 72092, Index No. NS 714 100, SIO Ref. 59 62, Nov. 1959, 29pp. Visibility Lab., Scripps Institution of Oceanography, University of California, San Diego, Calif. (USN Electronics Lab., San Diego, Calif.).

16,390
A psychophysical experiment was conducted 1) to determine the visual detection thresholds for targets of various shapes and internal pattern configurations as observed under various luminance conditions, and 2) to define the effective visual stimulus. The data were analyzed with respect to earlier results from the Tiffany study on target visibility and prediction curves for patterned target visibility were obtained. A theory of pattern target analysis was evolved on the basis of the experimental data and is described in detail.
G. I. R 3

16,391
Morris, Ailene. PREDICTING THE DETECTION RANGE OF A TARGET IN A MOVING FIELD OF VIEW. Contract NOBS 72092, Index No. NS 714 100, SIO Ref. 59 69, Dec. 1959, 20pp. Visibility Lab., Scripps Institution of Oceanography, University of California, San Diego, Calif. (USN Electronics Lab., San Diego, Calif.).

16,391
This paper reviews major references that report experimental data on visual thresholds for static and moving targets. The visibility of a stationary target varying with exposure time is compared to that of a target moving at various angular velocities relative to the observing eye in an effort to determine possible equality in terms of effective stimulus energy. The particular concern is with the prediction of the detection range of a target in a moving field of view from existing data.
R 76

16,392
Minsky, M. & Selfridge, O.G. LEARNING IN RANDOM NETS. Contract AF 19(604) 5200, Rep. 54G 0024, June 1960, 22pp. Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, Mass.

16,392
The authors consider how random nets might achieve several kinds of learning. Models range from simple one-to-one switching nets to recognition of compound stimuli and to optimization with respect to a task. "No plausible and feasible suggestions have been made about how random nets can accomplish real generalization or construct new concepts." A random net can be a useful technique for such tasks as performing correlations or averages among inputs, classifying inputs by assigning connections, or optimizing categorizing by improving connections and weights of connections.
I. R 18

16,393
Nickerson, J.F., Miller, A.W., Jr. & Shyne, N.A. A COMPARISON OF FIVE ARTICULATION TESTS FINAL REPORT. Contract AF 30(602) 1818, RADC TR 60 71, March 1960, 30pp. Electronics Research Lab., Montana State College, Bozeman, Mont.

16,393
A comparison of intelligibility estimates of five different articulation tests that have been used in a number of research laboratories was made in an effort to establish a means for equating intelligibility levels from different experiments. Ten Ss were given the tests (Harvard Sentence, Phonetically Balanced Word Lists, Navy Communication Words, Fairbanks Rhyme Test, and W-22 Word Lists) covering six signal-to-noise ratios two different times. Responses were translated into percent intelligibility and the data analyzed by graphical presentation and analysis of variance to determine variability due to Ss, tests, signal-to-noise ratios, replications, and interactions.
T. G. I. R 5

16,394
Savage, L.J. SUBJECTIVE PROBABILITY AND STATISTICAL PRACTICE. Contract AF 49(638) 391, AFOSR TN 59 1161, Oct. 1959, 45pp. USAF Mathematical Sciences Directorate, Office of Scientific Research, Washington, D.C. (University of Chicago, Chicago, Ill.).

16,394
This is a printed version of a lecture given to a meeting of statistics seminars at the University of London. The author argues that the concept of subjective probability is "capable of suggesting and unifying important advances in statistical practice." The author develops his arguments through defining subjective probability in terms of an idealized person; a discussion of Bayes' theorem and the likelihood-ratio principle as these relate to concepts of significance and confidence level and a discussion of the theory of precise measurement are also included. Illustrative examples are given for each of the above topics. The author believes that ultimately every topic in statistics should be reviewed in light of the concept of subjective probability.
G. R 116

16,395
Sampson, P.B., Coleman, P.D. & Elkin, E.H. *THE FEASIBILITY OF USING THE EYE AS A SOURCE OF CONTROL SIGNALS IN TRACKING.* Contract NONR 494(16), NR 144 122, Dec. 1959, 41pp. Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.

16,395
The idea that eye movements could be made to produce signals that could be used for machine control purposes was considered from the point of view of its feasibility. Topics relevant to the problem included 1) suggestions for applications, 2) techniques for obtaining eye movement signals, 3) tracking characteristics of the eye, and 4) human factors considerations in the design and use of an eye movement control device.
T. R 43

16,396
Sampson, H. BINOCULAR INTERACTION IN SERIAL ADDING. 1960, 18pp. University of Canterbury, Christchurch, New Zealand.

16,396
To investigate differences in speed and accuracy in serial addition problems when Ss worked under three pacing rates, varying periods of stimulus duration, and viewed stimulus material both binocularly and monocularly, 13 Ss worked twice under each condition. Results of analysis of variance of speed and accuracy of performance under the various conditions were presented in tables. Various possible interpretations of interactions which appeared were discussed.
T. R 12

16,397
Sampson, H. & Macneilage, P.F. TEMPORAL INTEGRATION AND THE SERIAL ADDITION PARADIGM. Aust. J. Psychol., 1960, 12(1), 70-88. (University of Canterbury, Christchurch, New Zealand).

16,397
The problem of temporal integration was viewed as being essentially to determine the "rules by which behavior comes to be characterized by 'predetermined orderly sequences of action.'" However results from experiments in this area are diverse and no theoretical formulation appears possible. The authors relate this to lack of an organized body of data relating specifically to temporal integration.
G. I. R 35

16,398
Sampson, H. SERIAL ADDITION AS A FUNCTION OF STIMULUS DURATION AND PACING. Canad. J. Psychol., 1958, 12(3), 179-183. (University of Canterbury, Christchurch, New Zealand).

16,398
Results from previous studies raised questions as to whether some source of disturbance in addition to speed of pacing affected performance in paced serial addition tasks. Two experiments were designed to answer whether the value of longer stimulus durations within pacing intervals is lost 1) if changes in stimulus durations are presented unsystematically while pacing rates are increased systematically and 2) if changes in pacing rates and stimulus duration occur systematically. Twenty Ss participated in two experiments in which a serial addition task was presented under five pacing conditions with nine on-off ratios and when pacing and stimulus durations were varied. Results were discussed as they allow for increased adequacy of account of factors influencing performance under these conditions. T. G. R 4

16,399
Sampson, H. STIMULUS DURATION AND PACED PERFORMANCE. Canad. J. Psychol., 1958, 12(1), 7-12. (Canterbury University College, Christchurch, New Zealand).

16,399
To investigate the role of stimulus duration in paced performance, serial addition performance was studied under these conditions: 1) pacing constant, on-off ratios varied; 2) "on" constant, "off" varied and "off" constant, "on" varied; 3) on-off ratio constant, pacing varied. In the first three experiments, 30 Ss were used. Results were presented in terms of analysis of variance of percents correct under the five experimental conditions. In experiments four and five, in which various pacing intervals were presented randomly, 25 Ss participated. Results of the four experiments were discussed as they relate to the problem of stimulus duration in paced performance as well as problems connected with variable pacing.
T. G. R 4

16,400
Rowen, B. AEROMEDICAL SUPPORT OF THE X-15 PROGRAM. Aug. 1960, 11pp. USAF Flight Test Center, Edwards AFB, Calif.

16,400
Areas of aeromedical support that are intimately associated with the X-15 research aircraft program are identified and discussed. The areas so treated are: 1) personal equipment used by the pilot, the MC-2 full pressure suit and related items; 2) an air-conditioned semitrailer van equipped for communications and pressure suit checkout which is used in preparation for all flights; 3) physiological data program whereby selected physiological parameters are telemetered and also recorded during flight; and 4) escape system development.
I.

16,402
Stave, A.M. HUMAN FACTORS IN DESIGN OF AUTOMATIC PROGRAMMING AND RECORDING FOR TRAINERS (AN/ASG-15-T1 FIRE CONTROL SYSTEM TRAINER). Proj. 1710, WADD TR 60 558, Aug. 1960, 13pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,402
This report describes the Fire Control System Trainer, AN/ASG-15-T1 for B-52 gunners. The Trainer features an automatic recording system and an automatic programming system. The parameters used in recording the student's performance are reaction times, critical target ranges, and a weighted error score displayed in numerical form. The programming is accomplished through the use of motion picture films that control a television presentation to the student; the recording is accomplished through a series of timing devices. The ASG-15 demonstrates the sophistication that can be achieved with relatively simple and inexpensive training equipment.
I. R 1

16,403
White, W.J. VARIATIONS IN ABSOLUTE VISUAL THRESHOLDS DURING ACCELERATION STRESS. Proj. 7222, Task 71712, WADD TR 60 34, April 1960, 14pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio. (Cornell Aeronautical Laboratory, Inc., Cornell University, Buffalo, N.Y.).

16,403
To observe in detail the changes in brightness vision that occur in central and peripheral retina during moderate acceleration, measurements were made of the absolute threshold of foveal (cone) and peripheral (rod) vision within the range of one to four g. One seasoned observer with considerable experience in riding the centrifuge and in making psychophysical judgments was used. Dislocation of the visual function was studied selectively by the use of anti-g suits. The results are discussed in terms of the practicability of using visual thresholds as a quantitative index of accelerative stress.
T. G. I. R 7

16,404
Viterbi, A.J. ON CODED PHASE-COHERENT COMMUNICATIONS. Contract NASW 6, Tech. Rep. 32 25, Aug. 1960, 19pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,404
This report discusses the result of encoding "independent equiprobable binary words or sequences of independent binary digits into sets of binary code words." These words or sequences are transmitted in the presence of additive white Gaussian noise and are detected by correlating them with their replicas at the receiver. Word error probabilities and bit error probabilities are determined, and received information rate and potential channel capacity are computed.
G. I. R 12

16,405
Thompson, G.L. RECENT DEVELOPMENTS ON THE JOB SHOP SCHEDULING PROBLEM. ONR Res. Memo. 69, May 1960, 10pp. Graduate School of Industrial Administration, Carnegie Institute of Technology, Pittsburgh, Penn.

16,405
Current efforts to solve the job shop scheduling problem of large multi-machine factories are reviewed in this paper. After defining the problem, the following methods are discussed and compared: the loading rule, the simulation, the heuristic, the integral linear programming, and the Monte Carlo methods. The two last methods are discussed in most detail.
T. R 9

16,406
Chenzoff, A.P., Flores, I., Crittenden, R.L., Frances, A.S., et al. HUMAN DECISION MAKING AS RELATED TO AIR SURVEILLANCE SYSTEMS. A SURVEY OF LITERATURE AND CURRENT RESEARCH. Contract AF19(604) 6164, Tech. Rep. 1, AFCCDD TR 60 25, DA Rep. 300 1, June 1960, 122pp. Dunlap and Associates, Inc., Stamford, Conn.

16,406
The first of a series, this report presents preliminary results of a critical survey of the literature to evaluate these studies as they relate to decision-making in an air surveillance system. Characteristics of decision-making within this context led the authors to focus attention on studies dealing with uncertainty, utility, and risk philosophy. Literature in the following areas was examined in some detail: mathematical and statistical decision theory, psychological and social factors in decision-making, and simulation and gaming in decision-making. Gaps in knowledge in each area are discussed together with implications for further research. A schematization of the decision-making process is presented. An appendix includes definitions of terms.
I. R 471

16,407
Franklin, G., Shaw, L. & Henry, E. STUDY OF ADAPTIVE AND TIME SHARED CONTROL SYSTEMS. Contract NONR 225(38), NR 049 132, April 1960, 21pp. Stanford Electronics Labs. Stanford University, Stanford, Calif.

16,407
The research reported has been directed toward the solution of two problems arising from the use of a digital controller in an automatic system: 1) adaptive control and 2) time-sharing. One approach to the first problem is to provide a logical design procedure for a controller that adapts by a choice or decision between a small number of alternatives. A short discussion and a few examples of two kinds of two-mode filtering problems are presented. The second problem concerns the design of a digital controller for the simultaneous control of more than one process or plant by sequential attention. Possible control assignment schedules and design methods for given schedules are considered and a number of alternate solutions obtained.
I. R 6

16,408
Follettie, J.F. A PERFORMANCE REQUIREMENT FOR BASIC LAND NAVIGATION. Contract DA 49 106 QM 1, Proj. 096 50 000, Task PATROL 1, Rep. 4, March 1960, 64pp. Human Resources Research Office, George Washington University, Washington, D.C.

16,408
This report presented the rationale and procedures used in treating two fundamental problems of curriculum development for a basic land navigation performance: 1) establishment of critical characteristics of a job, and 2) establishment of an appropriate framework for evaluating training. The main elements of the military problem were the need to improve basic land navigation ability of infantrymen and a restriction on the basic training time to be used for this purpose.
T. I.

16,409
Fry, G.A. & Enoch, J.M. HUMAN ASPECTS OF PHOTOGRAPHIC INTERPRETATION SEVENTH INTERIM TECHNICAL REPORT. Contract AF 30(602) 1580, Proj. 1115, Task 15001, RADC TN 58 298, & OSURF Proj. 696, MCRL T.P. (696) 10 266, Jan. 1958, 36pp. Mapping and Charting Research Lab., Ohio State University Research Foundation, Columbus, Ohio.

16,409
This is a review of work completed from November 1957 to January 1958 on a research program relating the physical characteristics of photographic images to the performance of the photo interpreter. Abstracts of reports concurrently submitted are included along with discussion of the completed simulator program and progress on the ophthalmograph program. A discussion of the problems encountered when the comparative cover technique is employed on aerial photographs which have undergone a line-scan transformation is presented.
G. I. R 7

16,410
Fry, G.A. & Enoch, J.M. HUMAN ASPECTS OF PHOTOGRAPHIC INTERPRETATION SECOND INTERIM TECHNICAL REPORT. Contract AF 30(602) 1580, Proj. 1115, Task 15001, RADC TN 57 152 & OSURF Proj. 696, Oct. 1956, 60pp. Mapping and Charting Research Lab., Ohio State University Research Foundation, Columbus, Ohio.

16,410
This is an interim report on a research program aimed at defining the range of values, from minimal to optimal, of visual performance for each of the various physical photographic parameters. In addition, methods of optimizing viewing conditions of photointerpreters are to be investigated. To date, a simulator and modified ophthalmograph unit have been constructed. Pilot studies have been completed on both instruments and are reported here. The work for the next quarter is outlined.
T. G. I. R 5

16,411
Forbes, A.R. SURVEY OF THE EFFECTS OF BUFFETING AND VIBRATION ON HUMAN BEHAVIOR. FPRC Memo. 105, Aug. 1959, 20pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

16,411
A review of the literature on the effects of flight through turbulent air, with particular reference to the effects of buffeting and vibration on the performance of the aircrew, is presented. The results of the few flight studies which have been conducted are reviewed along with the results of laboratory studies of the effects of sine-wave vibrations on the human organism. Special attention is given to those studies dealing with behavioral aspects of the problem.
R 58

16,412
Goldiamond, I. (Princ. Investigator). THE TEMPORAL DEVELOPMENT OF FLUENT AND BLOCKED SPEECH COMMUNICATION. FINAL REPORT. Contract AF 19(604) 6127, Tech. Reps. 2, 3 & 4, Sept. 1960, 107pp. Southern Illinois University, Carbondale, Ill.

16,412
This report comprised three technical reports: 1) effects of delayed feedback on the temporal development of fluent and blocked speech communication, 2) adaptation to delayed feedback as a function of instruction not to monitor one's own speech, and 3) the distribution of pauses. In the first study four male Ss with a history of stuttering read narrative material 90 minutes a day for eight months; eight normally fluent Ss were run for seven weeks. The second study investigated one of the possible ways an S can revert to normal communication rates in spite of continued delayed feedback of his own speech; two Ss were run daily (90-120 minutes) for 13 days. The third study employed five normal speakers and six stutterers; tape recording as each read a passage printed on three sheets six times. T. G. R 38

16,413
Burns, W. REPORT TO THE ROYAL NAVAL PERSONNEL RESEARCH COMMITTEE ON THE ACTIVITIES OF THE HEARING SUB-COMMITTEE. RNP60/974, He. S. 19, Nov. 1959, 8pp. Hearing Sub-Committee, RNPRC, London, England.

16,413
This report presents a brief review of the main activities of the Hearing Subcommittee and its predecessors followed by a list of its publications. The review covers: 1) auditory problems in Asdic operations, 2) protection in hearing, 3) standards of hearing for naval aircrew, 4) technical aspects of audiometry and documentation, 5) hearing problems related to diving, 6) medical care of hearing protection from high intensity noise, and 7) future work of the Subcommittee.
T. R 44

16,414
Brown, R.H. LUMINANCE REQUIRED OF OPAQUE AND TRANSPARENT CATHODE-RAY-TUBE PHOSPHORS. Projs. NA 433 003 & NE 096 600 2, NRL Rep. 5504, Aug. 1960, 8pp. USN Research Lab., Washington, D.C.

16,414
An analysis of human requirements for target detection was presented in terms of the variation in the incremental luminance of a signal as a function of background luminance. The minimal luminance of a signal for a radar display was derived utilizing assumptions based on state-of-the-art considerations regarding electronic parameters. The theoretical minimal luminance required of the conventional opaque phosphors, with and without circular-polarizing filters, and of the recently developed transparent phosphors were compared with the luminous output currently available. The phosphors and associated conditions providing the most visible signal were indicated.
I. G. R 10

16,415
Cowan, G.E. DEVELOPMENT OF SPECIALTY OUTLINES FOR COLLECTING JOB INFORMATION IN THE RADIO-RADAR SYSTEMS CAREER FIELD. Proj. 7734, Task 17016, WADD TN 60 213, Aug. 1960, 21pp. USAF Personnel Lab., Lackland AFB, Tex.

16,415
This study investigates the feasibility of using an instrument with standard functional work categories to collect occupational information across different specialties of a maintenance career field and at two skill levels. Specialty outlines were developed for the two skill levels for six specialties in the Radio-Radar Systems career field of the Air Force and administered to teams of proficient incumbents. Analysis of variance techniques were applied to estimates of percentage of time spent on each of 13 standard functional work categories. Each team of specialists was interviewed to discuss the content and format of the outline for its specialty. Reliability was established by administering the forms twice.
T. I.

16,416
Crampton, G.H. & Schwam, W.J. EFFECTS OF THE AROUSAL REACTION ON NYSTAGMUS HABITUATION IN CAT. Proj. 6X95 25 001, Task 04, Rep. 434, Aug. 1960, 14pp. USA Medical Research Lab., Fort Knox, Ky.

16,416
The effects of the arousal reaction on the reduction or habituation of nystagmus in the unanesthetized cat repeatedly rotated in darkness were determined. By the use of EEG records and eye-movement records, the relationships between nystagmus and drowsiness, alerting the animals by sounds, and continuous arousal sustained by cutaneous electric shock stimuli were studied.
G. I. R 24

16,417
Tregerman, L., Pericone, C., Maue, E., McBride, W., et al. INSTRUMENTATION OF THE INTEGRATED MAPPING SYSTEM. FOURTH INTERIM TECHNICAL REPORT. Contract DA 44 009ENG 3766, Proj. 8 35 11 540, Rep. SME AA 37, Nov. 1959, 11pp. Fairchild Camera and Instrument Corporation, Syosset, N.Y.

16,417
This interim report covers activity of the fourth quarter year period of a research and development program aimed toward the development of equipment which will obtain from a stereoscopic exercise of profiling several useful output products required in the production of topographic maps. The work of the period covered in this report consists mainly of the design and detailing of a line drop device and the addressing controls; these items are discussed in detail. An outline of the work planned for the next reporting period is presented.
I.

16,418
Askren, W.B. MAN FUNCTIONS IN SPACE FLIGHT. Paper presented to the Panel on Psychology, of the Armed Forces-NRC Committee on Bio-Astronautics, Washington, D.C., Dec. 1959, 10pp. USAF Wright Air Development Division, Wright-Patterson AFB, Ohio.

16,418

Duties typical of those to be assigned to future space crews are described in the form of an activity analysis for a three-man crew on a hypothetical 72-hour moon trip. Major activities are thus shown to be navigation, flight control, energy management, in-flight maintenance, and the like. The duties are further analyzed to determine the criteria that should be used in selecting personnel for a space flight of this type.

16,419

Atkinson, R.C. GENERALIZATION OF STIMULUS SAMPLING THEORY. Contract NONR 225(17) (NR 171 034), Tech. Rep. 29, June 1960, 22pp. Institute for Mathematical Studies in the Social Sciences, Stanford University, Stanford, Calif.

16,419

The purpose of the present paper was to introduce a "natural generalization" of the axioms given by Suppes and Atkinson for stimulus sampling theory. The modification provided a context in which experimental variables such as reward and motivation could be viewed as determiners of behavior. Additionally, the ideas presented in this paper provide an interpretation for experimental results on multiple response problems. The groups of axioms presented and developed deal with 1) conditioning of stimuli, 2) sampling of stimuli, and 3) responses.
T. G. R 4

16,420

Minot, O.N. COUNTING AND OUTLINING OF "TWO-DIMENSIONAL" PATTERNS BY DIGITAL COMPUTER. Contract S R006 09 02, Prob. NEL N5 5, Tech. Memo. 414, June 1960, 25pp. USN Electronics Lab., San Diego, Calif.

16,420

The main features of computer programs developed for counting and outlining of objects by a digital computer are described in this memorandum. The material presented is part of a larger work on automatic recognition or counting of significant two-dimensional objects. The advantages and limitations of the computer in such "visual" interpretive tasks are discussed.
I. R 5

16,421

Oyama, T. JAPANESE STUDIES ON THE SO-CALLED GEOMETRICAL-OPTICAL ILLUSIONS. Psychologia, April 1960, III(1), 7-20. (Hokkaido University, Sapporo, Japan).

16,421

American and European psychologists have not maintained especially an interest in the problem of optical illusions during the past three decades. In contrast, Japanese psychologists have exhibited lively interest. This paper reviews the experimental work which has been done in Japan. Studies reported were concerned with illusions of length and distance (including over- and underestimation of interrupted distance or of distance inserted into larger distance and vertical-horizontal illusions), of angle, direction, straightness and curvature, and of size or area. Five tentative conclusions were made concerning the nature of distortions as these relate to structural characteristics of the figure.
G. I. R 100 (approx.)

16,422

Allen, Patricia S., Bennett, E.M. & Kemler, Dorothy K. FORCED-CHOICE RANKING AS A METHOD FOR EVALUATING PSYCHOPHYSIOLOGICAL FEELINGS ONE OF A SERIES OF REPORTS PERTAINING TO THE EVALUATION OF MAN'S MINIMUM LIFE-SPACE REQUIREMENTS. Contract AF 33(616) 3068, Proj. 7222, Task 71747, WADC TR 58 310, Dec. 1959, 123pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (Bio-Mechanics Lab., Tufts University, Medford, Mass.).

16,422

The importance of adequate seating to personal comfort and hence efficiency of crew members, especially on prolonged flight, led to evaluation of design characteristics. The purpose of the present study was to develop reliable and efficient equipment evaluation techniques. The present investigation was focused on subjective meanings of comfort-discomfort or feeling states as these might relate to such things as boredom, excitement, etc. Multiple forced-choice ranking methods were employed to assess comfort inducing or inhibiting characteristics of aircraft seats. Twenty-four Ss assessed six seats.
T. G. I. R 46

16,423

Danaher, J.W., Eberhard, J.W. & Colman, K.W. PREDICTION OF OPERATOR EFFECTIVENESS IN DYNAMIC AIR TRAFFIC CONTROL SIMULATION (TECHNICAL REPORT). Contract FAA/BRD 27, Proj. N, Rep. 30, Nov. 1959, 110pp. Courtney and Company, Philadelphia, Penn.

16,423

This study was undertaken to develop a program for selecting simulator pilot operators to staff dynamic air traffic control simulators. On the basis of the results of two activity analyses of such systems and supervisor opinions regarding job requirements, operator performance rating scales were developed. The data collected using the scales were combined to form a composite criterion for use in the validation of 13 predictor variables (Civil Service Examination, ten tests comprising the Employee Aptitude Survey, age, and years of education). Validation studies were conducted in two separate operational settings. Operational implications of the findings are discussed.
T. G. I. R 16

16,424

Mullin, A.A. THE PRESENT THEORY OF SWITCHING AND SOME OF ITS FUTURE TRENDS. Contract NONR 1834(21), Proj. NR 049 123, Tech. Rep. 3, July 1960, 27pp. Electrical Engineering Research Lab., University of Illinois, Urbana, Ill.

16,424

This paper is an expository treatment of those mathematical aspects of switching theory that the author believes to be important. A switching circuit is defined as an electric circuit composed only of components each having its electrical property described by being in either one or the other of two different states. The classical theory of switching circuits is treated in two parts: combinational and sequential switching circuits. The stochastic theory is next presented, stochastic being used in the sense of involving statistical procedures concerning fallible switching elements. Trends in algebra, mathematical logic, mathematical analysis, and topology which the author feels will be associated in the future with the theory of switching are indicated along with some applications. I. R 74

16,426

Stern, J.A. PHYSIOLOGICAL STRESS AND FOOD CONSUMPTION. Contract DA19 129 QM 802, Proj. 7 84 15 007, Prog. Rep. 10, Jan. 1960, 10pp. USA Quartermaster Food & Container Institute for the Armed Forces, Chicago, Ill. (Washington University, St. Louis, Mo.).

16,426

This was a preliminary report of an investigation evaluating the effects of 1) group versus individual housing; 2) restricted feeding schedules; and 3) physiological stress on measures of body weight, total gram and caloric intake of standard laboratory feed versus self-selected diet, and water intake. The subjects were 36 male albino rats, divided into three groups: 1) group housed, standard laboratory diet; 2) group housed, self-selection diet; and 3) individually housed, self-selection diet. Some preliminary data were given.
G. R 7

16,427
USN Aviation Safety Center. EJECTION SEAT STUDY. June 1960, 21pp. USN Aviation Safety Center, Norfolk, Va.

16,427
To cope with the problem of low level ejection fatalities, the Navy has instituted a series of major changes in its aircraft ejection escape system. The changes consist of two new systems (the Martin-Baker and the rocket catapult) and modifications to the existing catapult system (a zero-second parachute lanyard and a seat-snubber). Data on these changes are reported in terms of number of ejections, number of ejections below 1000 feet, speed at ejection, injuries sustained, altitude of aircraft at time of ejection, and emergency preceding ejection. Cumulative ejection data for the years 1949-1959 are presented.
T. G. I.

16,428
Pfaffmann, C. THE PLEASURES OF SENSATION. Psychol. Rev., July 1960, 67(4), 253-268. (Brown University, Providence, R.I.).

16,428
The proposition that sensory stimulation per se together with its ensuing central neural events plays a significant role in the motivation as well as the guidance of behavior is presented. Experiments on taste are discussed as a model system to show the relations of gustatory stimulation to the control of consummatory responses and the reinforcement of instrumental behavior. The relations between hedonic processes and afferent nerve discharges, preference behavior, and taste reinforcement are next considered. Finally, the relation between affective sensory processes and discriminative functions is discussed in the light of some speculations on the physiological bases for these two aspects of sensory function and their significance in behavior.
G. I. R 74

16,429
Pfaffmann, C. THE AFFERENT CODE FOR SENSORY QUALITY. Amer. Psychologist, May 1959, 14(5), 226-232. (Brown University, Providence, R.I.).

16,429
This paper reviews some experiments on taste in which the methods of electrophysiology have been used to study the sensory process. Sensation itself is not studied; rather, the investigator "taps in" on the "basis of sensation" by recording and amplifying the nerve impulse traffic in the sensory fibers "en route" to the brain. The general implication of the findings for the theory of afferent coding is discussed.
T. G. I. R 21

16,430
Warburton, G.B., Jr., Lawrence, K.A. & Marks, M.R. SAGE TASK-EQUIPMENT ANALYSIS TRACKING SUPERVISOR TRACK MONITOR TRACK MONITOR SPECIAL. Contract AF 19(604) 5616, AFCRC TN 60 51, PRA Rep. 60 11, April 1960, 32pp. Psychological Research Associates, Inc., Arlington, Va.

16,430
This analysis is concerned with describing the relationship between equipment to be operated and the task of the operator in the positions of Tracking Supervisor, Track Monitor, and Track Monitor Special Team in one sector of the SAGE system. The report consists of systematic descriptions of responses required in given tasks, and of actions needed to effect these responses. Emphasis is placed on the stimulus condition which alerts the operator of need for response. There is also a provision for noting communications. Charts are provided which show for each action the response required, action involved, by whom, feedback, recipient, and remarks about communications which may be needed or used. A glossary of abbreviations and definitions is appended.
I.

16,432
Tanner, W.P., Jr. THE THEORY OF SIGNAL DETECTABILITY AS AN INTERPRETIVE TOOL FOR PSYCHOPHYSICAL DATA. Contract AF 19(604) 2277, Rep. 2659 9 T, AFCCDD TN 60 13, Tech. Memo. 78, May 1960, 27pp. University of Michigan Research Institute, Ann Arbor, Mich.

16,432
This paper was written to "make explicit and clear the philosophy underlying the application of the theory of signal detectability to the study of psychophysics." The theory was examined from the point of view of "determining a set of satisfactory assumptions for the purpose of developing an interpretive tool for use in psychophysical experiments." Two points which have attracted criticism are discussed: the use of the expected value criterion in the model and the use of the efficiency variable dependent upon calculations derived from a particular finite sampling plan. The concept of the ideal observer is illustrated and provides the framework for discussion and elaboration of the above points.
I. R 12

16,433
Ramo-Woolridge Corporation, Los Angeles, Calif. PROCEDURE PLAN HUMAN FACTORS METHODOLOGY. Contract DA 36 039 SC 80078, Proj. 75 0000, USAEPG SIG 902 17, Sept. 1959, 26pp. USA Electronic Proving Ground, Fort Huachuca, Ariz.

16,433
This paper describes the development of operating procedures for an automatic data processing subsystem which consists of 1) an analysis of system requirements and of preliminary man-machine procedures to meet these requirements, and 2) an evaluation of these preliminary procedures in a field test situation. A method was presented for analysis of operator requirements. The field test methodology was described. Problems involved in selection of personnel for programming and for maintenance were discussed briefly.
I.

16,435
Stern, T.S. THE USE OF AUTOMATIC DATA PROCESSING SYSTEMS AND COMMUNICATIONS NETWORKS TO STRENGTHEN REPAIR PARTS CONTROL. Thesis 123, April 1959, 105pp. Industrial College of the Armed Forces, Washington, D.C.

16,435
This paper presents the various problems of repair parts and the control functions closely related to repair parts support to the nation's military forces. The presentation is followed by a description of the automatic data-processing system and communications networks and their application to the problems involved in repair parts control systems. A series of recommendations is included.
I. R 82

16,436
Nowlis, V. METHODS FOR THE OBJECTIVE STUDY OF DRUG EFFECTS ON GROUP FUNCTIONING. Contract NONR 668(12), Proj. NR 171 342, Tech. Rep. 6, Sept. 1959, 36pp. Dept. of Psychology, University of Rochester, Rochester, N.Y.

16,436
The feasibility and potential outcome of drug research on subjects in small face-to-face groups is discussed. Three kinds of questions about the effects of psychoactive drugs on social behavior are presented and some of the methods relevant to each are reviewed: 1) what effects, if any, does a specific drug have upon any or all aspects of observable social behavior? 2) what effects does a drug have upon certain empirical relations in the domain of individual social behavior? and 3) what effects does a drug have upon empirical relations based on group characteristics?
R 91

16,437
Nareff, M.J. PASSENGER PHLEBITIS - A COMPLICATION OF LONG DISTANCE AERIAL TRAVEL. 1959, 14pp. USAF Aerospace Medical Center, Lackland AFB, Tex.

16,437
A series of eight cases of "passenger phlebitis" was presented. All followed long flights in military transport aircraft with varying seat configurations. Pathogenic mechanisms were discussed. The occurrence of previous thrombovenous disease in five of the cases indicated predisposition and the need for caution when these passengers fly. Symptoms that would lead to the suspicion of "passenger phlebitis" were outlined and implications for passenger instructions concerning prolonged immobility in flight were suggested.
T. I. R 8

16,438
Newsom, B.D. & Kimeldorf, D.J. SPECIES DIFFERENCES IN ALTITUDE TOLERANCE FOLLOWING X-IRRADIATION. Proj. NM 62 03 60, USNRDL TR 377, Oct. 1959, 9pp. USN Radiological Defense Lab., San Francisco, Calif.

16,438
The relationship between altitude tolerance and food consumption was investigated in irradiated and non-irradiated animals of several species (rats, rabbits, mice, guinea pigs, and hamsters). Food consumption was measured for three days following a mid-lethal dose of X-irradiation to assess the degree of post-irradiation anorexia. These animals were then exposed to a simulated altitude test along with non-irradiated animals which had been either fed in the same manner as the experimental animals or deprived of food during the three-day period. The mortality produced in four hours was used as the criterion of hypoxic tolerance for each species.
G. R 14

16.439
McLaughlin, J.T. & Marks, M.R. SAGE TASK-EQUIPMENT ANALYSIS AIR SURVEILLANCE OFFICER AIR SURVEILLANCE TECHNICIAN. Contract AF 19(604) 5616, AFCRC TN 60 53, PRA Rep. 60 10, April 1960, 40pp. Psychological Research Associates, Inc., Arlington, Va.

16,439
This report describes the operation of the Air Surveillance Officer-Air Surveillance Technician team in the Boston Air Defense Sector of the SAGE system. The analysis is concerned with delineating the interface between man and machine or, in other words, describing the relationship between the equipment to be operated and the task of the operators. The primary responsibility of this team is to maintain optimum radar coverage.
T.

16,440
Lawrence, K.A., Warburton, G.B., Jr. & Marks, M.R. SAGE TASK-EQUIPMENT ANALYSIS TRACKING OFFICER TRACKING TECHNICIAN. Contract AF 19(604) 5616, AFCCDD TN 60 2, PRA Rep. 60 19, May 1960, 39pp. Psychological Research Associates, Inc., Arlington, Va.

16,440
This report describes the operation of the Tracking Officer-Tracking Technician team in the Boston Air Defense Sector of the SAGE system. The analysis is concerned with delineating the interface between man and machine or, in other terms, describing the relationship between the equipment to be operated and the task of the operators. The primary functions of the team are: 1) maintaining satisfactory tracking status on tracks in the system, 2) keeping total number of tracks within computer capacity, and 3) preventing duplicate manual data inputs. The analysis is focussed on a description of actual job elements involved.
T.

16,441
Lawrence, K.A. & Marks, M.R. SAGE TASK-EQUIPMENT ANALYSIS INITIATION SUPERVISOR TRACK INITIATOR. Contract AF 19(604) 5616, AFCRC TN 60 52, PRA Rep. 60 18, April 1960, 30pp. Psychological Research Associates, Inc., Arlington, Va.

16,441
This report describes the operation of the Initiation Supervisor-Track Initiator team in the Boston Air Defense Sector of the SAGE system. The analysis is concerned with delineating the interface between man and machine or, in other terms, describing the relationship between the equipment to be operated and the task of the operators. The primary mission of the operation studied was that of detection and initiation of tracks or uncorrelated radar data. There is no attempt to describe environmental conditions, nor list physical and psychological traits or skill level needed by job incumbents; the orientation is toward description of elements of job performance.
T.

16,442
Lyman, J. (Proj. Leader). ARM PROSTHESIS RESEARCH OBSERVER PRACTICE HUMAN THERMAL STUDIES HUMAN TRACKING PROGRESS REPORT. Contract V1005M 2075, Contract NONR 233(49), Contract AF 33(616) 5402 & Contract N123 (60530)16361A, Rep. 60 50, June 1960, 21pp. Biotechnology Lab., Dept. of Engineering, University of California, Los Angeles, Calif.

16,442
This paper briefly reports studies in progress in the following areas together with plans for work for the next quarter: 1) studies to establish body control sites for application to externally powered prostheses, 2) physiological measurements of human thermal tolerance, 3) construction of a high transient rate environmental chamber, 4) engineering analysis of biotechnical factors in control systems, 5) selected prostheses application studies, 6) sensory-motor control and feedback investigations, 7) effectiveness of elimination of displayed information with observer practice increase, 8) development of a rationale for psychomotor tests measuring performance decrements in extreme environments, and 9) research on the performance of human operators of tracking instruments.
G. I. R 2

16,443
Lamphiear, D.E. & Birdsall, T.G. APPROXIMATIONS TO THE NONCENTRAL CHI-SQUARE DISTRIBUTIONS WITH APPLICATIONS TO SIGNAL DETECTION MODELS. Contract DA 36 039 SC 78283, Proj. 3 99 04 106, Rep. 2899 16 T, Tech. Rep. 101, May 1960, 20pp. University of Michigan Research Institute, Ann Arbor, Mich.

16,443
Closed form and tabular approximations for the central and noncentral chi-square distribution are reviewed and compared. An approximation suitable for application to signal-detection problems is used to evaluate the efficiency of energy-detecting devices masked by white Gaussian noise for detection of signals and discrimination between signals with slightly different energies.

16,444
Ireson, W.G., Smith, B.E. & Resnikoff, G.J. STATISTICAL TOLERANCE LIMITS. Contract N6ONR 25126 (NR 042 002), Tech. Manual 1, May 1960, 43pp. Applied Mathematics and Statistics Labs., Stanford University, Stanford, Calif. (Dept. of Industrial Engineering, Illinois Institute of Technolgy, Chicago, Ill.).

16,444

This report illustrates the application of a useful statistical technique to the problem of setting specifications to be held in the manufacture of an industrial product. Techniques for directly determining tolerance limits when the characteristic under study is approximately normally distributed are presented; the assumption is not made that the population values are known. Examples of situations to which the techniques are applicable, detailed instructions, and worksheets are provided. The report is addressed to quality control engineers, design engineers, and process engineers whose concern is the end product manufactured rather than the statistical technique used.
T. R 22

16,445
Itek Corporation. OPTICAL IMAGE FORMATION IN TERMS OF ENTROPY TRANSFORMATIONS. FINAL REPORT. Contract AF 49(638) 577, Itek P 163, AFOSR TR 60 63, April 1960, 31pp. Itek Corporation, Waltham, Mass.

16,445

Three important developments associated with problems in image formation optics: the application of communication and information theory to optics, the theory of partial coherence, and the matrix approach to image formation, are shown to be closely related concepts. Results are presented which indicate that change in entropy lose is a function of focal position. The arguments are presented as they relate to the case of quasi-monochromatic illumination.
G. R 19

16,446
Harris, J.L. A POSSIBLE CRITERION FOR VISUAL RECOGNITION THRESHOLDS. Contract NOBS 72092, Index No. NS 714 100, SIO Ref. 59 65, Nov. 1959, 18pp. Visibility Lab., Scripps Institution of Oceanography, University of California, San Diego, Calif.

16,446

A theoretical analysis of the detection and recognition capability of an ideal mosaic detector is described. The relationship between detection and recognition for this idealized mosaic is used to hypothesize a criterion for the threshold of visual recognition. A brief psychophysics experiment was performed as a first test of this hypothesis. The degree of success and the limitations of the test are discussed.
G. I.

16,447
Harvey, O.J. PERSONALITY CORRELATES OF CONCEPTUAL FUNCTIONING AND CHANGE ACROSS SITUATIONS. Contract NONR 1147(07), Tech. Rep. 3, ca. 1958, 30pp. University of Colorado, Boulder, Colo.

16,447

Working from the assumption that once a concept is formed the individual is motivated towards its maintenance, the author performed a series of experiments in which the results of various attempts to alter existing opinions or concepts were related to certain personality correlates. Nine experiments were performed using nine personality measures to study: 1) relative effectiveness of gradual and absolute approaches in changing weak and strong concepts, 2) effects of extreme anchor discrepancies, 3) reciprocal effects of the group and three types of leaders, 4) effect of proximal and remote anchors, 5) relationship of certain personality characteristics to concept shift, 6) displacement reactions to nondirectional criticism from source of power, 7) reaction to negative information about self, etc. T. R 9

16,448
Holland, J. ITERATIVE CIRCUIT COMPUTERS. TECHNICAL REPORT. Contract DA 36 039 SC 78057, Proj. 2794, Rep. 2794 12 T, May 1960, 14pp. University of Michigan Research Institute, Ann Arbor, Mich.

16,448

The paper first discusses an example of a computer, intended as a prototype of a practical computer, having an iterative structure and capable of processing arbitrarily many words of stored data at the same time, each by a different sub-program if desired. Next, a mathematical characterization is given of a broad class of computers satisfying the conditions just stated. Finally, the characterization is related to a program aimed at establishing a theory of adaptive systems by way of the concept of automaton generators.
R 14

16,449
Girard, F. MEDICAL AND HUMAN ENGINEERING ASPECTS OF FLIGHT IN RYAN VTOL AND STOL AIRCRAFT. Rep. 239, May 1959, 19pp. Advisory Group for Aeronautical Research & Development, NATO, Paris, France.

16,449

A short historical outline including brief descriptions of the VTOL (vertical take-off) aircraft which have been constructed and tested by the Ryan Aeronautical Company is given. The major aspects of the principal medical and human factors of these aircraft in hovering and transitional flight are discussed. Principal attention is given to problems of the control system.
T. I. R 5

16,450
Gulliksen, H. & Messick, S. (Eds.). PSYCHOLOGICAL SCALING: THEORY AND APPLICATIONS. Contract NONR 1858 (15), 1959, 210pp. John Wiley & Sons, Inc., New York, N.Y. (Princeton University, Princeton, N.J. & Educational Testing Service, Princeton, N.J.).

16,450

The chapters of this book were originally presented as papers at a conference designed to bring together investigators applying scaling techniques in widely different fields. The conference was organized around the following five general topics: 1) properties of category scales and quantitative estimation scales and their implications for the nature of psychological judgments under varying conditions; 2) problems in psychophysical scaling; 3) discussion of scaling in the context of attitude measurement; 4) choice and the measurement of utility, game theory and decision-making situations; and 5) various aspects of multidimensional scaling.
T. G. R 172

16,451
Folley, J.D., Jr., Fairman, Jean B. & Jones, Edna M. A SURVEY OF THE LITERATURE ON PREDICTION OF AIR FORCE PERSONNEL REQUIREMENTS. Contract AF 33(616) 6427, Proj. 7190, WADD TR 60 493, July 1960, 389pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (American Institute for Research, Pittsburgh, Penn.).

16,451

A survey of methods for predicting personnel requirements for future Air Force weapon systems is presented. Abstracts of 121 unclassified professional documents are included. Emphasis is placed on identifying procedures for deriving personnel requirements information and the supporting rationales. The current state-of-the-art is evaluated and presented with implications for future research requirements. Conclusions are presented in four areas: 1) describing positions, 2) combining work units and tasks into positions, 3) estimating manpower requirements, and 4) determining skill level requirements.
T. R 121

16,452
Flight Safety Foundation Inc. THE PSYCHOLOGIST AS MEMBER OF THE DESIGN TEAM. Human Factors Bull. 60 3H, 1p. Flight Safety Foundation Inc., New York, N.Y.

16,452

The special responsibilities of the psychologist in the design team are discussed under four separate headings: 1) recruitment, selection, and training; 2) human engineering data; 3) physical factors affecting the human operation; and 4) limits of human performance. The psychologist's role as an advisor on human factors is emphasized.
R 1

16,453

Flight Safety Foundation Inc. TIP---DESIGN FOR HUMAN LIMITATIONS. Human Factors Bull. 60 1H, 1p. Flight Safety Foundation Inc., New York, N.Y.

16,453

This tip sheet presents design values for 1) operation of equipment requiring a gripping or contracting force, 2) operation requiring leg strength, and 3) lifting-height operation. The values presented are based on measurements of man's strength capabilities. Other factors that must be considered when deciding what strength value is to be used with equipment are noted.
T. I. R 1

16,454

Fraenkel, A.S. COMPUTER DESIGN USING INDEX ARITHMETIC. Contract NONR 233(52), Rep. 60 52, May 1960, 8pp. Dept. of Engineering, University of California, Los Angeles, Calif.

16,454

This paper considers a number system for computers in which the two numbers entering a multiplication are transformed into indices. These indices are added in their own number system; the sum, when converted back, gives the product. Multiplication is thus replaced by the faster process of addition. Properties of indices corresponding to Mersenne primes are derived to be used to save storage required for conversion of numbers into indices and the reverse process. Limitations of the method are mentioned along with its applicability to certain special-purpose computers.
T. R 9

16,455

Colman, K.W., Wallace, W.H., Danaher, J.W., Clark, W.C., et al. HUMAN FACTORS IN AIR TRAFFIC CONTROL SYSTEMS DESIGN. SUMMARY REPORT PART 2. Contract FAA/BRD 27, Proj. N, Rep. 32, Nov. 1959, 30pp. Courtney and Company, Philadelphia, Penn.

16,455

This report summarizes briefly the tasks performed during the period August 1958 through November 1959 on a research program on human factors in air traffic control systems design. Technical memoranda and reports which give complete details of work accomplished are listed. Major human factors assistance given is discussed under three tasks: 1) development and evaluation of air traffic control systems (program planning and information requirements); 2) design of air traffic control data processing and display systems (Data Processing Central and Automatic Ground/Air/Ground Communication System); 3) simulation of air traffic control systems.
I. R 51

16,457

Abma, J.S., Huffman, Lois L. & Mason, L.J. THE FURTHER DEVELOPMENT AND EVALUATION OF AURAL READING DEVICES FOR THE BLIND. SUMMARY REPORT. Contract V1005 M 1961, June 1959, 75pp. Battelle Memorial Institute, Columbus, Ohio.

16,457

This report gave an account of engineering and evaluation activities on a project undertaking the development of a direct translating aural reader for the blind. Experience in using five prototype devices (optophones) during the years 1957-1958 indicated the desirability of a number of mechanical and electronic modifications which are described in detail. Plans for further developments were discussed. Evaluation activities included the investigation of various training techniques using ten blind subjects. Seven of the subjects were new to the program in September 1958, and three advanced subjects were retained from the previous group. Progress of the two groups was compared. Continuation of the evaluation of the optophone reading devices was recommended.
T. G. I. R 2

16,458

Armour Research Foundation of Illinois Institute of Technology. METHODS OF COMPARISON AND EVALUATION OF COMMUNICATION SYSTEMS TECHNICAL REPORT PHASE I VOLUME I OF II. Contract AF30(602) 2074, ARF Proj. E123, RADC TR 60 97A, March 1960, 147pp. Armour Research Foundation of Illinois Institute of Technology, Chicago, Ill.

16,458

This is the first of a two volume report on development of methods for comparing and evaluating long-range point-to-point communications systems. Basic concepts and definitions are presented. Various types of electromagnetic propagation are discussed in terms of technical characteristics of importance in selection of the propagation mode. Seventeen propagation modes are discussed in terms of the following factors (where sufficient data was available): theory, availability, suitable region of spectrum, topography requirements, range capability, available bandwidths, fading and antenna characteristics.
I. I. R 59

16,459

Baxter, J.R. & Lane, J.C. THE "TEE" VISUAL GLIDEPATH (T.V.G.) AN ALTERNATIVE TYPE OF VISUAL APPROACH AID. Note ARL HE 7, July 1960, 14pp. Aeronautical Research Labs., Australian Defence Scientific Service, Melbourne, Australia.

16,459

The British and the Australian systems for providing visual glidepath information for pilots of aircraft are compared as to relative disadvantages. An alternative aid which has none of the disadvantages of the other two is described. It is called T.V.G. because it provides a symbolic signal in the form of a T when the aircraft deviates from the desired glidepath. A mock-up of the T.V.G. system was built and a number of approaches were made in a preliminary evaluation. Potential advantages and problems of the system are discussed.
I. R 14

16,461

Graybiel, A., Guedry, F.E., Johnson, W. & Kennedy, R. ADAPTATION TO BIZARRE STIMULATION OF THE SEMICIRCULAR CANALS AS INDICATED BY THE OCULOGYRAL ILLUSION. Proj. MR005.13 6001, Subtask 1, Rep. 53, July 1960, 13pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

16,461

The purpose of this experiment was to determine the course of adaptation to the oculogyral illusion and to compare the effects of voluntary head movements with passive whole body movements. Four subjects participated in the 64 experimental runs. Tests were carried out at 5.4 and 10.0 rpm just before commencement of the run and tests at 10.0 rpm were carried out morning and afternoon of the first two days and morning of the last day. Results from the tests were considered to be of potential usefulness to problems in manned satellites should these be rotated to provide an artificial gravitational field.
G. R 16

16,462
Clark, B. & Graybiel, A. HUMAN PERFORMANCE DURING ADAPTATION TO STRESS IN THE PENSACOLA SLOW ROTATION ROOM. Proj. MR005.13 6001, Subtask 1, Rep. 52, May 1960, 25pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

16,462
To investigate the effects of prolonged constant rotation of human subjects, five subjects and one control (who had no vestibular function) were exposed to periods of rotation varying from 1.71 to 10.00 rpm for periods of two days each. Subjects were required to engage in a series of tasks designed both to serve as stressors and to provide performance measures during and immediately following rotation. Tests included body sway, walking, hand dynamometer, card sorting, hand steadiness, and arithmetic problems. Effects of stress on the normal as compared with the control subjects were pointed out, and symptoms reported by subjects in the present study were compared with those reported by subjects in an earlier study.
T. G. I. R 11

16,463
Graybiel, A. & Clark, B. SYMPTOMS RESULTING FROM PROLONGED IMMERSION IN WATER: THE PROBLEM OF ZERO G ASTHENIA. Proj. MR005.15 2001, Subtask 1, Rep. 4, July 1960, 27pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

16,463
The purpose of this study was to develop a technique to simulate the effects of reduced g on the muscular system of human subjects and to make preliminary observations of changes in muscular strength and coordination and in cardiovascular function. Four subjects were kept in tanks for a ten-hour period each day for a two-week period. The following tests were administered at varying times throughout the experiment: Whipple steadiness test, strength of grip, leg ergograph, body sway, treadmill, tilt-table, blood pressure, electrocardiograph, and blood tests. Observations were also made on sleep habits, subjective symptoms, muscular strength, orthostatic hypotension and zero-g asthenia.
T. G. I. R 28

16,464
Wolowicz, C.H., Drake, H.M. & Videan, E.N. SIMULATOR INVESTIGATION OF CONTROLS AND DISPLAY REQUIRED FOR TERMINAL PHASE OF COPLANAR ORBITAL RENDEZVOUS. NASA TN D 511, Oct. 1960, 30pp. National Aeronautics and Space Administration, Washington, D.C.

16,464
A simulator study was made of presentations and control requirements for a manned astrovehicle employed for the interception of artificial satellites during the terminal phase of an orbital rendezvous. Two oscilloscope presentations and one direct-visual-observation presentation and three control modes were investigated. The study was considered in terms of a manned interceptor having a home berth at a manned space station which is in circular orbit 500 miles above the earth. Interceptions were restricted to coplanar conditions.
G. I. R 2

16,465
Mallick, D.L. & Reeder, J.P. FLIGHT EVALUATION OF SEVERAL SPRING FORCE GRADIENTS AND A BOBWEIGHT IN THE CYCLIC-POWER-CONTROL SYSTEM OF A LIGHT HELICOPTER. NASA TN D 537, Oct. 1960, 9pp. National Aeronautics and Space Administration, Washington, D.C.

16,465
A flight evaluation was made of a light helicopter having a power-control system modified to include several feel-spring rates and a bobweight and viscous damper in the longitudinal control system. Evaluation was purely qualitative, made up of the opinions of eight research pilots and four research engineers familiar with stability and control problems. On the basis of the results, the most desirable feel system among those tested was reported.
T. I. R 1

16,466
Bell, C.G., Stevens, K.N., House, A.S., Heinz, J.M., et al. RESEARCH ON SPEECH SYNTHESIS. FINAL REPORT. Contract AF 19(604) 2061, AFCRC TR 60 101, Dec. 1959, 15pp. Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.

16,466
To increase understanding of the speech communication process, the experiments described in this paper sought to discover relations between 1) symbols used to describe language, 2) configurations and acoustic excitations of the vocal tract as functions of time, and 3) properties of the acoustic signals radiated from the vocal tract. The studies reported (largely by citation) were concentrated mostly on experiments with speech synthesizers and on the direct analysis of speech. A large part of the work reported on speech analysis was done with a digital computer. Related research activities were also mentioned.
I. R 53

16,467
Skinner, I.D. THE EFFECT OF LIMITED RESOURCES ON DECISION BEHAVIOR IN TWO-CHOICE SITUATIONS. M.A. Thesis, Aug. 1959, 39pp. University of Texas, Austin, Tex.

16,467
This study was designed to determine whether a relationship exists between the maximum number of trials allowed for a problem and the number of these trials a subject is willing to use for purposes of sampling. Subjects, 108 students run in groups of four, were given decision-making problems of varying length and were faced with the choice of making an early decision with high probability of error or of spending more available time gathering information having fewer trials left to recoup losses. Results were discussed as they related to other studies of decision-making, especially those related to probability learning.
T. G. I. R 16

16,468
Chase, R.A. & Parke, Carol. BIBLIOGRAPHY: STUTTERING. Jan. 1959, 7pp. Communications Lab., Dept. of Biometrics Research, New York State Department of Mental Hygiene, New York, N.Y.

16,468
This bibliography on stuttering includes books and articles from English language periodicals covering a period from 1920 to 1958. Most of the references, however, are from the past 20 years. The arrangement is alphabetical by author.
R 129

16,469
Hartman, B., McKenzie, R.E. & Graveline, D.E. AN EXPLORATORY STUDY OF CHANGES IN PROFICIENCY IN A HYPODYNAMIC ENVIRONMENT. Rep. 60 72, July 1960, 13pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,469

Changes in psychomotor efficiency were measured under conditions of simulated weightlessness (using the body immersion technique) and upon return to the normal one-g state. The experiment lasted six weeks and included a period of adjustment of diet and schedule before a trial run of 50 hours. The foregoing were followed by an experimental period of seven days. Testing continued through a seven-day recovery period. Results were discussed as they relate to prolonged periods of weightlessness, as in space flight and during the period of reentry.
R 4

16,471
Buchanan, A.R., Heim, H.C. & Stilson, D.W. BIOMEDICAL EFFECTS OF EXPOSURE TO ELECTROMAGNETIC RADIATION PART I - ULTRAVIOLET. Contract AF 33(616) 6305, Proj. 7163, Task 71823, WADD TR 60 376, May 1960, 181pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (Physics, Engineering, Chemistry Corporation, Boulder, Colo.).

16,471

This report is presented in two sections. The first is a review of literature pertaining to biomedical effects of exposure. The second includes a discussion on 1) biomedical effects of ultraviolet radiation: effects on proteins, amino acids, hormones, enzymes, and co-enzymes; and 2) behavioral effects of ultraviolet radiation: visibility and hue of such radiation, effects of solar radiation on dark adaptation and visual acuity, effects of ultraviolet radiation on dark adaptation, differential intensity sensitivity, visual acuity, and on the "reactivity" of the organism. Recommendations for further study are included.
G. R 657

16,472
O'Connell, M.H. AIRCRAFT NOISE. Rev. 3 60, June 1960, 29pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,472

This booklet reviews various aspects of aircraft noise and is intended primarily for use by the flight surgeon. Following a general introduction concerned with the manner in which human functions can be affected adversely by noise and the various thresholds involved, these major topics are treated: noises during flight, noise during ground operation, effects of noise, and protection against noise.
G. I. R 25

16,473
Plotnikoff, N., Birzis, Lucy, Mitoma, C., Otis, L., et al. DRUG ENHANCEMENT OF PERFORMANCE. FINAL REPORT. Contract NONR 2993(00), Proj. SU 3024, Sept. 1960, 175pp. Stanford Research Institute, Menlo Park, Calif.

16,473

The long range objective of studies reported here was [illegible] more discriminative tests of the effects of stimulant drugs on changes in performance under stress and fatigue. This final report consisted of a series of summary statements followed by more detailed reports of studies which were part of an integrated interdisciplinary research program which included behavioral psychology, pharmacology, neurophysiology, and neurochemistry. It was suggested that psychological measurement of motivation, emotion, learning, etc., under stress must be delineated and defined with care. Neurophysiological and neurochemical correlates of performance changes should be sought. Pharmacological effects of new stimulants should be evaluated by measuring changes in performance with the above serving as indices. I. R 397

16,474
Bergere, S.P. WORKING BIBLIOGRAPHY PICTORIAL NAVIGATION DISPLAYS. Q 54, M 5773, July 1959, 8pp. Man-Machine Information Center, Washington, D.C.

16,474

This report consists of a list of 70 citations of investigations of various aspects of pictorial navigation displays, published between 1947 and 1959. Unclassified, classified, and confidential reports are included.
R 70

16,475
Chapanis, A. RESEARCH ON TRACKING AT SAAB. Tech. Rep. ONRL 62 60, Sept. 1960, 8pp. USN Office of Naval Research London, England.

16,475

This report presented a detailed abstract of a Swedish study (Lennart Nordström) on the air-to-air missile tracking system of the SAAB-35 (a single-seat supersonic jet fighter). This study was concerned with tracking in one dimension--pitch. The problem was primarily that of quickening the system to compensate for time lags. The amount of quickening to use and the method used for arriving at the optimum were discussed.
G. I. R 5

16,476
Lamb, L.E. (Ed.). THE FIRST INTERNATIONAL SYMPOSIUM ON CARDIOLOGY IN AVIATION. CONDUCTED AT THE SCHOOL OF AVIATION MEDICINE 12-13 NOVEMBER 1959. Nov. 1959, 430pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,476

This symposium was held for the purpose of consolidating, integrating, and evaluating the data that have been collected concerning the cardiovascular system in aviation. Two panel discussions and 22 papers are reported in full. The papers are grouped under the following major topics: 1) aerospace flight and the normal cardiovascular system; 2) cardiovascular techniques; 3) cardiovascular disorders in aircrew personnel; 4) ECG studies (includes Canadian evaluation, prognostic implications of the ECG, and findings on 67,375 US Air Force pilots); 5) limits of cardiovascular normality for flying; and 6) the national program for study of cardiovascular disease.
T. G. I. R 380 (approx.)

16,477
Nehrich, R.B., Jr. & Logan, R.K. MATERIALS RESEARCH IN AND PRACTICAL APPLICATIONS OF ELECTROLUMINESCENCE. PO 06401, NE 09100 (NEL R1 7), Rep. 978, June 1960, 13pp. USN Electronics Lab., San Diego, Calif.

16,477

Research was conducted to determine the best techniques and materials for constructing electroluminescent cells for use in military equipments. Several applications were shown to be feasible, including training aids, visual readouts, and various indicators and displays. Considerable improvements were achieved in fabrication methods, including the use of copper-clad epoxy Fiberglas boards for the substrate layer of the cell.
I.

16,478
Uhlaner, J.E. SYSTEMS RESEARCH--OPPORTUNITY AND CHALLENGE FOR THE MEASUREMENT RESEARCH PSYCHOLOGIST. DA Proj. 2L95 60 001, PRB Tech. Res. Note 108, July 1960, 19pp. USA Personnel Research Branch, Adjutant General's Office, Washington, D.C.

16,478

Systems research was examined from the point of view of the human factors research scientist dealing with military problems. Traditional research approaches to problems in this area were presented briefly. The necessity for research psychologists to think in terms of total system effectiveness instead of primarily in terms of individual performance was pointed out, and possible contributions of the measurement psychologist were pointed out and discussed. A framework was presented for systems research oriented to human factors problems.
I. R 5

16,479
Westheimer, G. MODULATION THRESHOLDS FOR SINUSOIDAL LIGHT DISTRIBUTIONS ON THE RETINA. Proj. 654, Tech. Rep. 7, Oct. 1960, 8pp. Ohio State Universiaty Research Foundation, Columbus, Ohio. (Reprinted from: J. Physiol., 1960, 152, 67-74).

16,479
By a method based on Young's double-slit interference experiment, a retinal light distribution was created in which intensity varied sinusoidally with distance. This pattern was used to modulate a field of uniform retinal illumination with the average remaining constant at 2200 trolands. Monochromatic light of wave length 555μ was used. The minimum depth of modulation required for visibility of fringes was measured at various spatial frequencies (fringes/minute of arc) in three normal observers. The average modulation sensitivity curve was compared to the theoretical contrast transfer function of a perfect optical system like the eye's with a round pupil of two mm diameter. The usefulness of the results for evaluation of the contrast transfer function of the optics of the eye was discussed. G. I. R 7

16,480
Simons, D.G. MANHIGH II. USAF MANNED BALLOON FLIGHT INTO THE STRATOSPHERE. Contract AF 29(600) 808, AFMDC TR 59 28, June 1959, 327pp. USAF Missile Development Center, Holloman AFB, N.M.

16,480
The purpose of the flight described in this voluminous report was to put man and his balloon capsule into conditions equivalent to space flight to study reactions of both. A chronological report of preflight and inflight proceedings is given; the report is profusely illustrated. A running account of the flight is given including the pilot's comments during flight. A series of individual reports included data on ballasting and valving effects, meteorological aspects, cosmic ray monitoring, radiation effects on the pilot, communication and telemetry, nutritional aspects, hemotological experiments, and reports from both the flight surgeon and the tank scientist.
T. G. I. R 51

16,483
USA Arctic Test Board. SERVICE TEST OF MULTILITE SIGHT FOR USE WITH RIFLE, CAL .30, M1. Proj. ATB 3 250, Rep. ATDEV 3 472/64, July 1960, 10pp. USA Arctic Test Board, Fox Greely, Alaska.

16,483
To determine the suitability of the Multilite Sight for use with the M 1 rifle under arctic winter conditions tests were conducted in the field. Improvement in night-firing accuracy obtainable with the sight was established by a series of comparisons with standard rifle sights under various cold and nighttime conditions. Durability was tested under temperatures about -35 degrees F. The effect of the sight on day firing was established by comparison with standard sights. Deficiencies and suggested modifications were tabulated.
I. R 3

16,484
Brody, L. A STUDY OF THE LEARNING OF SELECTED DRIVING SKILLS THROUGH EXPOSURE TO A SPECIALLY PRODUCED MOTION PICTURE FILM. Contract N61339 78, Tech. Rep. NAVTRADEVCEN 78 2, April 1960, 19pp. USN Training Device Center, Port Washington, N.Y. (New York University, New York, N.Y.).

16,484
To determine to what degree a relatively complete and complex skill might be learned by the sole use of an instructional film, four driving skills were investigated: starting the engine; moving the car forward, backward, and stopping; performing a Y turn; and parallel parking. Subjects were 51 male high school students divided into an experimental and control group equated on driving familiarity, intelligence ratings, and grade level. The experimental group was given only film instruction; the control group was given only individual live instruction. A written achievement test and a road-performance test were completed one day after instruction with a follow-up road test one month later. Test scores for the two groups were analyzed for differences attributable to instructional method. T. R 18

16,486
Laboratory for Electronics, Inc. STUDY, DESIGN, AND DEVELOPMENT OF NAVIGATION DISPLAY FOR HELICOPTERS. FINAL REPORT. Contrct AF 33(600) 34034, Oct. 1959, 78pp. Laboratory for Electronics, Inc., Boston, Mass.

16,486
The study, design, and development program summarized in this report had as its prime purpose the over-all improvement in helicopter instrument flight. Three aspects of the program were described: 1) investigation of kind and type of instruments required and wanted by experienced helicopter pilots and of the way in which the instruments should be grouped, 2) investigation of the advantages to be gained by incorporating Doppler radar to improve the guidance displays for the pilot of a manually controlled aircraft, and 3) investigation of a Doppler-controlled automatic-stabilization system using the autopilot.
I. R 14

16,489
Korbel, H. DEVELOPMENT OF A NEW OPTICAL LANDING GUIDE. FINAL REPORT. Proj. 10, Rep. NS 000 001, Dec. 1959, 26pp. USN Material Lab., New York Naval Shipyard, N.Y.

16,489
Optical glidepath indicators, consisting of a light source and a large mirror, both located on the landing field, have proved to be effective in guiding pilots of aircraft during landings. The design, construction, and testing of a louver device which would replace the mirror are described. Among its advantages over the mirror are lower size and weight, lower cost, and greater flexibility in design. As an example of the last, the louver guide may be buried in the center of the runways rather than located to one side. Construction drawings of the Louver Landing Guide are included.
G. I.

16,490
Emanuel, A.F. & Mauch, H.A. THE DEVELOPMENT OF A READING MACHINE FOR THE BLIND. SUMMARY REPORT. Contract V 1005 M 1943, June 1959, 6pp. Mauch Laboratories, Inc., Dayton, Ohio.

16,490
This report described a reading machine development program (for the blind) in which an attempt is bein, made to improve the output of the direct translation type reading machine in order to reduce reading speed limitations and learning difficulties while retaining features of low cost and portability. A mechanical model of the human speech mechanism was built and evaluated in an effort to produce a speech-like output. A further effort was made in this same regard to develop a collection of speech sounds (word fragments) for the construction of artificial words resembling speech. A word synthesizer is being developed which will compose artificial words from the word fragments. Future plans for the solution of scanning problems were discussed.

16,491
Connelly, R.E. EVALUATION OF THE AIR FORCE INTEGRATED FLIGHT INSTRUMENT SYSTEM AND ENGINE PARAMETER INDICATOR. Task 61978(3) & (4), WADC TN 59 414, Dec. 1959, 11pp. USAF Directorate of Flight and All-Weather Testing, Wright-Patterson AFB, Ohio.

16,491
Flight tests were conducted to determine: 1) acceptability of changes incorporated in the production integrated flight instruments (consisting of sensing units, air data computer system, coupler, flight director, and flight instruments) as the result of previous tests; 2) acceptability of the miniaturized air speed and altitude indicators as stand-by instruments for use with the integrated flight instruments; and 3) performance and desirability of the engine parameter indicator. In addition to the above evaluations, 17 specific recommendations were made for development of future weapon systems.
I.

16,492
Godshall, J.C. UNDERWATER-ESCAPE PROGRAM HUMAN EGRESS AND CANOPY FORCE TESTS F4D-1 AND T2V-1 COCKPIT SECTIONS ABOARD A SUBMERGED SUBMARINE. INTERIM REPORT NO. 8. Proj. ADC AE 6307, Rep. NADC ED 5911, June 1959, 32pp. USN Air Development Center, Johnsville, Penn.

16,492
To determine the waterflow effect tending to close the canopy of a sinking aircraft and to investigate the problems encountered during pilot egress, tests were conducted at Key West, Florida, during November 1958. A single-place fighter cockpit (F4D-1) and a two-place trainer cockpit (T2V-1) were secured alternately to the aft deck of a submarine which was used as a research platform. Canopy force tests were conducted in tail down and nose down positions with canopy-removal testing. Human egress tests included both the above positions with canopy open and canopy jettisoned. On the basis of the test results, recommendations were made concerning equipment and escape procedures.
T. G. I. R 7

16,493
Clark, C.C. & Woodling, C.H. CENTRIFUGE SIMULATION OF THE X-15 RESEARCH AIRCRAFT. Proj. NM 11 02 12.4, Task MR005.12 0004.4, Reps. 9 & NADC MA 5916, Dec. 1959, 33pp. USN Air Development Center, Johnsville, Penn. (USN Aviation Medical Acceleration Lab., Johnsville, Penn. & National Aeronautics and Space Administration, Washington, D.C.).

16,493
Three centrifuge simulation studies were made to determine human tolerance to oscillating accelerations of the amplitude and duration which might be expected under conditions of operation of the X-15. In the third program, 51 recording channels were used: 18 to characterize computer aircraft response, including cockpit display; 13 to characterize pilot control motions and his electrocardiogram; 12 to characterize the centrifuge response; and 8 to characterize switch positions. Pilot performance in terms of tolerance of grayout, blackout, physiological and bodily reactions, and sensations were reported. The restraint system and cockpit instruments were described in some detail. A fourth program was contemplated.
G. I. R 17

16,494
Davis, H., Tasaki, I. & Goldstein, R. THE PERIPHERAL ORIGIN OF ACTIVITY, WITH REFERENCE TO THE EAR. Cold Spring Harbor Symposia on Quantitative Biology, 1952, XVII, 143-154. (Central Institute for the Deaf, St. Louis, Mo.).

16,494
To answer the question "How does the movement of a typical segment of the cochlear partition initiate nerve impulses?," the relevant facts concerning the mechanical stimulus, the structure and the known electrical activities of the sense organ, the nerve fibers connected to them, and the nerve impulses generated in these fibers are examined for relationships among these facts. A theory of the action of the ear as a mechano-neural translator is presented and discussed.
I. R 20

16,496
Tufts University. SELECTED REFERENCES IN SYSTEMS RESEARCH. PRELIMINARY DRAFT. Contract NONR 494(13), Dec. 1958, 13pp. Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.

16,496
This is a dittoed list of 194 titles in systems research covering the period 1947-1958.
R 194

16,497
Cohen, A. THE PSYCHOACOUSTIC AND COMFORT PROPERTIES OF HELMET COMMUNICATIONS GEAR. Proj. 7 83 01 007, Tech. Rep. EP 123, Jan. 1960, 23pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

16,497
To compare the sound suppression, speech intelligibility, and comfort properties of the Helmet, Combat Vehicle Crewman's, T56-6 (CVC) containing a standard communications system with an experimental system (Radio Corporation of America "Quiet Ear" Kit), various tests were conducted. First, the sound suppression of helmets fitted with each kit was determined in the laboratory by means of the threshold-shift technique at 12 different frequencies ranging from 250 to 8000 cps. Speech intelligibility and comfort qualities were tested in the field by 24 tank crewmen. After testing both sets of communication gear, each S completed a questionnaire on comfort aspects of the gear.
G. I. R 17

16,498
Crook, M.N. & Wade, E.A. EFFECT OF PERIODIC LUMINANCE REINTENSIFICATION ON THE READING OF VISUAL DISPLAYS. Contract AF 19(604) 4949, OAO TM 60 7, Rep. 1, Aug. 1960, 13pp. Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.

16,498
Two experiments are reported: 1) to determine whether reintensification of a display (e.g., as by a cathode ray sweep) affects the reading of scrambled letters, and 2) to determine whether speed of performance in a form-recognition task would be affected. The apparatus used provided intermittent light at 60 cps and steady light for comparison. Eighteen subjects were used, each tested under conditions of both steady and intermittent light. Mean time and error scores were computed and an analysis of variance done to determine effects of typographical arrangement and lighting conditions or of interactions between the two. Twenty subjects were used in the second experiment in which test forms replaced letters as stimulus material. Results in terms of time scores were analyzed as in Experiment 1. T. I.

16,499
Miller, C.C., Harper, R.B., Turnblade, R.C., Riley, D.E., et al. INVESTIGATION OF MEDIA AND DESIGN OF A CONSOLE FOR REAL-TIME DATA PRESENTATION PHASE I REPORT INVESTIGATION OF DATA PRESENTATION AND SELECTION OF PARAMETERS. Contract AF 04(611)4574, July 1959, 55pp. Federal Telecommunication Laboratories, Nutley, N.J. (ITT Laboratories, San Fernando, Calif.).

16,499

A group of parameters for real-time monitoring of high performance aircraft, sub-orbital, and orbital vehicles was formulated to provide information for flight safety control. Both aircraft and aircrew functionability were considered. A definition and purpose of real-time monitoring were followed by an outline-discussion and definition of flight operation of high performance aircraft, the potential role of real-time monitoring in the operation of such aircraft, console criterion and its application, and parameter selection in terms of malfunctions that could occur in the measurement of complex conditions. The art of data presentation was considered in terms of methods and of taking full advantage of the sensory system of the human. Vehicular and physiological malfunctions were presented. T. R 48

16,501

Bryan, G.L. & Schuster, D.H. AN EXPERIMENTAL COMPARISON OF TROUBLE SHOOTING TRAINING TECHNIQUES. Contract NONR 228(02), Proj. NR 153 093, Tech. Rep. 30, Dec. 1959, 68pp. Dept. of Psychology, University of Southern California, Los Angeles, Calif.

16,501

The purpose of this study was to compare the relative effectiveness of guidance (direction of the students' trouble shooting activities during training) as compared with explanation (justification and clarification of reason for each step). Trainees, each at his own pace, worked on 60 trouble shooting problems under one of the following conditions: 1) no guidance, no explanation; 2) partial guidance, no explanation; 3) complete guidance, no explanation; 4) partial guidance, explanation; or 5) complete guidance, explanation. Ten criterion problems were then administered and performance was compared for students trained under the various conditions. Differences were tested for significance. Implications of results for training of trouble shooters by the U.S. Navy were discussed and a sample problem described. T. I. R 9

16,502

Carlson, L.D. & Buettner, K.J.K. THERMAL STRESS AND PHYSIOLOGICAL STRAIN. Contract AF 18(600) 1467, Proj. 7952 13, AAL TN 57 13, June 1957, 13pp. USAF Arctic Aeromedical Lab., Ladd AFB, Alaska. (Depts. of Physiology and Biophysics, and Meteorology, University of Washington, Seattle, Wash.).

16,502

Major considerations in the evaluation of environmental stress and the resulting physiological strain are discussed. Emphasis is placed upon the fact that these are essential elements common to all investigations of environmental stress, which is defined as the tendency of the environment to cause a change in the individual. Strain is defined as the change in the homeotherm brought about by stress. Items are listed and discussed about which information must be given on environmental stress at various temperatures and for various conditions. The type of data needed for adequate evaluation is considered. Various charts and graphs are included.
G. R 19

16,503

Buchanan, D.A, ACCURACY OF SPEED ESTIMATION BY ESS OPERATORS. Contract AF 19(604) 2635, AFCRC TN 59 67, SDC FN 282, Nov. 1959, 17pp. System Development Corporation, Santa Monica, Calif.

16,503

This study had three purposes: 1) to determine how accurately experienced operators can estimate the speed of SAGE-displayed radar data tracts, 2) to evaluate the use of a Special Experimental Display Generation Program (SEDGE) in obtaining this type of information, and 3) to assess the utility of a specific application of SEDGE in the study of effects of other variables in speed estimation. Airmen Ss (13) were tested on 64 trials. Estimates on speed made by the S were subtracted from true speeds and recorded as error scores. Constant and average errors were compared to obtain relative variability of the scores. Individual differences among operators and possible explanations for low reliability of data were discussed in the context of contribution of the present study to methodology and directions of future studies. T. G.

16,504

Silverman, R.E. THE USE OF CONTEXT CUES IN TEACHING MACHINES. Contract N61339 507, Tech. Rep. NAVTRADEVCEN 507 1, March 1960, 28pp. USN Training Device Center, Port Washington, N.Y. (Dept. of Psychology, New York University, New York, N.Y.).

16,504

Three experiments were performed to examine the effectiveness of context cues as rote learning aids. Experiment I examined whether ancillary background cues affect learning of paired associates. Subjects (120) were paid to learn nine-paired associates, using a teaching machine for the purpose. Experiment II examined whether isolating some stimulus items by masking them would enhance learning (60 Ss). Experiment III examined whether ancillary background cues affect learning of difficult paired associates (48 Ss). Performance (in terms of errors) was compared, and differences were tested for significance. Implications of the findings for design and programming of automated learning devices were pointed out.
T. R 14

16,505

Hsieh, H.C. & Leondes, C.T. ON THE OPTIMUM SYNTHESIS OF SAMPLED DATA MULTIPOLE FILTERS WITH RANDOM AND NONRANDOM INPUTS. Contract AF 49(638) 438, Proj. 9783, AFOSR TN 60 440, Feb. 1960, 42pp. USAF Office of Scientific Research, ARDC, Washington, D.C. (University of California, Los Angeles, Calif.).

16,505

The synthesis of optimum sampled data multipole filter with n inputs and m outputs is considered in this report. The filter is linear, time invariant, and has finite memory. The synthesis procedure involves specifying "the weighting functions of the filter such that system error ...has zero ensemble mean and the system ensemble mean square error is minimum." The system is extended to the "case where each of the nonrandom signals can be expressed as an arbitrary linear combination of a set of known time functions," and to the synthesis of time-varying filter with sampled nonstationary random inputs.
G. I. R 8

16,506

Jacobs, H.L. THE LACK OF BEARING CONTACT AND THE PROBLEM OF WEIGHTLESSNESS: THE EFFECT OF PAST EXPERIENCE ON HUMAN PERFORMANCE ON A FREE-ROTATING, LOW-FRICTION TURNTABLE. Ann. N.Y. Acad. Sci., Sept. 1960, 84(9), 303-328. (Bucknell University, Lewisburg, Penn.).

16,506

To investigate the problem of performance in the absence of bearing contacts (one aspect of weightlessness), a low-friction oil-bearing turntable was developed. Three groups of subjects (liberal arts students, swimmers, and engineering students) were given simple tasks to perform on this turntable. Each subject stood at the center of the turntable axis of rotation with his feet clamped in position. His tasks were: 1) to make one complete turn of the body with turntable stationary at beginning of trial, 2) to stop the turntable and body from rotating and hold it for 30 seconds, and 3) to perform the same tasks with the aid of a bicycle wheel mounted on a steel bar. Observations were made on differences in performance and level of understanding of the tasks among the three groups.
T. G. I. R 18

16,507

Jackson, Margaret M. USAGE RATES OF AIRCRAFT OXYGEN. Proj. 7164, Task 71832, WADD TR 60 106, May 1960, 16pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio.

16,507

An investigation was conducted to evaluate aircrew oxygen requirements for current and future aircraft. A literature review of studies on the rate of oxygen use in flight was made. Data obtained from actual flights, altitude chamber studies, and simulated missions on a jet trainer and F-102 simulator with Ss wearing full-head pressure helmets or oxygen masks were presented and discussed. The basis for establishing aircraft oxygen installation figures was discussed in light of the findings.
T. G. I. R 13

16,508

Kilmer, W.L. SOME METHODS FOR INCREASING THE RELIABILITY OF COMPLEX DIGITAL COMMUNICATION SYSTEMS. Contract AF 30(602) 1915, Proj. 6795 102, Task 1, Rep. TN 59 355, Tech. Rep. 1, March 1959, 24pp. Electronics Research Lab., Montana State College, Bozeman, Mont.

16,508

First in a series of studies on methods and devices for making digital communication systems more reliable, this report contains two main sections. The first part generally concerns the logical problem of how to make digital computer termini of communication systems more reliable and is nothing more than a brief compendium of the most outstanding methods that have been presented in the literature thus far. The second part is an account of a theoretical scheme that has been especially devised to complement the methods referred to in Part I. The principle purpose and value of the scheme are discussed.
R 10

16,509

John I. Thompson & Company, Washington, D.C. INDIVIDUAL ALUMINUM FEEDING CONTAINERS PART I. ENGINEERING EVALUATION PHASE. Contract AF 33(616) 7080, Proj. 6373, Task 63121, WADD TR 60 522(I), Aug. 1960, 19pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

16,509

An evaluation was made of materials and techniques for fabricating a food container to be used in space flight. Requirements were for a six-ounce rectangular aluminum container and associated equipment--a mouthpiece and quick opening, expelling, and hand sealing devices. A comprehensive literature search, supplemented by personal interviews in industry and other interested activities, was made to survey the present state-of-the-art in food canning, container fabrication, and related processes. Recommendations concerning the most promising materials and processes were included with further design study designated for the associated equipment.
I. R 22

16,510

Holcomb, G.A. HUMAN EXPERIMENTS TO DETERMINE HUMAN TOLERANCE TO LANDING IMPACT IN CAPSULE SYSTEMS. Presented to the Fifth Symposium on Ballistic Missile and Space Technology, University of Southern California, Los Angeles, Calif., 31 August, 1960. Aug. 1960, 34pp. Stanley Aviation Corporation, Denver, Colo.

16,510

This discussion concerns the landing impact of a manned, encapsulated structure, incapable of controlled flight, whether it be a part of the original vehicle or an escape device. It is pointed out that present human tolerance to acceleration allowables in their present form are not adequate to guide the designer of landing impact hardware. The reasons for the inadequacy and the various areas of conflicts, ambiguities, and voids in methodology are discussed. Experimental drop data using the B-58 capsule and human subjects are presented. The inadequacies of these data for determining human tolerance allowables are pointed out along with the need for human testing of landing systems.
T. G. I. R 6

16,511

Holcomb, G.A. THE DEVELOPMENT OF AN AUTO-ADJUSTING AND POSITIONING SINGLE DISCONNECT TORSO RESTRAINT HARNESS FOR THE B-58 ESCAPE CAPSULE. Paper presented at 31st Annual Meeting of the Aerospace Medical Assoc., Miami Beach, Fla., May 9-11, 1960, May 1960, 23pp. Stanley Aviation Corporation, Denver, Colo.

16,511

This paper describes the design, development, and testing of a harness for the B-58 escape capsule. The design considerations leading to a harness for the uppertorso and to auto-adjustment and positioning aspects are discussed. Habit ability and comfort studies and dynamic tests are described. Needed research is indicated for new minimum stretch harness materials and a revision of human tolerance allowables for acceleration factors due to the nonwind blast environment of the capsule.
G. I.

16,512

Hays, E.L. & Bosee, R.A. DESIGN CONCEPT OF THE BIO-ASTRONAUTICAL RESEARCH AND TEST FACILITY OF THE AIR CREW EQUIPMENT LABORATORY, NAVAL AIR MATERIAL CENTER, PHILADELPHIA 12, PENN. 1960, 9pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,512

This paper considers the design concept of the Air Crew Equipment Laboratory's Bio-astronautical Research and Test Facility and its capability as a research device. The following performances can be expected from this research device: 1) capability of operating for any protracted period of time with from one to six subjects, 2) capability of maintaining the sealed environment without inboard leakage, and 3) capability of providing volume flexibility so that dynamics of environmental control can be studied. The various problems relating to space and orbital problems which can be studied in the facility are discussed.
I. R 7

16,513

Hanson, J.A. & Anderson, Edythe M.S. STUDIES ON DARK ADAPTATION. VII. EFFECT OF PRE-EXPOSURE COLOR ON FOVEAL DARK ADAPTATION. J. opt. Soc. Amer., Oct. 1960, 50(10), 965-969. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.).

16,513
The effect of pre-exposure color on foveal dark adaptation was investigated. Monocular absolute threshold curves were obtained for two observers with white, red, green, and blue test patches after pre-exposures of white, red, green, and blue. All combinations of test patch and pre-exposure color were measured. Other test conditions were: 1) two sizes of test patch (48 minutes and 2 degrees, 16 minutes); 2) size of pre-exposure field (10 degrees); 3) pre-exposure luminance and duration (100 ft.-L for 100 sec. for smaller patch; 10 ft.-L for 10 sec. for the larger); and 4) duration of test flash (0.033 sec.).
T. G. R 13

16,514
Hanson, J.A., Anderson, Edythe M.S. & Winterberg, R.P. STUDIES ON DARK ADAPTATION. V. EFFECT OF VARIOUS SIZES OF CENTRALLY FIXATED PRE-EXPOSURE FIELDS ON FOVEAL AND PERIPHERAL DARK ADAPTATION. J. opt. Soc. Amer., Sept. 1960, 50(9), 895-899. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass. & Dunlap and Associates, Inc., Santa Monica, Calif.).

16,514
The effect of various sizes of centrally fixated pre-exposures on foveal and peripheral dark adaptation was investigated. Absolute brightness sensitivity was measured monocularly with a one-degree circular test patch. Foveal dark adaptation curves were obtained after pre-exposure to fields subtending 1, 2.5, 5, 10, and 37.5 degrees diameter at three brightnesses (1 ft.-L for 10 sec., 100 ft.-L for 10 sec., and 1,000 ft.-L for 100 sec.). Peripheral dark adaptation curves were obtained for three sizes of pre-exposure fields at 2, 6, and 15 degrees on the horizontal meridian of the temporal retina for two brightnesses (0.1 ft.-L for 10 sec. and 10 ft.-L for 10 sec.).
G. R 7

16,515
Hanson, J.A., Anderson, Edythe M.S. & Winterberg, R.P. STUDIES ON DARK ADAPTATION. VI. EFFECTS ON FOVEAL DARK ADAPTATION OF SERIES OF ALTERNATING LIGHT AND DARK PERIODS. J. opt. Soc. Amer., Sept. 1960, 50(9), 900-902. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass. & Dunlap and Associates, Inc., Santa Monica, Calif.).

16,515
The effects of series of alternating light and dark periods on foveal dark adaptation were investigated. Absolute brightness thresholds were measured monocularly on two observers. The test patch, subtending one-degree diameter, and the pre-exposure, subtending 375 degrees, were centrally fixated. Foveal dark adaptation curves were obtained after 1, 10, and 25 presentations of five different light and dark period combinations. Light periods varied in brightness from 0.1 to 1.0 ft.-L lasting from 1 to 10 sec.; dark periods varied in duration from 0 to 25 sec. Duration of the dark period necessary to avoid cumulative effects of successive bright periods was discussed.
G. R 2

16,516
Hanson, J.A., Wulfeck, J.W. & Anderson, Edythe M.S. STUDIES ON DARK ADAPTATION. IV. PRE-EXPOSURE TOLERANCE OF THE DARK-ADAPTED PERIPHERAL RETINA. J. opt. Soc. Amer., June 1960, 50(6), 559-561. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass. & Dunlap and Associates, Inc., Santa Monica, Calif.).

16,516
The effects of low-brightness short-duration pre-exposures on peripheral dark adaptation were investigated. Three peripheral locations (2, 6, and 18 degrees) were tested with a square one-degree test patch of 0.033 sec. duration. Pre-exposure was to a centrally fixated circular field which subtended 55 degrees in diameter. Monocular curves were obtained after pre-exposures of 0.01, 0.1, 1.0, and 10.0 ft.-L, each presented for one and for ten sec.
G. R 2

16,517
Hornbaker, D.R. & White, R.O. A BASIC STUDY ON IMAGE DEGRADATION RESULTING FROM VIBRATION IN A PHOTOGRAPHIC SYSTEM. NOTS TP 2440, NAVORD Rep. 7048, March 1960, 19pp. USN Ordnance Test Station, China Lake, Calif.

16,517
A study to determine quantitatively the effect of simple harmonic vibration on photographic image resolution was performed. Vibrational amplitude and frequency as well as shutter speed were investigated. Quantitative information that will generally map out areas of vibration that adversely affect the photographic image were obtained. The primary effects of vibration were discussed.
G. I.

16,518
Hawkes, G.R. COMMUNICATION BY ELECTRICAL STIMULATION OF THE SKIN V. ABSOLUTE IDENTIFICATION OF DURATION. USAMRL Proj. 6X95 25 001, Task 05, Rep. 448, Oct. 1960, 8pp. USA Medical Research Lab., Fort Knox, Ky.

16,518
The number of possible absolute identifications of electrical cutaneous stimulus duration was determined on 12 Ss. Half of the Ss identified stimulus durations spaced an equal number of j.n.d.'s apart. The other half identified stimuli equally spaced by direct estimates of apparent subjective duration. Both j.n.d.'s and apparent equality spacing had been previously determined by experiment. Duration of stimuli ranged from 0.5 to 1.5 seconds and number of durations from 3 to 6. The amount of information transmitted as a function of number of durations was computed for each group.
T. G. R 10

16,519
Hawkes, G.R., Bailey, R.W. & Warm, J.S. METHOD AND MODALITY IN JUDGMENTS OF BRIEF STIMULUS DURATION. USAMRL Proj. 6X95 25 001, Task 05, Rep. 442, Sept. 1960, 16pp. USA Medical Research Lab., Fort Knox, Ky.

16,519
Relative magnitude and reliability of duration judgments were investigated for auditory, visual, and electrical cutaneous stimuli. Methods of reproduction, production, and verbal estimation were used with stimulus durations of 0.5 to 4.0 seconds. Nine Ss made judgments under all conditions. Mean judgments were analyzed as a function of modality and method. Differences in magnitude of response for the various conditions were determined by analysis of variance. The mean odd-even judgments were correlated as a measure of relative reliability of performance. The findings were discussed with regard to the feasibility of using duration as a cue in an electrical cutaneous communication system.
T. G. I. R 27

16,520
Hendler, E. & SantaMaria, L.J. RESPONSE OF SUBJECTS TO SOME CONDITIONS OF A SIMULATED ORBITAL FLIGHT PATTERN. ca. April 1960, 19pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,520
A series of tests were conducted to investigate physiological responses of human subjects exposed to pressure and thermal profiles characteristic of extreme conditions of orbital flight patterns (operational phases from pre-launch to post-landing recovery). All subjects wore ventilated full pressure suits for the 20 experiments performed. Measurements included environmental, suit, couch, skin, and rectal temperatures; electrocardiograms; and weight loss. The results are discussed with regard to thermal stress effects for each phase of orbital flight.
T. G. I. R 4

16,521
Flight Safety Foundation, Inc. MALE BODY DIMENSIONS. Human Factors Bull. 60 4H, 1p. Flight Safety Foundation, Inc., New York, N.Y.

16,521
This one-page bulletin presents eight major dimensions of the male body. The mean, normal deviation, and range are given for each dimension, and each dimension is indicated on a line drawing of the human figure.
I. R 1

16,522
Irvine, T.F., Jr. & Cramer, K.R. THERMAL ANALYSIS OF SPACE SUITS IN ORBIT. Proj. 6373, Task 63124, WADD TN 60 145, May 1960, 15pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

16,522
The thermal analysis of a model space suit is presented as a guide for designers and as a basis for more extensive studies for the prediction of a suited man's thermal environment in an earth orbit. Results demonstrate the feasibility of passive suit-temperature control through the proper choice of materials and surface spectral qualities.
G. I.

16,523
Joseph, R.D. CONTRIBUTIONS TO PERCEPTION THEORY (PROJECT PARA). Contract NONR 2381(00), Rep. VG 1196 G 7, June 1960, 116pp. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.).

16,523
Perceptrons are a class of brain models intended to simulate a portion of the logic of the brain concerned with memory and recognition. They are composed of three types of components--sensory units that translate the perceptron's environment into inputs for the machine, association units, and response units that serve as output units for the perceptron. Constraints are placed upon the connections between the various units and these, together with the numbers and characteristics of the components, determine subclasses of perceptrons. This report presents rigorous analyses of one approach to the perceptron's ability to associate responses with stimuli. Techniques that have proved useful in this series of studies are displayed.
T. G. R 6

16,524
Jenkins, G.M. & Chanmugam, J. AUTOCORRELATION ANALYSIS AND THE DESIGN OF EXPERIMENTS. Contract DA 36 034 ORD 2297, Projs. 5B 99 01 004, PB2 0001 & 1715, Tech. Rep. 37, June 1960, 67pp. Dept. of Mathematics, Princeton University, Princeton, N.J.

16,524
There are many examples in industry and science of situations where the uncontrolled variation in the observed responses is subject to autocorrelation when the independent variables are kept constant. This report is concerned with an investigation into the effect of this autocorrelation on the strategy of experimentation. An example is given in the design of experiments for a chemical process where the yields from consecutive runs are negatively correlated and a simple physical model for this behavior is presented. Systematic order in experimentation is contrasted with randomization. Part I presents basic principles and the problem statement; Part II and the appendices develop the necessary theory and formulae; and Part III applies the results to a typical example. T. G. R 26

16,525
Jerger, J. AUDIOLOGIC FINDINGS IN AN UNUSUAL CASE OF EIGHTH NERVE LESION. Rep. 60 84, Sept. 1960, 6pp. USAF Aerospace Medical Center, Brooks AFB, Tex. (Audiology Lab., Northwestern University, Evanston, Ill.).

16,525
A number of currently controversial aspects of auditory behavior were explored in a case of surgically confirmed eighth nerve lesion. Preoperative and postoperative air conduction audiograms were taken and compared for postoperative changes. Other aspects of auditory function were assessed through a series of tests: speech audiometry, binaural balance tests, Bekesy audiometry, and masking of pure tones by noise.
G. R 4

16,526
Johnson, R.H. COED - A DEVICE FOR SIMULATION OF MAN/MACHINE OPERATIONS. 1960, 13pp. Bendix Systems Div., Bendix Aviation Corporation, Ann Arbor, Mich.

16,526
A display and control simulation facility, Computer Operated Electronic Display (COED), is described. COED was developed as a tool for study of man/machine relationships in pre-prototype systems. It is flexible (easily accepts major system changes) and efficient (allows real time operation). Various uses of the facility are discussed.
I.

16,527
Jones, E.R. PREDICTION OF MAN'S VISION IN AND FROM THE MERCURY CAPSULE. Presented at the 31st Annual Meeting, Aerospace Medical Association, May 9, 1960, Miami Beach, Fla., May 1960, 12pp. McDonnell Aircraft Corporation, St. Louis, Mo.

16,527
This paper describes some of the visual factors examined during the design of the Mercury capsule for manned orbital flight, and then predicts what the occupant might see during a mission. The predictions are based on capsule operation and design, the space environment, and man's visual characteristics. Suggestions are made regarding training to improve the astronauts' visual capability.
I. R 16

16,528
Phillips, P.B. THE WHAT AND WHY OF THE NEW F.A.A. REGULATIONS (PSYCHIATRY). For the Civil Aviation Medical Association Section at the Aerospace Medical Association Meeting, May 9, 1960, Miami Beach, Fla. May 1960, 9pp. USN School of Aviation Medicine, Naval Air Station, Fla.

16,528
The psychiatric portion of the new medical regulations and physical standards for airmen is discussed and their significance for the examining flight surgeons is indicated. The process of developing these standards is described.

16,529
Guedry, F.E., Jr. & Lauver, L.S. THE OCULOMOTOR AND SUBJECTIVE ASPECT OF THE VESTIBULAR REACTION DURING PROLONGED CONSTANT ANGULAR ACCELERATION. Proj. 6X95 25 001, Rep. 438, June 1960, 27pp. USA Medical Research Lab., Fort Knox, Ky.

16,529
To determine the psychological and physiological reactions to angular acceleration with a view to increasing the range of predicting such events in a future military situation, six subjects received stimuli of two degrees/second^2 for 45 seconds and 1.5 degrees/second^2 for 60 seconds. The subject sat upright and was positioned with head at center of rotation with plane of lateral semicircular canals approximately in the plane of rotation. DC amplification of corneo-retinal potential was used to record eye-movements which were analyzed for changes throughout and following stimulation. These records were compared to subjective reports given by the subjects through the key-pressing technique. Theoretical implications of the findings are discussed.
G. I. R 24

16,530
Green, N.E. FATIGUE AND TENSION IN SAGE OPERATOR-TEAM PERFORMANCE: A SOCIOLOGICAL ANALYSIS. AFCCDD TN 60 15, May 1960, 22pp. USAF Operational Applications Office, Bedford, Mass.

16,530
This study has used a sociological approach to clarify the problem of fatigue and tension in operator-team performance in command and control type systems. The data were obtained from a human factors survey-questionnaire concerned with SAGE Direction Center work milieu. Fatigue and tension differences between functional activities were obtained through analysis of items in the survey providing relevant information. These differences were then related to work group cohesiveness, adjustment to operational pressure, satisfaction with organizational information channels, and reaction to the supervisory structure.
T. R 3

16,531
Gardner, R.A. & Forsythe, J.B. TWO-CHOICE DECISION-BEHAVIOR WITH COMPOUND CRITICAL EVENTS. Proj. 6X95 25 001, Rep. 435, Sept. 1960, 18pp. USA Medical Research Lab., Fort Knox, Ky.

16,531
A Humphreys type procedure was used to study two-choice behavior in an uncertain condition. The relative frequency of one category in the program, Category A, was held constant and the number of alternative categories was varied. However, the subject had only two choices - A or not A. The distribution of choices for 192 subjects in a program of 420 trials was analyzed in relation to the number of alternative categories of events in the program. Comparison of the results with those of two similar experiments was made.
T. G. R 8

16,532
J.W. Fecker, Inc. & American Optical Co. A PERISCOPE FOR FORWARD VISION OUT OF HIGH-SPEED AIRCRAFT. 1960, 7pp. J.W. Fecker, Inc., Pittsburgh, Penn. & Research Dept., American Optical Co., Southbridge, Mass.

16,532
This note describes a periscope for forward vision out of high-speed aircraft which was developed in the Research Center of the American Optical Company. The periscope described herein is said to be superior to previous periscopes in size, cost, complexity, and adequacy of field of view. The scheme of the new periscope is shown in an attached diagrammatic figure, and it is shown in photographs.
I.

16,533
Firstman, S.I. MONTE CARLO MODELS FOR ESTIMATING RELIABILITY: AN EXPLORATORY ANALYSIS. Proj. RAND, Res. Memo. 2149, June 1958, 37pp. Rand Corporation, Santa Monica, Calif.

16,533
An exploratory analysis is presented of the problem of a priori reliability estimating by means of the Monte Carlo method. The method permits integrating into one analysis the effects on the system output of environmental and operational stresses, of time-dependent deterministic events, and of randomly occurring catastrophic events. The problem considered here is that of predicting non-catastrophic failures. The utility of the method, the validity of the results, the unbiased nature of derived estimates, and the requirements for input data are demonstrated. To exhibit the use of a general model, the performance of a hypothetical component circuit is examined and an estimate of its reliability obtained.
T. G. I. R 7

16,534
Franks, P.E. & Furnish, C.W. AUTOMATED MAINTENANCE: THEORY, PRACTICE, AND IMPLICATIONS FOR TRAINING. Proj. 1710, Task 71606, WADD TR 60 412, Aug. 1960, 23pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

16,534
The development of Automatic Check-Out Equipment (ACOE) to take over the most difficult tasks of electronic equipment maintenance is described. The need for ACOE, growth of concept, factors affecting a workable concept, and characteristics of equipment test methods affecting its utilization are discussed. Functions of ACOE are presented as paralleling basic maintenance activities. A typical ACOE approach, present status of the concept, and its impact on other areas are reviewed. Effects on personnel requirements, motivation, logistics, cost, accuracy, and training are estimated and a training program is proposed.
I. R 23

16,535
Fuchs, L.A. & Hutchins, B.S. UNDERWATER RESEARCH TO SAVE PILOTS. 6pp. USN Air Development Center, Johnsville, Penn.

16,535
The Navy's Underwater Research Program was described in this paper. The major purposes of the program were to determine the basic parameters governing pilot escape in a water-crash situation and to recommend methods to reduce fatalities and permit safe egress from the ditched aircraft. Jet aircraft were the focus of the study. Summary information was presented on the following aspects of the problem which have already been experimentally studied: 1) flotation time, 2) sink rate, 3) sinking attitude, 4) cockpit differential pressures, 5) impact decelerations, 6) egress from cockpit, and 7) underwater seat ejections.

16,537
Duvall, D.P., Greenhill, L.P., Hutchison, G. & Murnin, J.A. THE EFFECTIVENESS, ACCEPTABILITY, AND FEASIBILITY OF TECHNICAL TRAINING COURSES RECORDED ON SOUND MOTION PICTURES AND SLIDES PLUS TAPES. Contract N61339 364, Tech. Rep. NAVTRADEVCEN 364 1, June 1960, 29pp. USN Training Device Center, Port Washington, N.Y. (Pennsylvania State University, State College, Penn.).

16,537
Two types of recorded instruction, slides plus tapes and sound motion pictures, were investigated for their effectiveness, acceptability, and feasibility for use in Navy technical schools. Two courses were recorded with a minimum of preparation, technical know-how, and photographic equipment, one by each method. Effectiveness was measured by comparing final course grades of trainees who were instructed solely by the recorded courses with those instructed by face-to-face instruction. Acceptability was estimated from questionnaire results. The feasibility estimate was provided by the contractor who produced the recorded courses and compared production costs and work of making the two types of recordings.
T. I. R 1

16,538
Cacioppo, A.J. & Diamantides, N.D. OBSTACLE IDENTIFICATION AND DISPLAY: PERCEPTUAL-MOTOR STUDIES FOR THE BELL HELICOPTER CORPORATION. FIRST INTERIM REPORT. Contract NONR 1670(00) FW 2601, GER 9645, March 1960, 42pp. Goodyear Aircraft Corporation, Akron, Ohio.

16,538
This report mentions briefly the previous year's accomplishments in studying obstacle identification and display. The present series of theoretical studies are designed to contribute further fundamental perceptual-motor data related to the generic task as stated above. The four task areas include: 1) display integration of information from several sensors, such as aerial, radar, and infrared photographs of the same areas; 2) an investigation of adaptive perceptual-motor characteristics of the human operator; 3) perceptual closure; and 4) perceptual representation.
G. I. R 13

16,539
Kaufman, H.M. & Blair, W.C. MULTIPLE DISPLAY MONITORING III TRACKING WHILE MONITORING. P60 014, Tech. Rep. SPD60 049, May 1960, 17pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

16,539
To determine the effect of a continuous psychomotor task on multiple display signal detection, a twofold task was performed by 27 Ss--compensatory tracking on one display (keeping a pointer on target) while monitoring two other displays for discrete, steady state signals. In the monitoring task, the S was also required to reset each signal as quickly as possible. Three conditions of tracking difficulty were used with separate groups of nine Ss assigned to each. Two 15-minute sessions per day for five days were used to obtain the following measures: frequency and duration of observation of each display, reset data, and time-on-target for tracking task.
T. G. I. R 2

16,540
Krauskopf, J., Cornsweet, T.N. & Riggs, L.A. ANALYSIS OF EYE MOVEMENTS DURING MONOCULAR AND BINOCULAR FIXATION. J. opt. Soc. Amer., June 1960, 50(6), 572-578. (Rutgers University, New Brunswick, N.J. & University of California, Berkeley, Calif.).

16,540
To obtain a quantitative description of the relative positions of the two eyes during binocular fixation, and to get information relevant to the mechanisms responsible for the maintenance of binocular fixations, recordings of the horizontal component of movements of the eyes were made during monocular and binocular fixation. Through the use of a mirror imbedded in contact lenses worn by the S, light from a projector was reflected to a photocell which drove a cathode ray oscilloscope. Thus, eye movements, which caused the mirror to move, could be accurately recorded. These records were analyzed in terms of eye positions and saccadic movements.
T. G. I. R 6

16,541
Keesey, U.T. EFFECTS OF INVOLUNTARY EYE MOVEMENTS ON VISUAL ACUITY. J. opt. Soc. Amer., Aug. 1960, 50(8), 769-774. (Hunter Laboratory of Psychology, Brown University, Providence, R.I.).

16,541
To evaluate the effect of involuntary eye movements on visual acuity, three types of acuity targets (vernier, fine line, and grating) were observed for varying exposure durations (from 0.020 to 1.280 seconds) under two viewing conditions. One was the "stabilized image" condition where a mirror on the eye was used to reflect the target beam in such a way as to stop the motion of the retinal image that would otherwise accompany eye movements; the other condition was optically the same except that eye movements produced normal motions of the retinal image. Acuity was defined in terms of a minimum angle of resolution (threshold value of angle subtended by critical dimension of target). The findings were discussed in relation to the scanning theory of acuity.
G. I. R 15

16,542
Kiehl, P.F. GUIDE TO AIRCREW PERSONAL AND AIRCRAFT INSTALLED EQUIPMENT. Proj. 6325, WADD TN 60 230, Sept. 1960, 154pp. USAF Operational Support Engineering Div., Wright-Patterson AFB, Ohio.

16,542
A catalogue format was used in this technical note to describe and illustrate both personal equipment for aircrews and the equipment installed in aircraft that is of special interest to aircrews. The document included information on special high altitude and long-range flight clothing, personal and aircraft-installed oxygen equipment, survival kits, life rafts and preservers, parachutes, inflight feeding systems, survival food packets, and aircraft-installed food service equipment. Brief descriptions of 128 items were included along with photographs illustrating the items.
I.

16,543
Keating, D.A. DESIGN PARAMETERS FOR THE ENGINEERING OF CLOSED RESPIRATORY SYSTEMS. Proj. 6373, Task 63120, WADC TR 59 766, Dec. 1959, 15pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,543
Design data essential to the engineer engaged in the design of closed respiratory systems (ones in which the occupant rebreathes his usable exhaled oxygen) have been compiled in a compact form for ready engineering reference. Stress was placed upon requirements of man in a high altitude or space-vehicle environment. The data presented can be considered as guidelines since man is an everchanging mechanism and each is different within his species and as a foundation of design requirements for closed ecological systems of increasing complexity.
T. R 21

16,544
Kennedy, O.W., Jr., Monroney, R. & Morse, H., III. AN EXPERIMENTAL ANALOG-DIGITAL FLIGHT SIMULATOR. Contract N61339 45 (Amendment 5), Tech. Rep. NAVTRADEVCEN 45 2, Dec. 1959, 116pp. USN Training Device Center, Port Washington, N.Y. (Servomechanism Lab., Massachusetts Institute of Technology, Cambridge, Mass.).

16,544
A demonstration system is described which was designed, built, and tested to determine the feasibility of combining analog and digital elements in a computer suitable for solving, in real time, a set of non-linear differential equations such as those pertaining to aircraft flight. A description of the special equipment designed for input-output to and from the whirlwind computer is presented along with a discussion of the results and conclusions of the demonstration. Four appendices are included which describe the equations, the program, the error analysis system, and the results of the integration formula study.
T. G. I. R 16

16,545
Lindberg, R.G. BIOMEDICAL RESEARCH IN SPACE. ASRL TM 60 19, Aug. 1960, 13pp. Astro Systems and Research Labs., Northrop Corporation, Hawthorne, Calif.

16,545
This paper discusses some characteristics of biological material which define the need for research in space, the kind of experiments that are required to produce cause and effect relationships, and the part that manned space structures will play in the pursuit of astrobiological knowledge.

16,546
Levine, R.B. NULL-GRAVITY SIMULATION. Paper presented at the 31st Annual Meeting of the Aerospace Medical Association, 9-11 May 1960, Rep. ORD 232, May 1960, 17pp. Operations Research Div., Lockheed Aircraft Corporation, Marietta, Ga.

16,546
This paper describes and discusses an artificial environment in which the conditions of null-gravity may be so well simulated that many effects of true, long-term weightlessness may be studied in the laboratory. The basic idea is the nullification of all the subject's cues to the direction of gravitational vertical by suspending the subject in a tank of water with the tank, water, and subject all rotating about some horizontal axis. The considerations leading to design and development of the simulator are discussed along with the present state of construction.
T. G. I. R 8

16,547
Leone, F.C., Haynam, G.E., Chu, J.T. & Topp, C.W. PERCENTILES OF THE BINOMIAL DISTRIBUTION. Contract AF 49(638) 361, AFOSR Rep. 60 620, June 1960, 36pp. Statistical Lab., Case Institute of Technology, Cleveland, Ohio.

16,547
Tables of percentiles of the binomial distribution for sample sizes n=10(5)100 and a=0.0025, 0.005, 0.01, 0.025, 0.05, 0.1, 0.9, 0.95, 0.975, 0.99, 0.995, and 0.9975 are presented. A brief discussion is given of the methods of evaluating percentage points of the binomial distribution, including the use of these and other related statistical tables. Some applications of the tables are mentioned. These include sampling and life-testing problems and an example of the use of the tables in theoretical work.
T. R 12

16,548
Llewellyn-Thomas, E. & Mackworth, N.H. RECORDING OF EYE MOVEMENTS BY THE TELEVISION EYE MARKER. J. Inst. Elec. Engrs., June 1960, 2(New Series), 331-334. (Defence Medical Research Labs., Toronto, Ontario, Canada).

16,548
This article describes a method of simultaneous display, on a television monitor, of the scene and the positions of gaze of an individual studying a fixed or moving scene before him. A discussion of the way in which eye movements, demonstrated in this way, can be recorded or used as control mechanisms is presented. The optical mixing system employed is described.
I.

16,549
Marko, A.R. MONITORING UNIT FOR HEART-AND RESPIRATION-RATE. Proj. 7220, Task 71751, WADD TR 60 619, Aug. 1960, 9pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

16,549
A small unit to monitor heart and respiration rate under both normal and unusual environmental conditions is described. The unit has been used at altitudes up to 100,000 ft. in temperature test chambers, in actual high altitude balloon flights (with telemetering), and for monitoring endurance tests of the B-58 aircraft's emergency escape capsule (floating in water). The advantages of this monitor compared with other methods are discussed. A circuit diagram of the electronic system of the unit is given.
I. R 3

16,550
Madden, J.M. A REVIEW OF SOME LITERATURE ON JUDGMENT WITH IMPLICATIONS FOR JOB EVALUATION. Proj. 7734, Task 17013, WADD TN 60 212, Aug. 1960, 14pp. USAF Personnel Lab., Lackland AFB, Tex.

16,550
The historical background of psychophysical measurement which bears upon the stimulus situation in job evaluation is described. The description is limited to research results that shed some light upon the effect of variations in stimuli when the judgmental process is considered comparable to that found in a typical job evaluation program. A brief resume of the development of the psychophysical method underlying most present day job evaluation systems is presented. Implications of the findings for evaluation procedures are discussed.
R 31

16,551
Malette, W.G., Fitzgerald, J.B. & Eiseman, B. RAPID DECOMPRESSION: A PROTECTIVE SUBSTANCE. Rep. 60 62, June 1960, 3pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,551
To evaluate the influence of methysiloxane on the mortality rate of animals undergoing a severe rapid decompression, rats were injected with either saline or methylsiloxane. The rats were then exposed to a large dose of gas embolis by means of rapid decompression. Mortality rates in the two groups were compared.
G. I. R 13

16,553
Miller, R.B. TASK AND PART-TASK TRAINERS AND TRAINING. Contract AF 33(616) 2080, Proj. 7197, Task 71640, WADD TR 60 469, June 1960, 96pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Products Development Lab., International Business Machines Corporation, Poughkeepsie, N.Y.).

16,553

Because enough simulators for sufficient and varied practice in job skills are rarely available, simpler devices are needed for training parts of tasks. Procedures for dividing total performance requirements into training segments lending themselves to distinctive types of trainers are described. Principle variables in the division are phase learning and time-sharing of activities. Risks and improper part-task training are discussed and principles for reducing them proposed. Classes of trainers are identified as: 1) familiarization, 2) instructed-response, and 3) automatized skill. For each class, the essential training and human engineering variables are discussed.
T. R 9

16,554

Mayo, A.M. APPLICATION OF ADVANCED ENGINEERING DEVELOPMENTS TO MEDICAL USE. Engng. Paper 898, 1960, 18pp. Engineering Section, Douglas Aircraft Company, Inc., El Segundo, Calif.

16,554

This paper discusses some highly effective new tools and methods for the medical profession which are based on advanced engineering developments in man-machine systems.
G. I. R 5

16,555

Machol, R.E. THE COMPUTER REVOLUTION IN ENGINEERING EDUCATION. ca. 1960, 3pp. School of Electrical Engineering, Purdue University, Lafayette, Ind.

16,555

The ready availability of the high-speed digital computers has wrought a fundamental and unprecedented change in engineering education. This paper describes one university's experiences with a small digital computer on which thousands of undergraduates have been taught to program within the past year. Future plans are discussed which involve a large centralized computer with remote-control installations in every instructional building. Its manner of use in the instructional program is described. An appendix contains an experimental use of the computer in a senior course in rotating machinery.

16,556

Mancinelli, D.A. CLOSED-CIRCUIT RESPIRATORY AND ENVIRONMENTAL CONTROL SYSTEMS. ca. 1959, 16pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,556

A closed-circuit respiratory and environmental system using potassium superoxide (KO_2) as the stored oxygen supply was tested using six U.S. Navy enlisted personnel and an eight-day confinement period. The system tested and the confinement chamber were described in detail. Continuous monitoring of gases in the closed system (oxygen evolved, carbon dioxide removed, carbon monoxide, hydrogen sulphide, sulphur dioxide, and trichloroethylene) and measurements of temperature and relative humidity were made. Upon completion of the eight days and removal of the Ss, the space was subjectively tested for odors. Other life support equipment currently under evaluation were listed.
T. I. R 4

16,557

Owen, D.B. & Williams, C.M. LOGARITHMS OF FACTORIALS FROM 1 TO 2000. TID 4500 (15th Edition), Rep. SCR 158, Dec. 1959, 36pp. Sandia Corporation, Albuquerque, N.M.

16,557

A table of logarithms, to the base ten, of factorial n is given for values of $n=1(1)2000$ to 15 decimal places. The table has applications in acceptance sampling for attributes, among other uses. The logarithms of the factorials are also available on magnetic tape number 128 for the Sandia Corporation IBM 704 Data Processing Machine.
T. R 11

16,559

Plough, I.C. & Isaac, G.J. MUSCULAR DEVELOPMENT AS A FACTOR IN BODY COMPOSITION. Proj. 6X 60 11 001, Subproj. 1 4, Rep. 247, 11pp. USA Medical Research and Nutrition Lab., Fitzsimmons General Hospital, Denver, Colo.

16,559

A series of regression equations were calculated relating body weight to the following body dimensions: height, skinfold thickness, arm diameter, and elbow diameter. The data were obtained from a group of 123 soldiers representing a wide spread in height, weight, and age. The findings were discussed in relation to the significance of muscularity and also the possibility that major body compartments may be predictable from simple body measurements.
T. G.

16,560

Purdy, W.C. THE HYPOTHESIS OF PSYCHOPHYSICAL CORRESPONDENCE IN SPACE PERCEPTION. Rep. R60ELC56, Sept. 1960, 62pp. General Electric Advanced Electronics Center, Ithaca, N.Y.

16,560

One approach to the theory of visual space perception was described. A one-to-one correspondence between perception and the geometric parameters of the optical stimulus was hypothesized (psychophysical correspondence). An analysis of the optical stimulus was undertaken in order to provide some experimentally testable statements which could be obtained deductively from the hypothesis. The geometry of the optical stimulus was described in terms of certain perspective gradients previously suggested by Gibson. Both monocular and binocular observations were included. An experiment to test the prediction of the effect of magnification on perceived slant was conducted.
T. G. I. R 23

16,561

Pritsker, A.A.B., Thomas, R.E., Christner, C.A. & Byers, R.H. THE EFFECT OF VARIOUS LEVELS OF AUTOMATION ON HUMAN OPERATORS' PERFORMANCE IN MAN-MACHINE SYSTEMS. SIXTH QUARTERLY PROGRESS REPORT. Contract AF 33(616) 6395, Task 71619, Oct. 1960, 8pp. Battelle Memorial Institute, Columbus, Ohio.

16,561

This is the sixth in a series of progress reports on research on the effects of various levels of automation on human operators' performance in man-machine systems. During this period a critical experiment was designed, a computer program to simulate the automation problem was developed, and an experimental apparatus was constructed. In addition, research was continued on introducing group structure into the mathematical model previously derived for the automation problem. In this report the simulation program, the design of the experiment, and plans for the next quarter are described.
T. I. R 1

16,562

deFlorez Company, Inc., Englewood Cliffs, N.J. THE APPLICATION OF POINT SOURCE PROJECTION TECHNIQUES TO GROUND OPERATION TRAINING. Contract NONR 1628(00), Tech. Rep. NAVTRADEVCEN 1628 10, June 1959, 30pp. USN Training Device Center, Port Washington, N.Y.

16,562

This report describes the results of a study to determine if a satisfactory visual presentation can be obtained with point light source techniques for application to a multi-vehicle ground reconnaissance trainer. The scope and important elements of the problem were determined from analysis of the training task. It is recommended that point source visual displays be investigated further in such ground-level tasks where the trainee follows predetermined general routes such as roads and where terrain contour is not essential, for example, driver training devices.
I. R 3

16,563
Dalziel, C.F. THE EFFECTS OF ELECTRIC SHOCK ON MAN. May 1956, 19pp. US Office of Health & Safety, Atomic Energy Commission, Washington, D.C. (University of California, Berkeley, Calif.). (Reprinted from: IRE Trans. on Medical Electronics, May 1956, PGME 5).

16,563

A review of what is known about the quantitative effects of electric currents on man is presented. Experimental studies on human beings and on animals are reviewed. The discussion begins with the first tingling sensations resulting from barely perceptible currents, proceeds with reactions produced by currents of increasing intensity, and includes various causes of electrocution. The paper concludes with mention of effects caused by high-frequency currents, burns and blisters, and the necessity for prompt application of approved methods of resuscitation for victims of severe electric shock accidents.
T. G. I. R 10

16,564
Cotterman, T.E. EFFECTS OF VARIATIONS IN SPECIFICITY OF KNOWLEDGE OF RESULTS ON THE IMPROVEMENT OF A PERCEPTUAL SKILL. Proj. 1710, Task 71605, WADC TR 58 673, Aug. 1960, 33pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

16,564

To explore the effects of variations in the specificity of knowledge of results on the rate and level of learning of a simple perceptual judgment, 90 subjects estimated individually how many degrees a one-fourth inch arrow would have to be turned to match the position of an adjacent arrowheaded line drawn across a three and one-half inch circle. The stimuli were presented in five sets of 24, each set containing the same 24 stimuli in random order. Knowledge of results, given orally after each estimation, ranged in specificity from simple right-wrong information to amount and direction of error for five experimental groups. No knowledge was given a control group. Differences in mean absolute and algebraic error per stimulus were analyzed for each group.
T. G. I. R 19

16,565
Cotterman, T.E. TASK CLASSIFICATION: AN APPROACH TO PARTIALLY ORDERING INFORMATION ON HUMAN LEARNING. Proj. 7183, Task 71621, WADC TN 58 374, Jan. 1959, 15pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,565

This report outlines the general philosophy and approach to a basic venture in the study of human learning--task classification. It is proposed that a rational classification be developed for the tasks human beings have to learn. Each task category would be set up in such a way that a specified set of common principles of learning referring to basic variables would operate in essentially the same way in all task situations subsumed under it. In this way the actual and hypothesized effects of various basic and task variables and their interactions would be set forth. The characteristics and supporting arguments for this classification, methodological problems involved in its development, and the problem of evaluation are discussed.
T, R 3

16,566
Chapman, K.M. A MINIATURE, DIRECT-PLOTTING PULSE-FREQUENCY NOMOGRAM. Proj. 7216, Task 71712, WADC TN 57 371, Nov. 1957, 6pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,566

A device is described for conveniently and inexpensively plotting event rates from time-based data records, such as heart rate from ECG and discharge frequency from volleys of nerve impulses. Principles of design, construction of a prototype, and photographic duplication of copies in quantity are discussed. The use of a nomogram for plotting nerve impulse frequencies is illustrated.
T. G. I. R 2

16,567
Cooper, J.I., Rigby, Lynn V. & Spickard, W.A. PROCEEDINGS OF SHIRT SLEEVE SEMINAR ON MAINTAINABILITY. Contract AF 33(616) 7059, NOR 60 320, Aug. 1960, 118pp. Norair Div., Northrop Corporation, Hawthorne, Calif.

16,567

This is a transcript of the proceedings of a workshop-type seminar on maintainability. The purpose of the seminar was to discuss and help supply answers for a guide for the design for maintainability from an integrated systems standpoint. Two aspects of such a guide were presented in outline form for discussion: a guide for the systems analyst and design engineer; background information.
G. I. R 4

16,568
Creer, B.Y., Smedal, H.A. & Wingrove, R.C. CENTRIFUGE STUDY OF PILOT TOLERANCE TO ACCELERATION AND THE EFFECTS OF ACCELERATION ON PILOT PERFORMANCE. NASA TN D 337, Nov. 1960, 35pp. National Aeronautics and Space Administration, Washington, D.C. (Ames Research Center, Moffett Field, Calif.).

16,568

To measure the effects of various sustained accelerations on the control performance of pilots, an experimental set-up was used which consisted of a flight simulator with a centrifuge in the control loop. The pilot performed his control tasks while being subjected to acceleration fields such as might be encountered by a forward-facing pilot flying an atmosphere entry vehicle. Information was obtained on the combined effects of control task complexity and magnitude and direction of acceleration forces on pilot performance. Boundaries of human tolerance to acceleration were established. The three-axis type of side-arm controller was evaluated in comparison with the two-axis type in combination with toe pedals for yaw control.
T. G. I. R 26

16,569
Connor, J.A., Jr. AEROSPACE NUCLEAR SAFETY. Ca. 1960, 20pp. US Aerospace Nuclear Safety Board, Atomic Energy Commission, Washington, D.C.

16,569

The aerospace nuclear power program is reviewed briefly and problem areas in aerospace nuclear safety are analyzed. The biomedical analyses and research programs associated with the development, testing, and operation of the manned nuclear aircraft, satellite auxiliary power (SNAP), nuclear ramjet (Pluto), and the nuclear rocket (Rover) are discussed. The necessity for international accord in the registration and regulation of nuclear energy for safety of all peoples is indicated.
T. R 20

16,570
Collins, W.E., Crampton, G.H. & Posner, J.B. THE EFFECT OF MENTAL SET UPON VESTIBULAR NYSTAGMUS AND THE ELECTRO-ENCEPHALOGRAM. Proj. 6X95 25 001, Task 04, Rep. 439, Sept. 1960, 15pp. USA Medical Research Lab., Fort Knox, Ky.

16,570
To determine the effect of different mental conditions on the horizontal component of vestibular nystagmus produced by rotation and to ascertain the relationship of EEG patterns to these conditions, six Ss were given rotation stimulation in the dark while 1) attending to the stimulus, 2) doing arithmetic problems, and 3) daydreaming. Vestibular nystagmus and the EEG were recorded simultaneously. The recordings were analyzed for three types of data: duration and magnitude of nystagmus and amount of alpha. The data were then subjected to analysis of variance techniques for effects due to Ss, conditions, and trials.
T. R 14

16,571
Brock, F.J. ACCELERATION SHOCK PROTECTION EXPERIMENTS USING LIVE PIGS. No date, 15pp. McDonnell Aircraft Corporation, St. Louis, Mo.

16,571
This paper presents the results of acceleration shock experiments on live pigs and describes analytical work on these data yielding a fuller understanding of the phenomena and leading to an approximate method of predicting the magnitude of some of the effects of acceleration shock.
T. G. I.

16,573
Beeding, E.L., Jr. & Mosley, J.D. HUMAN DECELERATION TESTS. Task 78503, AFMDC TN 60 2, Jan. 1960, 11pp. USAF Missile Development Center, Holloman AFB, N.M. (Presented to 31st Annual Meeting of the Aerospace Medical Association, 9-11 May 1960, as "Human Tolerance to Ultra-High G Forces.").

16,573
This report describes a series of experiments conducted to determine human tolerance to impact forces with the subject seated in the backward facing position. The experiments were conducted on the AFMDC Daisy Track using healthy young males.
T. G. I. R 2

16,574
Bloom, A. A CORRELATION OF PHYSIOLOGICAL AND MECHANICAL TESTING TO MEASURE OXYGEN BREATHING SYSTEM EFFICIENCY. April 1960, 22pp. Sierra Engineering Company, Sierra Madre, Calif.

16,574
This paper deals with one technique for relating the physiological and physical methods for testing oxygen-breathing systems. The systems reported deal with the crew and passenger systems currently in use on three major jet transports flying today. Specific testing of passenger and crew masks is discussed in detail.
G. I.

16,575
Yeager, P.B. THE PRACTICAL VALUES OF SPACE EXPLORATION. Report of the Committee on Science and Astronautics, US House of Representatives, Eighty-Sixth Congress, Second Session, Pursuant to H. Res. 133, Union Calendar 928, House Rep. 2091, July 1960, 54pp. US Government Printing Office, Washington, D.C.

16,575
This report delineates in lay language and in terms which will be meaningful to those who have not followed the American space program closely the reasons for the great investment of the US Government in space exploration and the probable terms of the investment. The value of the space program is discussed in relation to its impact on national security, the economy, and every day living. The long-range and unseen values are also discussed.
I. R 89

16,576
Bowen, J.H. & Sharp, E.D. TABLES FOR MOOD'S DISTRIBUTION-FREE INTERVAL ESTIMATION TECHNIQUE FOR DIFFERENCES BETWEEN TWO MEDIANS. Proj. 7183, Task 71616, WADD TN 60 89, May 1960, 19pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

16,576
This report presents tables which can be used to obtain fiducial probabilities and confidence intervals for differences between the medians of two populations. Also included are the formulae, as originally derived by Mood, and an illustrative application of the technique to experimental data.
T. R 4

16,577
Adams, J.A., Hufford, L.E. & Dunlop, J.M. PART- VERSUS WHOLE-TASK LEARNING OF A FLIGHT MANEUVER. Contract N61339 297, Tech. Rep. NAVTRADEVCEN 297 1, June 1960, 60pp. USN Training Device Center, Port Washington, N.Y. (University of Illinois, Urbana, Ill.).

16,577
To examine the contribution of part-task training to total task training, two matched groups of pilots were trained in a hypothetical toss-bomb maneuver to be performed in the SNJ Operational Flight Trainer. One group had separate training in flight control and procedural tasks; the contrasted group had concurrent training in the two classes of tasks. After equal amounts of training, both groups were asked to perform the maneuver in the whole-task version (criterion task). Performance of the two groups was compared for various behavior measures. Operational implications were discussed.
T. G. I. R 13

16,578
Yngve, V.H. A MODEL AND AN HYPOTHESIS FOR LANGUAGE STRUCTURE. March 1960, 58pp. Research Laboratory of Electronics & Dept. of Modern Languages, Massachusetts Institute of Technology, Cambridge, Mass.

16,578
A simple and easily mechanized model for sentence production is set up. On the basis of the behavior of the model and the assumptions underlying it, a hypothesis is advanced which leads to a number of specific predictions concerning the types of syntactic structures to be expected in language. The structure of English is then examined in the light of these predictions, and it is shown that the predicted structures account for much of the apparently nonfunctional complexity. The model presented here arose out of research directed toward the mechanical translation of languages.
I. R 2

16,579
Sharma, H.S. & Radliff, M.H. PHYSIOLOGICAL LIMITATIONS OF MASK MOUNTED REGULATOR P/N 1732-2; DETERMINATION OF. Proj. TED NAM AE 5194, Rep. NAMC AGEL 428, Feb. 1960, 5pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,579

Tests were conducted in order to determine oxygen consumption rates associated with the use of the mask mounted regulator P/N 1732.2. Four Ss thoroughly indoctrinated in the use of the F9F-2 OFT flight simulator were exposed to predetermined flight patterns while breathing 100 per cent oxygen either with or without safety pressure. Subjects were observed closely in order to detect any tendencies to hyperventilate during these exposures.
T.

16,580
Reynolds, M.A. TRACKING INSTRUMENT, PORTABLE TYPE 6-A. Proj. OTAC 376, Rep. 1, April 1960, 14pp. USA Development and Proof Services, Aberdeen Proving Gound, Md.

16,580

Tracking instrument, Type 6-A, was installed on an M48A2 tank to test its ability to simulate tracking problems. Both tracking and lead problems were conducted by two skilled gunners, inexperienced with the instrument. Duplicate tests were run under field tracking and lead conditions. The usefulness of the instrument for checking turret-tracking performance of tanks was discussed.
T. I.

16,581
Birnbaum, A. A UNIFIED THEORY OF ESTIMATION. I. Contracts NONR 285(38) & NONR 266(33), Rep. IMM-NYU 266, April 1960, 78pp. Institute of Mathematical Sciences, New York University, New York, N.Y.

16,581

This paper extends and unifies some previous formulations and theories of estimation for one-parameter problems. The basic criterion used is admissibility of a point estimator, defined with reference to its full distribution rather than special loss functions. Theoretical methods of characterizing admissable estimators are given and practical computational methods for their use are illustrated in a variety of examples.
G. R 27

16,582
Cramer, R.L. RESPONSE OF MAMMALIAN GRAVITY RECEPTORS TO SUSTAINED TILT. May 1960, 9pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,582

To determine whether nuclear vestibular responses are subject to modification over time if the stimulus is held constant, cats were used as subjects with the stimulus a prolonged tilt at constant angle. Cats were anesthetized, the common carotid arteries ligated, and tracheotomy performed. The animal was secured to the catboard and a radical craniectomy was performed leaving only the pons and medulla. Records of electrical activity in the projections of the otolith organ were secured as the board was tipped nose down for approximately one and a half minutes, returned to horizontal for the same length of time, tipped to nose up position and again to horizontal. The results are discussed in relation to sensori-motor problems of prolonged weightlessness.
G. I. R 2

16,583
Ashkenas, I.L. & McRuer, D.T. THE DETERMINATION OF LATERAL HANDLING QUALITY REQUIREMENTS FROM AIRFRAME-HUMAN PILOT SYSTEM STUDIES. Contract AF 33(616) 5661, Proj. 1365 13553, WADC TR 59 135, June 1959, 80pp. USAF Flight Control Lab., Wright-Patterson AFB, Ohio.

16,583

This report represents one phase of an effort aimed at the use of airframe-human pilot system studies as the basis for derivation of vehicle dynamic handling qualities, specifically, lateral qualities. Tentative criteria are derived for certain roll/aileron transfer function qualities by applying existing pilot dynamic response data to servo analysis studies of the airframe-pilot system. The criteria are examined in the light of existing pilot opionion data and limited regions of validation are established. For those regions where no data exist, the tentative criteria can provide an interim basis for design and a guide to future testing.
T. G. I. R 57

16,584
Waggoner, J.N. DIAGNOSIS OF THE STATE OF HEALTH OF A MAN IN SPACE. To be presented on May 11, 1960, at the 31st Annual Meeting of the Aerospace Medical Association in Miami Beach, Fla., May 1960, 8pp. AiResearch Manufacturing Div., The Garrett Corporation.

16,584

This paper discusses the problems associated with the diagnosis of the state of health of a man in space by his physician on the earth. Research that has so far been accomplished concerning the validity and interpretation of the medical data available to the physician (pulse rate, respiratory rate, skin and core temperatures, and electrocardiographic tracings) is discussed with particular reference to knowledge gained about the electrocardiographic story and blood pressure and pulse recording techniques. The use of knowledge gained in this type of research to diagnostic techniques on the ground is discussed.

16,585
Gulliksen, H. MATHEMATICAL SOLUTIONS FOR PSYCHOLOGICAL PROBLEMS. A TECHNICAL REPORT. Contract NONR 1858 (15), National Science Foundation Grant G 642, June 1958, 54pp. Princeton University, Princeton, N.J. & Educational Testing Service, Princeton, N.J.

16,585

The value of the mathematico-deductive approach to various psychological problems is discussed with particular emphasis on 1) the usefulness of matrix algebra for expressing a large number of psychological theories and for comparing the theory (observation equations) with data, and 2) the generality of multidimensional scaling as an approach to a variety of psychological problems. The discussion of each illustrative problem stresses the close tie between the mathematical statement and the psychological statement; for every variation in psychological assumptions there must be a matching variation in the mathematical equations.
T. G. I. R 90

16,586
Karpovich, P.V., Dering, R.R. & Ikai, M. REFLEX AND REACTION TIME. Contract DA 49 007 MD 889, July 1960, 14pp. Dept. of Physiology, Springfield College, Springfield, Mass.

16,586

The relation between knee jerk reflex and knee extension reaction time was studied with an electrogoniometer on 48 Ss, 29 nonathletes and 19 trained athletes. Reflex time, amplitude of movement, duration of upstroke, and speed of movement were recorded for the knee jerk reflex; time and speed of movement were recorded for knee extension reaction time. The correlations of measures within each group and the differences between the groups were analyzed. Practical implications for military drill and training were discussed.
G. I. R 8

16,587
Jones, F.N. SUBJECTIVE INTENSITY FUNCTIONS IN SOMESTHESIS. PROGRESS REPORT. Contract DA 49 007 MD 1001, Jan. 1960, 4pp. University of California, Los Angeles, Calif.

16,587
This progress report discusses three topics: 1) the perfection of an electronically controlled touch stimulator is described in general terms; 2) the calibration of a semiconductor thermocouple junction for temperature stimulation is discussed and its defects are indicated; 3) subjective magnitude functions for touch are reported. The usefulness of rate of stimulus movement as a dimension for magnitude estimation is discussed. Results of subjective scaling are to be reported at a later date.

16,588
von Beckh, H.J. THE INCIDENCE OF MOTION SICKNESS DURING EXPOSURES TO THE WEIGHTLESS STATE. XIth International Astronautical Congress, Stockholm, Sweden, Symposium on Space Medicine, August 15-20, 1960, 12pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

16,588
This report compiles and evaluates observations on the occurrence of motion sickness made during the airborne weightlessness program conducted by the USAF Aeromedical Field Laboratory. The first 47 missions used the classical Keplerian trajectory with weightlessness of up to 45 seconds and 2.5 g in the initial and final pull-out. The next 51 missions used the same trajectory which was preceded or followed by a diving spiral which produced loads from 4.0 to 6.5 g. There were 18 subjects with various degrees of flying experience. Motion sickness as a hazard in manned orbital and space flight is discussed.
T. I. R 10

16,589
Korotkin, A. & Cornog, D.Y. DISPLAY-CONTROL COMPATIBILITY. Human Factors Data Bull. 50, May 1960, 3pp. Human Factors Group, Weapons System Engineering Dept., Air Arm Div., Westinghouse Electric Corporation, Baltimore, Md.

16,589
The fact that displays and controls may interact to produce a more efficient system that would be expected by analyzing each separately (compatibility) is discussed in this data bulletin. An experimental study demonstrating this point is summarized with graphic presentation of pertinent data. Three displays (auditory or spoken word, visual or window presenting digital readout, and visual or ten by ten matrix of lights) and three controls (double column, a row and a column, and a ten by ten matrix of push buttons) were used. The operator's task was to depress the button or buttons corresponding to a stimulus of two elements. The data were analyzed on the basis of speed and accuracy of information transmission for each combination of display and control.
G. R 1

16,591
Riggs, Lorin A. & Niehl, Elizabeth W. EYE MOVEMENTS RECORDED DURING CONVERGENCE AND DIVERGENCE. J. opt. Soc. Amer., Sept. 1960, 50(9), 913-920. (Brown University, Providence, R.I.).

16,591
To record horizontal binocular eye movements during convergence and divergence by a method with greater sensitivity and accuracy than the methods previously used in comparable studies, a method of direct photography, based upon collimated beams of light reflected from plane mirrors mounted on tightly fitting contact lenses, was used. Three Ss with normal binocular vision and acuity were studied. Recordings were made of both binocular and monocular eye movements as the Ss fixated alternately near (or median) and far test objects. A quantitative analysis of the eye movements was made and compared with predictions made on the basis of theoretical expectations.
T. G. I. R 24

16,592
Ziedman, K. DEVELOPMENT AND SPECIFICATIONS OF THE DISPLAY-CUE ANALYZER. Contract NONR 233(49), Rep. 60 73, Biotechnology Lab. Tech. Rep. 4, Aug. 1960, 19pp. Dept. of Engineering, University of California, Los Angeles, Calif.

16,592
Equipment is described which was devised to analyze the effects of variations in display cues on operator performance. The basic apparatus consists of a display panel, response panel, programming unit, control unit, and various recorders. The basic display is a panel on which small lamps can be arranged in any pattern. Variation in display cues is produced by placing cardboard sheets with different geometrical configurations of cues over the lamps. The operator responds by pushing a switch corresponding variably to a given display lamp. Future plans for development are discussed.
I. R 1

16,593
Ziedman, K. & Lyman, J. AN ASSESSMENT OF PROBABILITY DISTRIBUTION OF SIGNAL OCCURRENCE IN COMBINATION WITH RELEVANT AND IRRELEVANT CUES FOR MASSED PRACTICE AND TRANSFER OF TRAINING. Contract NONR 233(49), Rep. 60 75, Biotechnology Lab. Tech. Rep. 5, Aug. 1960, 13pp. Dept. of Engineering, University of California, Los Angeles, Calif.

16,593
The effects of variation in display cues and stimulus probability on perceptual-motor performance were studied. Three experimental conditons were used with two different programs of order of stimulus occurrence. The three displays consisted of discs with stimuli (circles) arranged around the periphery of the disc in a low relevancy, high relevancy, and high irrelevancy position in relation to the signal lights. The programs controlling the order of stimulus presentation were: 1) a random occurrence of each light, and 2) a dither program which attempted to simulate the effect of a dither pointer. The subjects (24) were divided into three groups and were tested for two 30 minute sessions on one of the three displays under each presentation program.
T. G. I. R 4

16,594
Zwislocki, J. THEORY OF TEMPORAL AUDITORY SUMMATION. Contract 669(13), April 1960, 15pp. Bioacoustics Lab., Syracuse University, Syracuse, N.Y. (Reprinted from: J. acoust. Soc. Amer., Aug. 1960, 32(8), 1046-1060).

16,594
A theory of temporal auditory summation is developed and applied to the threshold of audibility for various temporal patterns of pulses and sinusoidal vibrations. The theory is based on the assumption of an exponential decay of neural excitation and, for the threshold of audibility, it includes only one time constant. Various factors that may affect temporal auditory summation are discussed. It is shown that the same theory applies to muscle contractions.
G. R 47

16,595
Wobig, W.H. & Tryon, L.E. FAULT LOCATION STUDY. Contract AF 30(602) 1996, Proj. 1978, Task 55090, RADC TR 59 250, Dec. 1959, 189pp. Electronics Engineering Department, Stromberg-Carlson, General Dynamics Corporation, Rochester, N.Y.

16,595
The activities, findings, and conclusions of a research and development study program concerned with the automatic detection and isolation of system performance faults to the system nodule level are described in this report. Simple ordering scheme and sequential methods are considered. Recommendations for the basic system components of an Automatic Fault Locator, applicable to complexes at SAGE Radar Sites and other ground electronic systems, are presented.
T. G. I.

16,596
Wilson, C.L. (Ed.). PROJECT MERCURY CANDIDATE EVALUATION PROGRAM. Proj. 7164, Task 71832, WADC TR 59 505, Dec. 1959, 133pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,596
A battery of physiological, psychological, and biochemical tests served as a basis for Project Mercury candidate recommendation. Data were yeilded on physiological limitations of high transverse g, anthropometric measures, intelligibility measures, effects of noise and vibration on performance, body responses to heat stress, physical fitness tests, and psychological evaluation tests. The final candidate recommendation meeting was described. Methods used to correlate biomedical data statistically and a list of possibly significant correlations were discussed. Recommendations for future experimentation and evaluation programs were included.
T. G. I. R 30

16,597
Webber, C.E. & Adams, J.A. ISSUES IN THE USE OF AN ANALOG-DIGITAL DATA SYSTEM FOR THE MEASUREMENT OF TRACKING BEHAVIOR. Contract AF 49(638) 371, AFOSR TN 59 528, April 1960, 33pp. Aviation Psychology Lab., Dept. of Psychology, University of Illinois, Urbana, Ill.

16,597
Tracking data collected by an analog-digital data system and processed with a digital computer are recommended as a solution for certain research restraints imposed by traditional methods of measuring tracking behavior. An experiment on system parameters is performed entirely on a digital computer to evaluate sampling rate and number of digits per reading of simulated tracking error functions for time-on-target measures. Representative empirical data of 15 Ss are presented for two-dimensional tracking.
T. G. I. R 6

16,598
Valentine, G.A. HUMAN FACTOR CONSIDERATIONS IN THE DESIGN OF THE B-58 ESCAPE CAPSULE. Presented to the 31st Annual Meeting of the Aerospace Medical Association, Miami, Fla., May 9-11, 1960, Rep. 1176, May 1960, 10pp. Stanley Aviation Corporation, Denver, Colo.

16,598
The human factor considerations that helped shape the design of the B-58 Escape Capsule are discussed and the way in which the Capsule meets the requirements is described. Both normal and emergency operations are described with the latter including pre-ejection, ejection, and recovery and surface survival.
T. I.

16,599
Vos, J.J. & Bouman, M.A. ON SEARCH FOR RETINAL INTERACTION IN GLARE. Rep. IZF 1960 9, Aug. 1960, 14pp. Institute for Perception RVO-TNO, Soesterberg, The Netherlands.

16,599
A series of experiments was reported in which a search was made for retinal interaction in glare situations. Absolute and contrast thresholds were investigated as a function of target size and time of presentation in the presence of a blinding light source. The functions were studied as the intensity of the glare source was varied and were compared to previous studies where background luminance was varied. It was hypothesized that parallel results could explain the action of the glare source in terms of entopic stray light, and that systematic divergence would point to a process of nervous adaptation.
G. I. R 10

16,600
von Beckh, H.J. MULTI-DIRECTIONAL G-PROTECTION DURING EXPERIMENTAL SLED RUNS. Reprint from Proceedings Xth International Astronautical Congress, London, England, 1959, 671-682. USAF Aeromedical Field Lab., Holloman AFB, N.M.

16,600
Described was a device which acts as a multi-direction al g-protection. A catapult sled track with the sled propelled by one or two MIAI ejection-seat catapults was used. The anti-g platform was in the form of an isoceles triangle which was pivoted on its apex by a vertical axis which was fixed on the structure of the sled and allowed free rotation through 360 degrees. Two accelerometers, placed in positions corresponding to the animal's (rat) spinal and transverse-to-spine direction, were used to obtain acceleration data. The favorability of such a free moving platform was discussed as was the need to extend studies to primates and human subjects.
G. I. R 5

16,601
Tindle, E.R. IMPROVED MARKING OF BUOYANT VESTS AND CUSHIONS. Proj. J28 3/1 5(259), July 1960, 2pp. USCG Testing and Development Div., Office of Engineering, Washington, D.C.

16,601
To investigate the resistance to weathering and flexing of six types of prototype labels for marking buoyant vests and cushions, all samples were first flexed 1,000,000 times using a machine designed for this purpose. Cracking and loss of legibility were assessed. All samples were subjected to accelerated weathering in an Atlas DMC/HR Weather-Ometer. Background discoloratior and fading, letter fading, and loss of legibility were recorded. Recommendations were included.
T. R 2

16,602
Thomas, R.E., Pritsker, A.A.B., Christner, C.A. & Byers, R.H. THE EFFECT OF VARIOUS LEVELS OF AUTOMATION ON HUMAN OPERATORS' PERFORMANCE IN MAN-MACHINE SYSTEMS. Contract AF 33(616) 6395, June 1960, 134pp. Battelle Memorial Institute, Columbus, Ohio.

16,602
This report is concerned with the problems involved in the design of man-machine systems and presents a method for generating data on the effects of various levels of automation in human operators' performance in man-machine systems. The relationship of man to machines is discussed and the descriptive and quantitative automation models are developed as well as the equipment, experiments, summary of results, and appendices which constitute the report.
T. G. I. R a few

16,603
Smith, W.M., McCrary, J.W. & Smith, K.U. DELAYED VISUAL FEEDBACK AND BEHAVIOR. Science, Oct. 1960, 132(3433), 1013-1014. (Dept. of Psychology, Dartmouth College, Hanover, N.H. & Dept. of Psychology, University of Wisconsin, Madison, Wisc.).

16,603
To study the effects of delayed visual feedback on simple visual-motor tasks, the RCA laboratory magnetic tape video recording and reproducing system was used to introduce a delay of approximately 520 msec. between actual performance and the S's observation of his performance. The S carried out various tasks (writing letters of alphabet, star tracing, placing dots in circles, etc.) on an electronic handwriting analyzer which permitted measurement of both manipulative and travel components of the performance under conditions of television-delay, television-no-delay, and normal or ordinary observation.
T. I. R.6

16,605
Slodki, C.J. SENSITOMETRIC APPROACH TO THE SELECTION OF FILMS FOR POSSIBLE RADAR SCOPE USE. Proj. 6272, Task 62504, WADC TN 57 317, Sept. 1957, 34pp. USAF Aerial Reconnaissance Lab., Wright-Patterson AFB, Ohio.

16,605
This report presents a sensitometric technique that can be utilized for selection of radar film emulsions. Components of a complete radar system were investigated to determine the separate and compound effects of phosphor light emission on the sensitivities of film emulsions. Sensitometric curves illustrating the results are presented in the report. Further investigation into each individual portion of the radar system is recommended.
G.

16,606
Strauss, W.J. THE VALIDITY OF OPERATIONS RESEARCH STUDIES WITH EMPHASIS ON THOSE PERTAINING TO FORCE COMPOSITION QUESTIONS. Contract AF 33(616) 6824, IAWR Rep. 60R3 & WADD TR 336, Feb. 1960, 30pp. Institute for Air Weapon Research, Labs. for Applied Sciences, University of Chicago, Chicago, Ill.

16,606
This report attempts to examine some of the basic philosophical questions of the foundations of operations research. It tries to delineate and interrelate some factors which confuse analysts and users of the type of operations research concerned with force structure considerations and the selection of weapon systems for use in the nation's future defense. Several criteria for judging, involved in tests of validity, are presented. The operations research process is discussed: the nature of assumptions, model, pay-off function values, and recommendations. Also included is a discussion of the epistemology of operations research compared with mathematics and the empirical physical sciences.
R 50

16,607
Schueller, O. SPACE ENVIRONMENT SIMULATORS. Presented at 31st Annual Meeting, Aerospace Medical Association, 9-11 May 1960, Miami Beach, Fla., May 1960, 29pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,607
This paper attempts to point out the area of space technology in which the life sciences and physical sciences overlap in an effort to aid understanding and cooperation of the two. The need to construct space environment facilities for research, testing, and training is cited and should include the environmental orbits about the earth, e.g., the moon and the near planets. A review of the space environments of these is given. The problems of protection are considered from a biological and physical viewpoint and illustrated by a moon capsule suit. A basic concept of a test facility for studying the problems of life support systems for manned capsules and space suits is presented.
I. R 2

16,609
Seidenstein, S., Chernikoff, R. & Taylor, F.V. THE RELATIONSHIP OF A RETINAL-GAIN INDEX TO SYSTEM PERFORMANCE. Proj. RR 006 09 41 4341, NRL Prob. Y02 01, NRL Rep. 5548, Sept. 1960, 7pp. USN Research Lab., Washington, D.C.

16,609
This study was designed to determine the nature of the relationship of each of three gain factors (optical, display, and retinal) to systems errors. Prediction suggests a simple linear function of each type of gain to system error but distance cues may alter this prediction. Therefore, a compensatory tracking system was used with subjects tracking under 12 combinations of viewing distance and display gain. Both position- and aided-control dynamics were used. The task was to maintain coincidence between a horizontally moving marker dot and a center line. The discussion includes the applicability of the visual system to be treated from a control-system viewpoint.
R 1

16,611
Smith, K.U., McDermid, C.D. & Shideman, F.E. ANALYSIS OF THE TEMPORAL COMPONENTS OF MOTION IN HUMAN GAIT. Amer. J. phys. Med., Aug. 1960, 39(4), 142-151. (Depts. of Psychology & Pharmacology, University of Wisconsin, Madison, Wisc.).

16,611
A new method of measurement of different patterns of human locomotion, the electrobasometer, was applied to detailed analysis of the time characteristics of the stride and contact movements of walking and running. The effects of the shoe on gait, sex differences, age differences, relation between gait and body height and weight and quantitative relations between component movements in the locomotion pattern are presented here. Specifications are given for a portable electrobasometer for field, clinical, and laboratory use. A psychophysical, as opposed to a mechanical, theory of gait is presented and discussed.
G. I. R 5

16,612
Smith, K.U. & Bloom, R. THE ELECTRONIC HANDWRITING ANALYZER AND MOTION STUDY OF WRITING. J. appl. Psychol., 1956, 40(5), 302-306. (University of Wisconsin, Madison, Wisc.).

16,612
This study applies precise methods of motion analysis to the investigation of writing skill. An Electronic Handwriting Analyser is described that permits separate and automatic measurement of the component movements of manipulation and travel in the writing task. Preliminary results obtained from ten Ss on the writing of single numbers and script letters are presented and discussed in terms of differences in duration of the two component movements and the nature of individual differences obtained. The significance of the technique used in the general study of motor coordination in relation to growth, aging, learning, and other psychological factors is discussed.
T. I. R 8

16,613
Smith, W.M., Smith, K.U., Stanley, R. & Harley, W. ANALYSIS OF PERFORMANCE IN TELEVISED VISUAL FIELDS: PRELIMINARY REPORT. Percept. Mot. Skills, Sept. 1956, 6, 195-198. (Princeton University, Princeton, N.J. & University of Wisconsin, Madison, Wisc.).

16,613
Observations of a preliminary nature are described dealing with the nature of writing performance when the S observes his own behavior on closed-circuit television. Samples of writing obtained with three different horizontal angular displacements of the visual field are described. The use of closed-circuit television as an instrument for analysis of the spatial and temporal organization of perception, motion, and other aspects of behavior in relation to the visual environment is discussed.
I.

16,614
USAF Rome Air Development Center. PROCEEDINGS OF SYMPOSIUM ON DECISION THEORY AND APPLICATIONS TO ELECTRONIC EQUIPMENT DEVELOPMENT 10-11 MAY 1960 VOLUME 1. Proj. 8505, RADC TR 60 70A, April 1960, 143pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

16,614
Included here are a number of papers presented at the Symposium on Decision Theory and Application to Electronic Equipment Development in May 1960. The papers are concerned with machine control and decision problems. Some of the papers included are: "An Introduction to Bayes Decision Procedures," "The Decision Problem in Radar," "A Sequential Multi-Decision Procedure," "Signal Detection by Adaptive Filters," "The Resolvability of Point Sources," and "The Search and Detection Efficiency of Surveillance and Communication Devices Using Sequential Probability Ratio Analysis."
T. G. R many

16,615
Rohles, F.H., Jr. & Grunzke, M.E. A CONTINUOUS TRACKING DEVICE FOR PRIMATES. Proj. 6893, Task 68930, AFMDC TR 60 10, April 1960, 14pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

16,615
A tracking task was designed that requires a primate to track a continuously moving target in order to avoid electric shock. The device itself and the procedures employed to train a rhesus monkey to track the target 80 percent of the time were described.
G. I. R 2

16,616
Ronchi, Lucia & Mori, Gina F. ON THE FACTORS WHICH AFFECT THE CONTRAST ENHANCEMENT IN A FIGURE WITH "QUASI PERCEPTIVE CONTOURS" AND A PRACTICAL APPLICATION OF SUCH A FIGURE. Atti Della Fondazione Giorgio Ronchi, Sept.-Oct. 1959, XIV(5), 495-508.

16,616
This paper was concerned with a figure with "quasi perceptive contours" and deals with the factors responsible for and the effect of luminance and viewing angle on contrast enhancement. Monocular viewings of the figures were made at varying luminance. To investigate the effect of viewing angle, the figure was uniformly illuminated and surrounded by a field of dim luminance. After-images were examined as well as observations under intermittent illumination. Conclusions were drawn and some practical implications concerning the preception of contrast were noted and discussed.
G. I. R 13

16,617
Rohles, F.H., Jr. (Ed.). A PRELIMINARY SURVEY OF HUMAN FACTORS PERSONNEL. Contract NONR 2718(00), Jan. 1960, 27pp. Documentation Incorporated, Washington, D.C. (USAF Aeromedical Field Lab., Holloman AFB, N.M.).

16,617
This directory of Human Factors Personnel represents the results of a preliminary survey of individuals engaged in human factors work and includes physicians, psychologists, physiologists, engineers, and anthropologists. Both alphabetical and geographical location listings are presented.

16,618
Berger, C., Reese, H.C. & Feder, C.A. A PSYCHOLOGICAL OPERATIONS BIBLIOGRAPHY. Proj. PROSYMS, May 1960, 176pp. Special Operations Research Office, American University, Washington, D.C.

16,618
This bibliography attempted to assist military, research personnel and those interested in psychological operations. Literature in the field was listed and annotated. Emphasis was on psychological warfare but included are propaganda, the cold war, and reports on brainwashing. The introduction explained how the bibliography is arranged and a brief review of the literature on psychological operations in World Wars I, II, the Korean War, other limited wars since 1945, and the cold war was given. Some of the titles included were: "Are We Hitting the Target?," "Revolution in America," "Political Science Quarterly," "German Rule in Russia," and so forth.

16,619
Bellows, R.M. AN EXPERIMENTAL ISOLATION OF SOME FACTORS DETERMINING RESPONSE TO RHYTHMIC CUTANEOUS STIMULATION: III. INTERPRETATION. Psychol. Rev., Jan 1937, 44(1), 62-76.

16,619
Certain theories and principles concerned with the interpretation of cutaneous phenomena are treated. The discussion is presented with reference to experimentally determined aspects of response to rhythmic (intermittent) stimulation of the lower lip (see 16,620). The doctrine of specificity (qualitative theory) vs. the pattern (quantitative) theory is discussed. A bio-physical interpretation of vanishing flicker and response to vibratory stimuli is considered.
I. R 46

16,620
Bellows, R.M. AN EXPERIMENTAL ISOLATION OF SOME FACTORS DETERMINING RESPONSE TO RHYTHMIC CUTANEOUS STIMULATION. I. FREQUENCY, PRESSURE, AND TIME. J. exp. Psychol., Dec. 1936, XIX(6), 716-731.

16,620
To investigate some variables (frequency, pressure, and adaptation time) involved in the phenomenon of vanishing tactual flicker, seven subjects were tested. Apparatus was constructed which would deliver pulsations of air, of known intensity, temperature, and frequency to the cutaneous surface (lower lip) which was covered with petroleum jelly to control moisture. Five stimulus intensities (1.0 to 3.0 cm) were used to obtain the critical point at which successive stimuli vanished on five different trials. Subjects attempted to maintain frequency of stimulation at the speed of vanishing flicker for a period of 20 minutes. Actual frequencies were recorded every minute. The relations among the three variables were analyzed.
G. R 24

16,621
Banghart, F.W. & Pattishall, E.G. HUMAN FACTORS AT EXTREME ALTITUDES: SYNOPSIS AND BIBLIOGRAPHY. Contract AF 18(600) 1792, HQARDC TR 60 7, March 1960, 111pp. Division of Educational Research, University of Virginia, Charlottesville, Va.

16,621
This combined synopsis and bibliography covers the range of areas that problems of human factors deal with in connection with extreme altitudes arising from space flights. The synopsis covers the following areas: ecology behavior and performance, acceleration and deceleration, weightlessness, radiation, and instrumentation. The bibliography is arranged under the above categories plus space and space medicine. Each area is covered from 1956 to 1959 and supplemented prior to 1956.
R many

16,623
Albert, B.S. PROBABILITY APPLICATIONS IN MILITARY OPERATIONS RESEARCH THE PRACTICE IN ONE ORGANIZATION. Rep. NA59H 507, Nov. 1959, 135pp. North American Aviation, Inc., Columbus, Ohio.

16,623
This paper demonstrates the application of probability theory in military operations research. It gives a complete account of the growth of military operations research in industry, the functions performed for management and the biases that arise. Probability techniques are discussed and include the frequency interpretation of probability. A number of probability statements and theorems are presented and important distribution functions are described and illustrated. Case studies are presented and show the probability applications to weapon system requirements. The report is concluded by an evaluation of the accuracy and reliability of probability determinations.
T. G. R 21

16,624
Cacioppo, A.J. & Diamantides, N.D. OBSTACLE IDENTIFICATION AND DISPLAY: PERCEPTUAL-MOTOR STUDIES FOR THE BELL HELICOPTER CORPORATION SECOND INTERIM REPORT. Contract NONR 1670(00) FW 2601, GER 9828, June 1960, 40pp. Goodyear Aircraft Corporation, Akron, Ohio.

16,624
This is a report on perceptual representation, perceptual closure, and design of experimental apparatus investigating the adaptive perceptual motor characteristics of human operators. The apparatus designed is explained and described. The perceptual representation experiment was designed to compare the effects of different types of symbolism on simple association learning. Two groups of seven were tested. Group I was to associate seven geometric symbols with a number. Group II was to associate real world representations with a number. To test closure, ten subjects viewed a set of straight lines and four sets of isoceles triangles with portions of the perimeter removed. The task was to indicate when they saw the flicker when viewed through a stroboscope.
T. G. I. R 14

16,625
Burns, N.M., Ziegler, R.B., Noble, Rosalie & Gifford, E.C. ENVIRONMENTAL REQUIREMENTS OF SEALED CABINS FOR SPACE AND ORBITAL FLIGHTS A BIBLIOGRAPHY OF PSYCHOPHYSIOLOGICAL STUDIES RELEVANT TO SPACE AND ORBITAL FLIGHT. Weptask Assign. RAE 20C 030/2001/R005 01 002, Prob. Assign. C04AE13 1, Rep. NAMC ACEL 441, Oct. 1960, 151pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,625
This bibliography was compiled from studies that were found to be useful from a psychological, physiological, and environmental viewpoint with an emphasis on psychological and physiological problems of space and orbital flights. A total of 582 entries under 16 categories listing author, title and entry are presented on file card forms following the form suggested by the 1957 revision of the Publication Manual of the American Psychological Association. The literature review for the bibliography was completed in April 1960. Some of the areas included are psychological problems of man in space flights, studies in sensory deprivation, leadership in isolation and many more.

16,627
Frankfort, M., Hoffman, D., Rarity, J. & Saporta, L. DISPLAY METHODS FOR COUNTERMEASURES RECEIVERS FINAL REPORT. Contract DA 36 039 SC 74990, Proj. 3 99 06 122, April 1960, 47pp. College of Engineering, New York University, New York, N.Y.

16,627
The purpose of this study was to investigate miniaturizing the digital display equipment developed in an earlier study. The techniques applicable to miniaturizing such a display are discussed and include the pulse width measuring unit, the group repetition period measuring unit, and the recording device or data printer. A miniature data printer based on electro-sensitive paper was developed. An automatic direction finder was investigated as was the design for an automatically actuated camera for oscilloscope pulse photography.
G. I. R 9

16,628
Foley, P.J. THE EXPRESSION OF CERTAINTY. Amer. J. Psychol., Dec. 1959, LXXII(4), 614-615. (Defence Research Medical Labs., Toronto, Ontario, Canada). (DRML Proj. 76, Rep. 766, PCC D77 94 2021, HR 167).

16,628
To evaluate the meanings of expressions of certainty, 38 subjects were asked to give five statements a value from one (X will not occur) to ten (X will occur). The statements rated were: "1) I am sure X will occur; 2) I suppose X will occur; 3) I am certain X will occur; 4) I think X will occur; and 5) I am positive X will occur." A frequency-distribution showing the number of subjects who assigned values to each statement was shown. From the results obtained, conclusions concerning the meaningfulness of these phrases were drawn.
I. R 1

16,629
Flight Safety Foundation, Inc. AVIATION CRASH INJURY RESEARCH FINAL REPORT. Contract NONR 401(21) & Contract NONR 2883(00), Sept. 1959, 13pp. Flight Safety Foundation, Inc., Phoenix, Ariz.

16,629
A final report on the undertakings and activities of the aviation Crash Injury Research Program was presented. The objectives and tasks of the programs were cited and the accidents investigated were reported. Evaluations of aircraft and aircraft components of the DC-C, the Army L-20 Beaver, Army L-19, and the XH-40 Army utility helicopter were made. A new Helicopter Accident Injury Report Form was developed and made available to the U.S. Army, Federal Aviation Agencies, and interested state groups. A crash survival design manual was developed and a training program in crash-injury accident investigation was initiated.

16,630
Flanagan, J.L. NOTE ON THE DESIGN OF "TERMINAL-ANALOG" SPEECH SYNTHESIZERS. J. acoust. Soc. Amer., Feb. 1957, 29(2), 306-310. (USAF Cambridge Research Center, Cambridge, Mass. & Acoustics Lab., Massachusetts Institute of Technology, Cambridge, Mass.). (AFCRC TN 57 550, Scientific Rep. 13).

16,630
Electrical speech synthesizers that are analogs of the human speech-producing mechanism from a terminal point of view are discussed such synthesizers are basically lumped-constant electrical networks having transmission characteristics similar to the transmission properties of the vocal tract. The synthesis of vowel sounds by such networks is considered. A comparison is made between cascade and parallel connectious of simple electrical resonators for producing vowel sounds on the basis of which yields sounds having formants of proper amplitude.
G. I. R 15

16,632
Derksen, W.L., Delhery, G.P., Monahan, T.I. & McGreevy, J.M. THERMAL AND OPTICAL PROPERTIES OF THE NML SKIN SIMULANT. Lab. Proj. 5046 3 Part 122 Final Report, Tech. Objective AW 7, SF 001 05 11, DASA 1169, Jan. 1960, 11pp. USN Material Lab., Brooklyn, N.Y.

16,632
As part of a larger program on the effects of the thermal radiation on materials, the protection afforded by clothing against burns is being studied. To facilitate these studies a skin simulant has been developed, employing an inert material and relying on physical measurements for predicting burn severity. The skin simulant is described in this report and related to measured properties of the skin itself. The thermal and optical qualities of the simulant are discussed along with its limitations. Its use in studies of protective values of clothing are also discussed.
G. I. R 11

16,633
Coombs, W.C., Salaman, R.G. & Cottrell, D.E. A RESEARCH STUDY AND ENGINEERING INVESTIGATION OF A DIGITAL TELEVISION SYSTEM FINAL REPORT. Contract DA 36 039 SC 74928, DA Proj. 3 22 00 400, SC Proj. 0053 PH 58 91 (4442), SC Specification 58 ECL/D 4442 (57/4483), Colorado Research Corporation Proj. 23 20, June 1959, 61pp. Colorado Research Corporation, Broomfield Heights, Colo.

16,633
This study was designed to investigate the feasibility of a digital TV. It was desired to develop optimum system standards which would produce an acceptable picture for a variety of military applications using a minimum bit rate. The work was directed towards the application of such a system to intercommunications, briefing, and observing hazardous operations in military operations. New scanning methods and methods of digital modulation were developed. These include the Difference Signal Modulation, and Pulse Code Modulation methods. Recommendations for future projects were presented.
T. I. R 14

16,635
Glenn, W.A. A COMPARISON OF THE EFFECTIVENESS OF TOURNAMENTS. OOR Rep. 1166 44, Feb. 1960, 51pp. Virginia Polytechnic Institute, Blacksburg, Va.

16,635
Investigated are five tournament types to determine their effectiveness in selecting the best one of four players. The types studied are: roundrobin, knock-out with repeated games, replicated knock-out (two methods), and the double elimination tournament. Expressions for the probability with which the best player wins under each type is determined. The five types are evaluated and compared for their effectiveness.
T.

16,636
Hardy, J.D. THE PHYSIOLOGY OF TEMPERATURE REGULATION. Task MR005.15 2002.1, Rep. NADC MA 6015, Rep. 22, June 1960, 296pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn. (University of Pennsylvania, Philadelphia, Penn.).

16,636
This review of physiological temperature regulation is restricted to a consideration of the temperature responses of the homoiotherms and, more particularly, of the usual laboratory animals and man. Principal attention is given to the literature since 1952 although reference is made to much of the older work for purposes of continuity and clarity. The major divisions of the review are 1) physiological responses to cold, 2) physiological responses to head, and 3) the physiology of temperature regulation.
I. R 851

16,637
Grant, G. & McKendry, J.M. DESIGN FOR MAINTAINABILITY. Contract N61339 330, NAVTRADEVCEN TR 330 1, April 1960, 20pp. USN Training Device Center, Port Washington, N.Y.

16,637
A summary report of a one year study of the problem of design for maintainability is presented. The definition and approaches to achieve maintainability (improving equipment design, improving the skill of the technicians, and improving maintainance aids) are set forth. Investigation of several designers of training devices revealed a need to initiate new research to provide information to help designers achieve maintainability. The master plan of the research effort is included as well as the published reports which were products of the program. The final product was a comprehensive handbook of recommendations for the design and construction of electronic equipment.
I. R 12

16,638
Gordon, H.C. & Schwedes, J.C. VERTICAL FLIGHT INSTRUMENT PRESENTATION TEST F-106A/B CATEGORY II. AFFTC TR 59 26, Addendum I, Feb. 1960, 96pp. USAF Flight Test Center, Edwards AFB, Calif.

16,638
To evaluate the vertical instrument equipped aircraft (F-106) for safety of flight deficiencies and instrument system accuracy, reliability, and maintainability, one F-106A was flown on 52 test missions for 70:15 hours and one F-106B was flown on 30 missions for 40:05 hours. The F-106 Vertical Flight Instrument Panel consists of nine instruments: Mach-airspeed-angle of attack indicator, standby airspeed indicator, attitude-director indicator, horizontal situation indicator, altimeter-vertical speed indicator, standby altimeter, display mode selector, heading select switch, and bearing selector. The performance of each is discussed.
T. G. I.

16,639
Harris, W. & Buckner, D.N. A STUDY OF FACTORS INFLUENCING THE JUDGMENT OF HUMAN PERFORMANCE. Contract NONR 1241 (00), Proj. NR 153 625, Tech. Rep. 1, Aug. 1960, 50pp. Human Factors Research, Incorporated, Los Angeles, Calif.

16,639
This study was the first of a series designed to explore relationships among variables that influence judgments of human performance. Two experiments were performed to investigate performance judgment behavior under controlled conditions. In an exploratory study, a method by which such behavior could be observed was investigated. A second study was an extension and replication of the first. Rating of performance of others was compared with the making of psychophysical judgments. Importance of studying rater-performer interactions as well as individual rater differences was pointed out.
T. G. R 14

16,640
Greenberg, B.G. & Sarhan, A.E. MATRIX INVERSION, ITS INTEREST AND APPLICATION IN ANALYSIS OF DATA. J. Amer. statis. Ass., Dec. 1959, 54, 755-766. (University of North Carolina, Chapel Hill, N.C.). (OOR Rep. 1597:7).

16,640
This paper is concerned with the inversion of a class of matrices with special patterns as well as the numerical inversion of matrices in general. It also provides some special methods for the inversion of matrices for special and general cases. Some of the types of matrices considered are: diagonal matrices of type r, type r diagonal inverse matrix, generalization of matrix partitioning in inversion, and non-patterned matrices. These results will be applied to problems in analysis of data where such matrix inversion is applicable.
R 10

16,642
McFarland, R.A. HUMAN FACTORS IN VEHICULAR DESIGN AND OPERATION, WITH SPECIAL REFERENCE TO ACCIDENTS. Contract DA 49 007 MD 166, March 1960, 50pp. Harvard School of Public Health, Boston, Mass.

16,642
This is a progress report of a long term research program concerned with the improvement of operating efficiency and safety through more effective integration between the driver and his vehicle. Research carried on during the year covered by this report includes: 1) Completion of abstracting of literature to revise the Monograph "Human variables in motor vehicle accidents," 2) A comparison of American and foreign made cars in regard to driver workspace, 3) Development of instrumentation and electronic recording procedures of driver responses, 4) A human factors study of accidents in military vehicles, 5) Collaborative studies related to accident research, and 6) Analysis of visual data having implications for night driving.
T. I. R 43

16,643
USA Food Acceptance Branch. VARIABILITY OF FOOD ACCEPTANCE BEHAVIOR UNDER NORMAL FEEDING CONDITIONS PART I. BASIC RESULTS OF CONSUMPTION SURVEY. INTERIM REPORT. Proj. 7 84 15 007, QMFCIAF Rep. 30 59, Nov. 1959, 36pp. USA Food Acceptance Branch, QM Food & Container Institute for the Armed Forces, Chicago, Ill.

16,643
To examine consumption and reasons for non-consumption of A rations, a study, reported in three parts, was conducted. The first report cited was conducted to assess the adequacy of the methods and procedures used in the pilot and final phase of the study. The final phase was conducted at four installations in four separate parts of the country with procedures and materials the same for all posts. Three questionnaire forms were used with five foods studied at each meal. The results were examined in terms of percent of food taken and percent of food eaten. The variability and reliability of consumption in terms of different food classes and other variables were discussed.
T.

16,644
Wayne-George Corporation, Boston, Mass. HIGH-SPEED ELECTROMECHANICAL GOGGLE. Contract AF 33(616) 5287, Proj. 6332, Task 77653, WADC TR 59 114, May 1959, 21pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,644
High-speed electromechanical shutter goggles to be used to protect the eyes of the wearer from burns or flash blindness caused by a high intensity flash are described. The shutters of the goggles are actuated by disposable explosive dimple motors which are controlled by a small transistorized electronic package carried by the pilot. The shutters are closed in less than 500 microseconds after onset of the flash. They also have the feature of being compatible with some helmets and oxygen masks.
I.

16,645
Truax, S., Andreassi, J.L., Bishop, E.W. & Channell, R.C. HUMAN FACTORS REVIEW OF THE MOBILE AIRCRAFT CONTROL TOWER AN/TSW-1(XC-2) FINAL REPORT. Contract DA 36 039 SC 78921, Proj. 3 99 00 110, Feb. 1960, 23pp. Dunlap and Associates, Inc., Stamford, Conn.

16,645
The mobile aircraft control tower AN/TSW-1 (XC-2) is reviewed in terms of the ability of the operator to accomplish the purpose of the system. The mission of the equipment and system requirements is discussed. The report also contains a brief description of the equipment and its proposed operating procedures, a general evaluation of the system, and an evaluation of specific design characteristics of the equipment.
I.

16,646
Thomas, E.L., Howat, R. & Mackworth, N.H. TV TRACKER RECORDS EYE FOCUS POINTS. Electronics, April 1960, 3pp. (Defence Research Medical Labs., Toronto, Ontario, Canada).

16,646
Described is a device for following the movements of the corneal reflection in order to study eye movements. The needed equipment is described, and block diagrams of coding and gate circuits are provided.
I.

16,647
Taylor, A.A., Finkelstein, Beatrice & Hayes, R.E. FOOD FOR SPACE TRAVEL "AN EXAMINATION OF CURRENT CAPABILITIES AND FUTURE NEEDS". ARDC TR 60 8, July 1960, 64pp. USAF Air Research and Development Command, Andrews AFB, Washington, D.C.

16,647

This is a study describing and evaluating the present programs for providing food and water for manned space flight. The duration of the flight presents particular problems, thus the study is considered in terms of duration of flight. The three categories are: nutrition and feeding requirements for short space missions of two to three days duration; nutrition and space feeding for space missions of intermediate duration; and bio-logistics of long space trips. The latter considers the need for a closed ecological system and its functional processes. Also included are menus for short, medium, and long flights.
T. G. I. R 63

16,648
Smith, O.W. DISTANCE CONSTANCY. Contract AF 33(038) 22804 & NONR 401 (14), Sept. 1956, 5pp. Cornell University, Ithaca, N.Y.

16,648

To investigate the distance constancy problem which requires the judgment of a far extent as longer or shorter than a near standard extent, 23 Ss were required to make such judgments. The standard stimulus (a white sheet of oilcloth 54 inches wide and 10 feet long) was viewed at 25 ft. in front of the S; the variable stimulus, at 125 ft., was exposed in lengths which were multiples of three. An approximation method was used to determine the S's mean match of equality. Data from 23 Ss were analyzed to determine whether distance constancy holds under these conditions.
R 3

16,649
Smith, O.W. THE EFFECTS OF WINDOWS OF TWO SIZES ON MATCHES OF OBJECTIVE VELOCITY. Contract NONR 401 (14), Sep. 1956, 13pp. Cornell University, Ithaca, N.Y.

16,649

The effects of windows of two different sizes on judgments of objective velocity were investigated. Two windows, one of which was twice the linear dimension of the other, were used; identical movement patterns were viewed through the windows. The task was to adjust the speed of the variable so that the physical velocity of its surface was judged equal in terms of ft./sec. to the speed of the standard under the following conditions: 1) large window for both variable and standard fields, 2) small window for both fields, 3) small window was standard and the large was variable, and 4) the reverse of (3). Match judgments of 22 Ss were obtained for analysis.
T. R 5

16,650
Smith, O.W. & Gibson, J.J. APPARATUS FOR THE STUDY OF VISUAL TRANSLATORY MOTION. Contract AF 33(038) 22804 & NONR 401 (14), Sept. 1956, 6pp. Cornell University, Ithaca, N.Y.

16,650

Specifications were given for an apparatus to be used in the investigation of perception of visual motion. The apparatus was constructed and described in detail. The authors suggest its use in investigation of the following problems: 1) effects of variables such as velocity of the standard and mode of observation employed in comparison on accuracy of reproduction of velocity; 2) constant errors in velocity perception; 3) improvement of velocity discrimination and absolute judgments of velocity; 4) of "upper" threshold for visual speed; 5) of recognition of forms as dependent on speed; and 6) of apparent direction of motion as dependent on shape and orientation of framing window.
I. R 2

16,651
Smith, E.K., Anastasio, F.J., Kalustyan, B.C., Snyder, R.B., et al. THE APPLICATION OF POINT SOURCE PROJECTION TECHNIQUES TO AIR-TO-SURFACE ATTACK-TRAINING. Contract NONR 1628(00), NAVTRADEVCEN TR 1628 7, June 1959, 57pp. USN Training Device Center, Port Washington, N.Y. (The deFlorez Company, Inc., Englewood Cliffs, N.J.).

16,651

The results of an investigation to determine if a satisfactory visual presentation can be obtained with point light source techniques for application to an air-to-surface attack trainer are described. An analysis of the training task used to determine the skills to be developed and the cues required for its performance is included. An actual system was developed which will provide some training in the task. Its limitations are indicated along with the need for further evaluation by persons fully conversant with the training task.
I. R 9

16,653
Smith, E.K., Anastasio, F.J., Kalustyan, B.C., Snyder, R.B., et al. THE APPLICATION OF POINT SOURCE PROJECTION TECHNIQUES TO SURFACE VESSEL OPERATION TRAINING. Contract NONR 1628(00), NAVTRADEVCEN TR 1628 9, June 1959, 47pp. USN Training Device Center, Port Washington, N.Y. (deFlorez Company, Inc., Englewood Cliffs, N.J.).

16,653

The results of an investigation to determine if a satisfactory visual presentation can be obtained with point light source techniques for application to a destroyer docking trainer were described. An analysis of the training task was made showing the skills to be developed and the cues required for its performance. Point source projection systems were developed and were considered capable of providing some valuable training in shiphandling and destroyer docking. The limitations of the system were discussed.
I. R 4

16,654
Reese, T.S. & Stevens, S.S. SUBJECTIVE INTENSITY OF COFFEE ODOR. Amer. J. Psychol., Sept. 1960, LXXIII, 424-428. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.). (Rep. PNR 219).

16,654

A method for presenting controlled intensities of stimuli of olfaction was designed to determine how the subjective intensity of coffee odor grows with stimulus concentration. The method of magnitude estimation was used. "Sniffing-bags" made of Scotchpak 20A20, a material made of plastic and aluminum, were designed. The Ss were presented five concentrations in separate bags and instructed to estimate the intensity of odor in each bag. Each of the five concentrations were judged twice by each of the 12 male and 8 female Ss. The results are discussed in terms of the power function law. The sensory transducer of olfaction behaving as a "compressor" is also discussed.
G. R 11

16,655
Reynolds, G.S. & Stevens, S.S. BINAURAL SUMMATION OF LOUDNESS. J. acoust. Soc. Amer., Oct. 1960, 32(10), 1337-1344. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.). (Rep. PNR 244).

16,655

A stimulus of a given sound pressure sounds louder when it is heard by two ears than when it is heard by one. This fact was demonstrated by a series of experiments designed to quantify the ratio of binaural to monaural loudness at various stimulus levels. Various methods were used to obtain the data: magnitude estimation, magnitude production, one- vs. two-ear ratio production, monaural-binaural loudness matching, and the cross-modality matching of loudness to the apparent intensity of a vibration. Binaural and monaural loudness functions obtained by these methods were compared.
T. G. I. R 10

16,656
Reed, I.S. STATISTICAL ERROR CONTROL OF A REALIZABLE BINARY SYMMETRIC CHANNEL. Contract AF 19(604) 5200, Group Rep. 47.35, Nov. 1959, 13pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

16,656

To determine the statistical confidence that one may have in error-correction machines which are based on error correction codes, a method was developed to measure the statistics of a channel as the message is being received. It is demonstrated how the statistics of a channel can be measured as the message is being received and how the levels of acceptance or rejection are established. A phone line channel was used to carry out the procedure, however it is felt that the method can be generalized to other channels.
I. R 3

16,657
Quade, D. THE ASYMPTOTIC POWER OF THE KOLMOGOROV TESTS OF GOODNESS OF FIT. Contract AF 49(638) 261, AFOSR TN 60 55, Mimeo. Series 243, Dec. 1959, 95pp. Dept. of Statistics, University of North Carolina, Chapel Hill, N.C.

16,657

The purpose of this paper was to investigate the asymptotic power against sequences of alternatives which converge to the hypothesis distribution $H(x)$ against sequences of alternatives $G_n(x)$ for which $\sup_x \sqrt{n}/H(x)-G_n(x)/$ tends to a limit. The one-sided Kolmogorov test for goodness of fit is used with the application of Doob's "heuristic procedure." Although the one-sided test is used and demonstrated with examples, the two-sided tests can also be applied.
T. G. R 19

16,658
Postley, J.A. THE DESIGN OF COMPLEX MANAGEMENT-CONTROL SYSTEMS. Contract AF 49(368) 700, Proj. RAND, Res. Memo. 2483, Nov. 1959, 21pp. The Rand Corporation, Santa Monica, Calif.

16,658

This report discusses the need to apply data-automation technology in Air Force operations. The application of automation to the new control and support systems with which the Air Force is currently involved is stressed. The problems encountered in the system design involve the policies and procedures that must be followed by organizations, persons, and automatic devices in working towards the objective of the system. It also includes selecting and programming data-processing equipment.

16,659
Pletcher, K.E. TO ERR IS HUMAN AND MAY BE FATAL. Rep. M 6 60, June 1960, 18pp. USAF Directorate of Flight & Missile Safety Research, Norton AFB, Calif.

16,659

An investigation of aircraft accidents that have occurred over the past five years reveals that a considerable cause of accidents has been due to human error. A discussion of the factors influencing human errors includes three major categories which affect human performance: physical status, physiological adversities, and behavior variables. Other important factors are the intelligence and capacity of the pilots to learn, inexperience, application irregularities, and deficiencies in aids to flying. Emphasized is the fact that modern flying is a coordinated enterprise requiring the cooperation of a number of people in the aircraft and on the ground.
T. R 1

16,660
Pasternack, B.S. & Ogawa, J. "ESTIMATION AND TESTING OF PARAMETERS BY ORDER STATISTICS" STOCHASTIC BOUNDS ON THE "F" STATISTIC WHEN DATA ARE INCOMPLETE: ONE-WAY CLASSIFICATION. Contract DA 36 034 ORD 2184, DA Proj. 5B99 01 004, ORD Proj. TB2 0001 & OOR Proj. 1597, OOR Rep. 1597, Tech. Rep. 11, Jan. 1960, 19pp. University of North Carolina, Chapel Hill, N.C.

16,660

This paper was designed to obtain analogous stochastic sounds on the F-statistic, when data are incomplete, for the case of one-way classification. The procedure used is indicated and a numerical example of the method is also presented.
R 1

16,661
Norton, J.R., Taylor, C.L., Davis, H., Haase, R.H., et al. TECHNICAL STUDIES IN CARGO HANDLING - VII. THE HUMAN OUTPUT FUNCTION, ITS CONCEPT AND MEASUREMENT. Contract NONR 233(07), Rep. 59 75, Dec. 1959, 19pp. Dept. of Engineering, University of California, Los Angeles, Calif.

16,661

It is not yet possible to measure directly on the human muscle involved the total physiological energy cost to a human of the performance of a task. An approximation of direct measure is discussed in this report. Total physiological energy cost is here termed the Human Output Function (HOF); it is differentiated from the mechanical work involved, defined as force times a distance or torque times an angle, which is only a part of total energy cost. An equation is developed for use with Lauru's force plate as an indirect measure of HOF. Preliminary design analyses for a force plate for laboratory analyses of cargo handling tasks are presented.
T. I. R 10

16,662
Nickson, J.J. & Glicksman, A.S. STUDY OF THE POST-IRRADIATION SYNDROME IN HUMANS TERMINAL REPORT. Contract DA 49 007 MD 1022, April 1960, 25pp. Sloan-Kettering Institute for Cancer Research, New York, N.Y.

16,662

To investigate the effects of low doses of total body irradiation on modification of tremor response and to study the post-irradiation syndrome in man in a number of parameters, seven subjects with incurable cancer were studied after total body irradiation. Four of the patients had fractionated doses of irradiation varying from 25 r daily for five days to two doses of 50 r separated by six weeks. Three patients received single exposures: one received 130 r, one received 125 r, and one received 88 r. Hemotological and biological studies were performed. This report includes a summary of the various aspects investigated over the past five years on patients receiving total body irradiation.
G.

16,663
Morrison, Nina K. DEVELOPMENT OF CONDUCTIVE CLOTH PLANTAR ELECTRODE FOR USE IN MEASURING SKIN RESISTANCE. Proj. 7222, Task 71747, WADC TN 58 284, Oct. 1958, 11pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,663
The design and development of a conductive cloth plantar electrode for use in studies of galvanic skin resistance changes is described. The conductive cloth electrode proved to be more effective than a lead electrode due to its flexibility, comfort over extended periods of time, light weight, and better continuous contact with the foot. The concept of placing electrodes inside socks is presented as it was developed for skin resistance studies of Ss who were active over extended periods of time. The sock electrodes were worn continuously for periods up to seven days without discomfort and the GSR writeout was relatively free of movement artifacts.
G. I. R 5

16,664
Stevens, S.S. THE PSYCHOPHYSICS OF SENSORY FUNCTION. Amer. Scientist, June 1960, 48(2), 226-253. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.). (Contract NONR 1866(15), PNR 236).

16,664
Following a brief resume of the history of psychophysics, developments since 1930 are discussed. Major topics are measurement; sensory qualities; two kinds of continua (prothetic and metathetic); three kinds of sensory measures (discriminability scales, category scales, and magnitude scales); operating characteristics of sense organs; exponents of the power functions relating psychological magnitude to stimulus magnitude; cross-modality comparisons; force of handgrip scaling; variability in sensory responses; and the role of transducers.
T. G. R 29

16,666
Mauch, H.A. THE DEVELOPMENT OF A READING MACHINE FOR THE BLIND SUMMARY REPORT. Contract V1005 M 1943, June 1960, 10pp. Mauch Laboratories, Inc., Dayton, Ohio.

16,666
A summary report on the development of a reading machine was given and directed toward the solution of detail problems and the building of prototype models. A scanning method had been devised which can select 26 word fragments as well as a word synthesizer. The construction of prototype models was undertaken plus studies to develop a recognition operation which included scanning optimization and photocell studies. Basic solutions were found for scanning characters other than small letters and for various types of print. A matrix using a reduced number of diodes was developed and a functional model was built and demonstrated.

16,667
Lehmann, W.P. (Chief Investigator). MACHINE LANGUAGE TRANSLATION STUDY RESEARCH ON THE MACHINE TRANSLATION OF GERMAN FOURTH QUARTERLY PROGRESS REPORT. Contract DA 36 039 SC 78911, April 1960, 59pp. University of Texas, Austin, Tex.

16,667
This is the fourth quarterly progress report of a study of problems in translation of natural language by large scale digital computers. This report presents the theoretical basis for the system in detail. Complete segregation of the permanent translation process from the structural characteristics of specific input and output languages is required by the system. To achieve this, information about a specific language is supplied by data formats called recognition and production grammars. The way in which generalized processes use such grammatical data to recognize and produce sentences is explained in detail and illustrated with material from German and English grammars.
I. R 3

16,668
Kamen, J. VARIABILITY OF FOOD ACCEPTANCE BEHAVIOR UNDER NORMAL FEEDING CONDITIONS PART 2. REASONS FOR NON-CONSUMPTION INTERIM REPORT. Proj. 7 84 15 007, QMFCIAF Rep. 38 59, Dec. 1959, 24pp. USA Food Acceptance Branch, QM Food & Container Institute for the Armed Forces, Chicago, Ill.

16,668
To obtain the reasons given by soldiers for not eating a food, a test was conducted at 17 Army installations located in four widely separated areas of the country. Three questionnaire forms were used and these differed only in the order in which the reasons for nonconsumption of foods were listed. Two mess halls were chosen at each of the four installations to be surveyed each day for all three meals, with approximately 32 soldiers in each of the mess halls. The soldiers completed a questionnaire at each meal. The results were examined in terms of: 1) soldiers not eating all that they had taken, 2) those not taking a food, and 3) the most salient reasons given for not doing so.
T. R 2

16,669
Jenkins, G.M. & Chanmugam, J. AUTOCORRELATION ANALYSIS AND THE DESIGN OF EXPERIMENTS. Contract DA 04 200 ORD 996, Tech. Rep. 2, Aug. 1960, 67pp. Applied Mathematics & Statistics Labs., Stanford University, Stanford, Calif.

16,669
This study is concerned with the investigation into the effect of autocorrelation on the strategy of experimentation. Its application in industry is considered and an example of its application is given. The report is divided into three parts. Part I discusses the basic principles involved and a statement of the problem. Part II presents the formulae and theories necessary and so is highly statistical. Part III indicates the practical applications of these results and discusses the implications of the results.
T. G. R 24

16,670
Humphries, M. ERRORS IN MARKING THE CENTRES OF LINES, CIRCLES, AND LENTICULAR FIGURES AS A FUNCTION OF SIZE. Percept. Mot. Skills, Aug. 1960, 11, 67-70. (Defence Research Medical Labs., Toronto, Ontario, Canada). (DRML Proj. 107, Rep. 107 7, PCC D77 94 20 23, HR 168).

16,670
To determine the accuracy with which centers of targets variously shaped and sized could be marked, ten Ss marked the centers of a series of lines (from 0.125 to 2.00 inches in length viewed both horizontally and vertically); circles (diameters same as lines); and lenticular shapes (sized approximately as above). An analysis was made of absolute errors to determine the effect of size and orientation.
G. I. R 5

16,671
Gebhard, J.W. & Hanes, R.M. (Eds.). INFORMATION REQUIREMENTS FOR THE CONTROL OF COMBAT FORCES. Summary of the Proceedings of a Conference sponsored by Working Group VI-Visual Displays, National Academy of Sciences, Washington, D.C., June 24-26, 1959, Contract NONR 2300(05), March 1960, 21pp. Armed Forces-NRC Vision Committee, ONR, Washington, D.C.

16,671
This was a report on the proceedings of the Conference on the Information Requirement for the Control of Combat Forces. Representatives of the several services presented requirements for displays of data used in making command decisions. The matter of automation in decision-making and the degree of desirability of automation in the defense forces, bomber forces, Army, and Navy were discussed. A roster of the attendants at the conference was also included in the report.
I. R 1

16,672
Swartz, W.F., Obermayer, R.W. & Muckler, F.A. SOME THEORETICAL LIMITS OF MAN-PERISCOPIC VISUAL PERFORMANCE IN AN ORBITAL RECONNAISSANCE VEHICLE. Contract AF 33(616) 5472, Engng. Rep. 10,978, Dec. 1959, 132pp. Martin Company, Baltimore, Md.

16,672
An analytic human engineering evaluation of the man-periscope method of presenting visual information to the orbital reconnaissance operator was given. The objective of the report was to establish theoretical limits of visual performance as a function of 1) minimum-resolvable-object-length, 2) area viewed, 3) time-to-view, and 4) display scale-factor. From a review of the literature, 13 parameters were selected and examined as to their interrelationships and their effects on the four dependent variables for five representative orbital altitudes. The derived data were then extrapolated to an orbital altitude range of 113 to 22,289 miles.
T. G. I. R 44

16,673
Weybrew, B.B. (Princ. Investigator). BIBLIOGRAPHY OF SENSORY DEPRIVATION, ISOLATION AND CONFINEMENT. Proj. MR005.14 2100.03.04, Memo. Rep. 60 1, Jan. 1960, 13pp. USN Medical Research Lab., New London Submarine Base, Conn.

16,673
A bibliography has been compiled of publications in the area of sensory deprivation, isolation, and confinement for use in connection with studies of stress associated with long submerged cruises. A total of 146 entries are listed and fall under the following categories: review articles, anecdotal literature, experimental literature, studies of confinement peculiar to space flight, studies peculiar to submarine environment, sociological and prison confinement, animal studies, theoretical publications, and miscellaneous.

16,674
McCollom, I.N. PSYCHOLOGISTS IN INDUSTRY IN THE UNITED STATES. Amer. Psychologist, ca. 1958, 704-708. (San Diego State College, San Diego, Calif.).

16,674
The author discusses the increasing role of the psychologist in industry today and considers the areas in which he is active and some of his functions in his work. The general areas considered include: personnel selection; personnel development; human factors in design; productivity; management; and miscellaneous. The author makes note of the fact that those who do not ordinarily think of themselves as "industrial psychologists" are actually part of the industrial picture. This group includes the psychologist concerned with human factors and product design for human use.
R 6

16,675
McCaffrey, J.A. & Stern, J.A. A CLOSED ENVIRONMENTAL SIMULATOR FOR MANNED SPACE FLIGHT. Presented at: Aerospace Medical Association, Thirty-first Annual Meeting May 9-11, 1960, BAC 2263 B R1, AM 71 359, 1 1100, 1960, 6pp. Boeing Airplane Company, Seattle, Wash.

16,675
A design for a closed environmental simulator for manned space flight is presented under the contention that such a space station will yield valuable psychological and physiological information which can be utilized in manned space flight. The simulator is a closed ecological system capable of sustaining four men for 90 days. Consideration has been taken of work area, living area, the ecological system, gas-exchange system, food system, water-cycle system, water treatment system, and air-conditioning

16,676
King, R.G. PHYSIOLOGICAL EFFECTS OF POSTURAL DISORIENTATION BY TILTING DURING WEIGHTLESSNESS. For Presentation at 31st Annual Aero Space Medical Association Meeting, Miami, Fla., May 9-11, 1960, 8pp. Life Sciences, Operations Research Incorporated, Silver Spring, Md.

16,676
This report is concerned with observations on labyrinth functions, and specifically the functions of the utricular otolith during weightlessness. The experiment was designed to test the hypothesis that since only gravity could cause displacement of the otolith in the absence of rotation or movement, no postural responses would result by static disorientation of the head under zero gravity. Observations on compensatory poses were made in a C-131 airplane during normal and weightless flight on two normal and four decerebrate pigeons. Some caution should be exercised in generalizing the results to man.
I. R 1

16,677
Wathen-Dunn, W. (Chm.). PROCEEDINGS OF SEMINAR ON SPEECH COMPRESSION AND PROCESSING. AFCRC TR 59 198, Volume 1, Sept. 1959, 230pp. USAF Electronics Research Directorate, AFCRC, Cambridge, Mass.

16,677
This is the first of two volumes of reports which were delivered at the Seminar on Speech Compression. The reports included in Volume 1 are: "Basic Factors in Speech Perception and Applications to Speech Processing"; "Effects of Multiple, Narrow Pass Band Filtering on the Intelligibility of Speech"; "Some Aspects of Intonation and Speech"; "The Effective Use of Digital Simulation for Speech Processing"; "Experiments with a Dynamic Analog of the Vocal Tract"; "Some Progress with Vocoder-Type Systems"; "A Twelve-Channel Transistorized Vocoder"; "The Formodec as a Tool for Speech Studies"; and "A Digitalized Continuous-Analysis Speech Compression System."
T. G. I. R many

16,678
Wenzel, D.G. & Rutledge, C.O. THE DOSE-EFFECT AND DURATION OF ACTION OF PHENOBARBITAL, MEPROBAMATE, CHLORPROMAZINE, AND OXANAMIDE ON MOTOR AND PSYCHO-MOTOR PERFORMANCE. Contract NONR 583(09), Nov. 1960, 8pp. University of Kansas, Lawrence, Kan.

16,678
The present study was conducted to determine the effects of certain drugs and tranquilizers on motor and psychomotor performance as a function of time and to observe any indications of stimulant-induced impairment on performance. Fifteen Ss were tested prior to and 1, 2, and 3 hours following the administration of the following drugs: phenobarbital with doses of 15, 30, and 45 mg; chloropromazine with doses of 25, 50, and 100 mg; meprobamate with doses of 200, 400, and 800 mg; oxanamide with doses of 200, 400, and 800 mg; and three placebo doses. A random administration of drugs was used and a t-test was applied to the data.
T. R 11

16,679
Savage, I.R. CONTRIBUTIONS TO THE THEORY OF RANK ORDER STATISTICS: COMPUTATION RULES FOR PROBABILITIES OF RANK ORDERS. Contract NONR 2582(00), Task NR 042 200, Tech. Rep. 9, Sept. 1959, 4pp. University of Minnesota, Minneapolis, Minn.

16,679
The problems involved in the computations of the probabilities of rank orders are noted. This paper presents two rules which may be employed to facilitate the computation of probabilities of rank order for one-sample and two-sample cases. An example for the application of the rules is presented for both the one-sample rule and the two-sample rule.
R 3

16,680
Stevens, J.C. & Stevens, S.S. WARMTH AND COLD: DYNAMICS OF SENSORY INTENSITY. J. exp. Psychol., Sept. 1960, 60(3), 183-192. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.). (Rep. PNR 234).

16,680
To determine how the apparent magnitude of warmth and cold depends on the intensity of thermal stimulation, the method of magnitude estimation was used under three conditions. The three conditions used were: 1) magnitude estimation of temperature on the arm applied by a thermostatically controlled aluminum stimulator; 2) thermal sensations measured with a hand dynomometer which was a cross-modality matching technique; and 3) immersing the hand into a water bath. The functions of all three conditions were plotted and interpreted in terms of the power function law.
G. I. R 9

16,681
Richter, D.L. TWO-STAGE EXPERIMENTS FOR ESTIMATING A COMMON MEAN. Contract AF 49(638) 261, Tech. Note 59 793, Mimeo. Series 231, June 1959, 15pp. Institute of Statistics, University of North Carolina, Chapel Hill, N.C.

16,681
In this paper the investigator treats the problem of estimating the common mean μ of two populations using a fixed number n of observations. The paper is broken down into three parts with Chapter I setting forth the problem and, in Chapters II and III, the asymptotic minimum value of m is derived. The results are indicated and the reasons for the results are discussed.
R 3

16,682
Rubin, H. AUDITORY FACILITATION FOLLOWING STIMULATION AT LOW INTENSITIES. J. acoust. Soc. Amer., June 1960, 32(6), 670-681. (University of Pittsburgh, Pittsburgh, Penn.).

16,682
Auditory thresholds may become lower (improve) following stimulation by sound of low intensity. This shift in threshold was determined by comparing the reference threshold of a test pulse, presented alone, to the threshold for the test pulse preceded by a stimulating pulse. Duration, intensity, and frequency of the stimulating pulse were controlled, as were duration and frequency of the test pulse and duration of interval between pulses. Both pure tones and white noise were used in various combinations for the stimulating and test pulses; there were four observers: the nature of the facilitatory process, auditory or attentional, and its locus, whether peripheral or central, are discussed.
T. G. I. R 25

16,683
Mooney, C.M. RECOGNITION OF AMBIGUOUS AND UNAMBIGUOUS VISUAL CONFIGURATIONS WITH SHORT AND LONGER EXPOSURES. Brit. J. Psychol., 1960, 51(2), 119-125. (Canadian Joint Staff, London, England). (Proj. D77 94 35 29 (HR 180), DRML Rep. 142 3).

16,683
This study was designed to investigate the importance of eye movements in learning to recognize visual configurations and to provide a test for the hypothesis that visual inspection should be more effective in learning to recognize configurations most amenable to cognitive constructions or associations. Twenty-five subjects viewed three types of items mounted on 35 millimeter slides. The categories were: forms with details, details only, and forms only. These were sorted into two groups of 24 slides each. The subjects viewed one group under 5.0 seconds exposure time and the other at 0.07 seconds exposure.
T. G. I. R 8

16,684
Reza, F.M., Speth, A. & Jutila, S. STUDY OF SYSTEM RELIABILITY. Contract AF 19(604) 2452, AFCRC TN 58 356, SURI Rep. EE 507 586T 1, Tech. Rep. 1, June 1958, 18pp. Syracuse University Research Institute, Syracuse, N.Y.

16,684
This was a report on the major work done over the first year of this project. The three major areas of study were: 1) study of tolerance in systems, 2) redundant component networks, and 3) equilibrium between disturbance and recoveries. Topological rules for obtaining network functions were outlined and a method for a systematic study of tolerance was devised. A number of redundant component networks were discussed and a method to determine the reliability of one class of redundant component connections was developed. The concept of the equilibrium probability associated with a "self-recovery system" was introduced. A basic linear integral equation was developed and the properties of such processes were investigated.
R 2

16,685
Nelson, R.T. AN EMPIRICAL STUDY OF ARRIVAL, SERVICE TIME, AND WAITING TIME DISTRIBUTIONS OF A JOB SHOP PRODUCTION PROCESS. Management Sciences Res. Proj. Res. Rep. 60, June 1959, 41pp. University of California, Los Angeles, Calif.

16,685
This paper is concerned with intermittent production systems producing specified job lots to customer orders on essentially general purpose equipment. The three important elements which contribute to the flow time of work of such a job are processing time, transport time, and waiting time. From empirical data the nature of the arrival and service time distributions for the machine centers of a typical job shop during an experimental time period was studied and the correspondence of the assumptions of existing waiting line theoretical models were examined.
T. G. R 13

16,686
Siegel, A.I., Bulinkis, J., Hatton, R. & Crain, K. STUDY TO ASSESS THE EFFECTIVENESS AND UTILIZATION OF FULL PRESSURE SUITS. A TECHNIQUE FOR THE EVALUATION OF OPERATOR PERFORMANCE IN PRESSURE SUITS AND OTHER FLIGHT APPAREL. Contract N156 34553, Proj. TED NAM AE 5177, Part 3, Rep. NAMC ACEL 435, April 1960, 97pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn. (Applied Psychological Services, Wayne, Penn.).

16,686
This report describes a method for absolute and comparative measurements of the capabilities of men in full pressure suits. The measurement logic and devices used are presented and the measurement of the: 1) rate of movement; 2) psychomotor coordination; 3) manual dexterity light performance; 4) work space requirements; 5) visual field; 6) anthropometric flexibility; and 7) effort exerted for task performance were suggested. The planned measurements are fully described as are the elements of the equipment involved in the measurements. The procedures for administering and scoring the measures are also included.
T. G. I. R 3

16,687
Seaton, R.W. RESPONSE PATTERNS TO AN APPEAL TO TASTE IRRADIATED FOODS INTERIM REPORT. Proj. Food Acceptance Study 7 84 15 007, QMFCIAF Rep. 34 59, Jan. 1960, 16pp. USA Food Acceptance Branch, QM Food & Container Institute for the Armed Forces, Chicago, Ill.

16,687
This study was made to obtain response patterns of subjects requested to taste irradiated foods. An attempt was made to determine some of the factors promoting the likelihood of rejecting an innovation. Request letters and response cards were sent to 720 civilian and military food tasting volunteers to test irradiated food. Returns from 530 people included 360 positive replies (would test irradiated food). The factors analyzed were: sex differences; military versus civilian status; age differences; birthplace; and role of urban and rural environment. The unique nature of the population tested is noted and the need to exercise care in generalizing the results is made.
T. R 37

16,688
Sem-Jacobsen, C.W. & Sykehus, G. "BLACK-OUT" AND UNCONSCIOUSNESS REVEALED BY AIRBORNE TESTING OF FIGHTER PILOTS. EEG Laboratory, Oslo, Norway.

16,688
To verify earlier work, 50 pilots from various United States Air Force bases were tested with airborne EEG recordings. The EEG tracings were supplemented with EKG recordings, respiration rates, and flight patterns. The role of "pilot error" as a source of aircraft accidents as well as "black-out" and unconsciousness under heavy g-load was discussed.

16,689
Smith, E.K., Anastasio, F.J., Kalustyan, B.C., Snyder, R.B., et al. THE APPLICATION OF POINT SOURCE PROJECTION TECHNIQUES TO AIR-TO-SURFACE OBSERVATION TRAINING. Contract NONR 1628(00), NAVTRADEVCEN TR 1628 8, June 1959, 39pp. USN Training Device Center, Port Washington, N.Y. (deFlorez Company, Inc., Englewood Cliffs, N.J.).

16,689
The results of an investigation to determine if a satisfactory visual presentation can be obtained with point light source techniques for application to an air-to-surface observation trainer were described. An analysis of the training task and the skills and cues required for its performance were included. A system was devised and described. It was recommended that this system be evaluated experimentally.
I. R 9

16, 690
Schloss, H.S. A BIBLIOGRAPHY OF PUBLICATIONS IN THE THEORY OF GAMES. Contract AF 19(604) 4573, AFCRC TN 59 797, Scientific Rep. 1, Oct. 1959, 97pp. Electronics Research Lab., Northeastern University, Boston, Mass.

16,690
The present bibliography was compiled from a range of sources which includes the Mathematical Reviews from 1944 to the present; Operations Research; Annals of Mathematical Statistics; and existing bibliographies from the works by J.C.C. McKinsey, D. Blackwell and M.A. Ginshick; Abraham Wald, R.D. Luce and H. Raiffa; and also from the listings in Contributions to the Theory of Games IV, Annals of Mathematical Studies, no. 40, Princeton University Press.

16,691
Smith, E.K., Anastasio, F.J., Harac, S., Kalustyan, B.C. et al. STUDY OF POINT LIGHT SOURCE PROJECTION SYSTEM COMPONENTS. Contract NONR 1628(00), NAVTRADEVCEN TR 1628 1, March 1959, 211pp. USN Training Device Center, Port Washington, N.Y. (deFlorez Company, Inc., Englewood Cliffs, N.J.).

16,691
This report is first in a series designed to investigate the usefulness of the point light source in presenting the visual displays required for various training devices. The basic components of the system--the point source of light, the display-object, and the screen--were described. Variations in system parameters were studied intensively to determine their interrelationships and their effects on the qualities of the visual displays obtained. Values of system parameters which achieve optimum visual display qualities were then related to the basic components of the system to establish desirable attributes of these components. Useful technical information was furnished in the appendices.
T. G. I.

16,692
Stavid Engineering, Inc., Plainfield, N.J. RESEARCH DIRECTED TOWARD INSTALLATION, TESTING, DEVELOPMENT, AND MODIFICATION OF EXPERIMENTAL DATA PROCESSING EQUIPMENT FINAL ENGINEERING REPORT. Contract AF 19(604) 3503, AFCRC TR 59 355, Nov. 1959, 92pp. USAF Electronics Research Directorate, AFCRC, Bedford, Mass.

16,692
This report summarizes the work performed under the project designed to provide technical and engineering support necessary to the operation of a complex data processing system used as a tool in human research studies. Description of the equipment involved is provided and layout and logic diagrams are also included. Also described are the outstanding factors encountered in providing maintenance. A proposed study is offerred to provide greater flexibility and adaptability and to overcome some of the limitations imposed by existing equipment.
I. R 12

16,694
Winzen Research, Inc., Minneapolis, Minn. MANHIGH I. AFMDC TR 59 24, June 1959, 36pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

16,694
The report presented is on the Manhigh I operation which was the first of a series of manned balloon probes into the upper atmosphere. A description of the man operated capsule is given as well as a detailed report on the procedure of the operation. Described are the aerostat and flight control, oxygen and capsule pressurization, air regeneration and temperature control, instrumentation and communication system. An evaluation of the operation and recommendations for improvement are given.
T. G. I.

16,696
Williams, A.C., Jr., Simon, C.W., Haugen, Ruth & Roscoe, S.N. OPERATOR PERFORMANCE IN STRIKE RECONNAISSANCE. Contract AF 18(600) 1798, Proj. 7184, Task 71580, WADD TR 60 521, Aug. 1960, 75pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Hughes Aircraft Company, Culver City, Calif.).

16,696
A description of a strike reconnaisance mission and an analysis of the variables affecting the operator's performance were given. Two experiments based on the above were conducted. The problem considered was to investigate human performance in target identification. The first experiment attempted to determine the sorts of things an observer can identify in aerial photographs of varying resolutions and scale factors. The second experiment attempted to examine some of the problems involved in developing equations for predicting target identifiability. Observers were asked to find airfields in a limited time under conditions similar to experiment I, and time and error scores were recorded.
T. G. I. R 130

16,697
Susskind, C. PROCEEDINGS OF THE THIRD ANNUAL TRI-SERVICE CONFERENCE ON BIOLOGICAL EFFECTS OF MICROWAVE RADIATING EQUIPMENTS 25, 26, 27 AUGUST 1959. RADC TR 59 140, Aug. 1959, 337pp. Printing Dept., University of California, Berkeley, Calif.

16,697
This is a report of the proceedings of the Third Annual Tri-Service Conference. A number of studies were conducted to investigate the biological effects of microwaves. Included in the report were the following studies: biological effects of microwave energy at 200 mc upon the eyes of selected mammals; temperature regulation in laboratory animals irradiated with 3 cm microwaves; some effects of ultra-high frequency energy on primate cerebral activity; theoretical considerations pertaining to thermal dose meters; electrical substitutes for human tissue; some recent developments in pulsed energy sleep; a microwave medical safety program in an industrial electronics facility; and studies on the effects of 2450 mc radiation on the eye of the rabbit.
T. G. I. R many

16,698
Siebens, A.A., Frank, N.R., Kent, D.C., Newman, M.M., et al. MEASUREMENTS OF THE PULMONARY DIFFUSING CAPACITY FOR OXYGEN DURING EXERCISE. Amer. Rev. Respiratory Diseases, Dec. 1959, 80(6), 806-824. (Cardiopulmonary Lab., USN Hospital, St. Albans, N.Y. & Dept. of Physiology, State University of New York, Brooklyn, N.Y.).

16,698
To test the interpretation that pulmonary diffusing capacity reflects the area and permeability of the alveolar-capillary "membrane," measurements were made under circumstances thought to affect primarily area or permeability. Selected patients who had resections of lung tissue, others with interstitial fibrosis and sacroid disease, and "normal" patients (most were young men) were tested using the method of Lillienthal, Riley, Proenamel and Franke. Values of pulmonary diffusing capacity were compared for the several groups. Observations on effects of age and severity of exercise were also made.
T. G. R 38

16,699
Tanner, W.P., Jr. A SYSTEM APPROACH TO THE COUNTERMEASURES PROBLEM. Contract DA 36 039 SC 78283, DA Proj. 3A99 06 001 01, Proj. 2899, Tech. Rep. 103, April 1960, 88pp. University of Michigan Research Institute, Ann Arbor, Mich.

16,699
Communication, radar, and countermeasures problems are each analyzed in terms of pertinent concepts from information theory and signal detectability theory. The communication problem (recognition) and the radar problem (detection) are first clarified in order that the countermeasures problem can be analyzed. Areas requiring further research are pointed out.
T. G. I. R 8

16,700
Wolin, B.R. DESCRIPTION OF SIMULATED SAGE OPERATOR POSITION. Contract AF 19(604) 2635, AFCRC TN 59 68, SDC FN LX 283, Nov. 1959, 31pp. System Development Corporation, Santa Monica, Calif.

16,700
The apparatus described here was designed to be used to test various arrangements and types of switches, buttons, and knobs for insertion of instructions from SAGE consoles to SAGE computers. The apparatus was constructed from parts salvaged from a SAGE console. The subject receives the visual stimulus from an image projected on the rear of a ground glass screen at his position. A detailed account of the apparatus and its operations is given. A number of suggested improvements are also included in the report.
T. G.

16,701
Abbey, D.S. ABILITY AND PERFORMANCE ON A COMPLEX PERCEPTUAL-MOTOR TASK. Percept. Mot. Skills, 1960, 11, 55-56. (University of Toronto, Toronto, Ontario, Canada).

16,701
To examine relationships between early ability and practice on a complex perceptual-motor task, four groups of Ss were formed on the basis of performance during the initial minute of practice. Data were then collected in 20-second intervals and combined into ten one-minute trials for analysis. The task required the S to place a lighted green disc within a lighted red ring by manipulation of an airplane-type control stick. A match was recorded for each proper placement. Both slope and rate of change of the learning curve were analyzed for relationship to initial level of ability.
R 5

16,702
Abbey, D.S. & Cowan, P.A. INCOMPLETE VISUAL FEEDBACK AND PERFORMANCE ON THE TORONTO COMPLEX COORDINATOR. Percept. Mot. Skills, 1960, 11, 43-45. (University of Toronto, Toronto, Ontario, Canada).

16,702
To investigate the effects of incomplete visual feedback on a complex coordination task, two groups of ten Ss each practiced for 20 minutes on the Toronto Complex Coordinator (display panel of 81 double-light assemblies arranged in a 9 by 9 matrix and a control stick used to position a lighted green disc within an illuminated red ring). The apparatus was modified for one group so that visual representation of the Ss' control movements was made intermittent. In the second group, continuous visual representation of tracking movements was given. Mean matches per minute and standard deviations of the matches were compared for the two groups.
T. R 3

16,703
Abma, J.S., Huffman, Lois L., Mason, L.J. & Coffey, J.L. THE FURTHER DEVELOPMENT AND EVALUATION OF AURAL READING DEVICES FOR THE BLIND SUMMARY REPORT. Contract V1005 M 1961, June 1960, 63pp. Battelle Memorial Institute, Columbus, Ohio.

16,703

This summary report described engineering and evaluation activities on the Batelle reader for the blind. Eleven blind Ss were divided into three training classes on the basis of previous training and their ability to use the reading devices. A method that combined tape recording and operation of the machines was used. Context training was introduced in an attempt to improve reading speed. Two experiments were conducted to test the use of a mechanical-tracking accessory. A series of code studies resulted in the recommendation of an improved code. An automatic shut-off device was devised to eliminate tones which would otherwise be heard continually. An investigation was made of possible non-reading applications for the reader. Further research areas were recommended. T. G. I.

16,704

Adrian, W. & Jainski, P. EXPERIMENTAL STUDIES ON THE RELIABILITY OF THE VISUAL THRESHOLD INTERNATIONALLY AGREED UPON FOR THE CALCULATION OF LUMINOUS INTENSITIES OF LIGHT SIGNALS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 4 4, 21pp. US Coast Guard Headquarters, Washington, D.C. (Federal Ministry of Transport, Maritime Signals Test Field, Germany).

16,704

This study was designed to investigate the reliability of visual threshold used for calculating the luminous intensities of maritime lights. The study questioned whether the established value, derived from the deductive method, was still adequate. The factors influencing the theshold value were discussed and the diminishing factor and the conspicuity factor were determined in the laboratory using 24 subjects. The influence of colors on threshold were discussed as were the experimental findings.
T. G. I. R 9

16,705

USA Food Acceptance Branch. FOOD PREFERENCE SURVEY CONDUCTED IN 1958 INTERIM REPORT 10. Proj. 7 84 15 007, QMFCIAF Rep. 23 59, June 1959, 9pp. USA Food Acceptance Branch, QM Food & Container Institute for the Armed Forces, Chicago, Ill.

16,705

In continuation of a program of food preference surveys of Army men initiated in 1949, data were obtained on 27 foods for the first time, and also on a number of foods previously surveyed, to determine whether attitudes had changed over several years. From 1000 to 1250 respondents were chosen from each of four posts selected as being representative of the Army. Each respondent filled in a questionnaire about the specific foods, rating each on a nine-point scale, or checking a "not tried" box. Mean preference ratings and percent not tried were given for each food along with the earlier rating when available.
T. R 15

16,706

von Bekesy, G. NEURAL VOLLEYS AND THE SIMILARITY BETWEEN SOME SENSATIONS PRODUCED BY TONES AND BY SKIN VIBRATIONS. J. acoust. Soc. Amer., Oct. 1957, 29(10), 1059-1069. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.). (Rep. PNR 200).

16,706

Some similarities and differences between skin sensations and hearing were investigated. The volley principle was used to design experiments on how the skin perceives the pitch and locus of a vibrator. The various experiments were concerned with: 1) pitch sensation on the skin, 2) summation of vibratory stimuli with different frequencies, 3) fusion frequency for vibrations of the skin, 4) rotating skin sensations analogous to the rotating tone in hearing, 5) apparent size of the sensation, and 6) modification of sensation according to sensitivity of skin.
G. I. R 6

16,707

Beeson, E.J.G. & Capp, L.J. DISCHARGE LAMPS FOR VISUAL SIGNALLING APPLICATION. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 2 4, 25pp. US Coast Guard Headquarters, Washington, D.C.

16,707

Considered here is the application of Mercury and Xenon lamps as discharge lamps for visual signalling. The characteristics of the Mercury lamps and the Xenon lamps are fully discussed and evaluated in terms of other types. The advantages and disadvantages are cited.
T. G. I. R 5

16,708

Bennett, G. REACTIONS AND PERFORMANCE OF PILOTS FOLLOWING DECOMPRESSION. ca. 1960, 7pp. British Overseas Airways Corporation, London Airport, London, England.

16,708

The reactions of a group of experienced pilots to decompression were studied by depressurizing the aircraft in flight without previous warning being given to the pilot. The times taken to recognize that a pressure change had taken place, to don their oxygen masks, and to begin descent to lower altitudes were recorded. The relations of these times to age, experience, and recency of indoctrination procedures were explored.
T.

16,709

Blaise, P. COLOR VISION IN MARITIME SIGNALING. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 4 1, 18pp. US Coast Guard Headquarters, Washington, D.C. (Dept. of Highways, Lighthouse and Beacon Service, Paris, France).

16,709

The purpose of this study was to investigate to what extent the results of standard colorimetry applies to maritime lights. The physiology of color was discussed and experiments on the vision of a colored point at low intensities were conducted. Eight distinct colors were produced with five levels of luminosity shown to the observers for each color. These were presented under two conditions, one representing total darkness, the other moonlight on a full-moon night. Recommendations based on the results were made.
T. G.

16,710

Blaise, P. & Petry, P. A PROPOSAL REFERRING TO NOTATION FOR LUMINOUS INTENSITY AND THE PREVISION OF THE RANGE OF THE LIGHTS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 4 2, 19pp. US Coast Guard Headquarters, Washington, D.C. (French Lighthouse Authority, Paris, France).

16,710

This report proposes several methods that would aid in standardizing the methods of calculating and denoting the luminous range of a light. The two major proposals are that a logarithmic scale to express luminous intensit be adopted and that the metereological services of the various nations broadcast the state of the atmospheric transparency by indicating the daytime visibility in nautical miles. Other recommendations and suggestions of aid to the navigator are set forth.
T. G. R 7

16,711
Boeing Airplane Company. BOEING HUMAN VIBRATION FACILITY. Contract NONR 2994(00), D3 3301, Sept. 1960, 14pp. Human Factors Unit, Boeing Airplane Company, Wichita, Kan.

16,711
Described in this report are the facilities developed by the Boeing Airplane Company for research concerning design questions regarding human performance capability under low frequency, high amplitude vibration environment. Included are descriptions of the experimental isolation room, experimental control station, voice communication system, arrangement of the physical components, performance capability, and the management and operation of the human vibration chamber.
I.

16,712
Brown, J.L., Phares, L. & Fletcher, Dorothy E. SPECTRAL ENERGY THRESHOLDS FOR THE RESOLUTION OF ACUITY TARGETS. J. opt. Soc. Amer., Oct. 1960, 50(10), 950-960. (University of Pennsylvania, Philadelphia, Penn. & USN Air Development Center, Johnsville, Penn.).

16,712
Threshold relative energy measurements were made with monochromatic light at ten μ intervals between 400 and 710 μ for threshold criteria which represented a series of visual acuities (0.11, 0.20, and 0.33) in addition to light detection. Spectral threshold energy distributions for the three visual acuity and light detection thresholds were shown graphically. The relation between the logarithms of threshold energy and visual acuity required by the criterion of threshold had been predicted from monochromatic energy data for several broad spectral distributions of illumination and predictions were compared with empirical data obtained in this experiment.
T. G. I. R 13

16,713
Britton, J.H. INITIAL SIX MONTHS' EXPERIENCE WITH AIRLINE PILOTS' ELECTROCARDIOGRAMS. Aerospace Med., Oct. 1960, 31, 859-862. (Medical Certification Div., Bureau of Aviation Medicine, Federal Aviation Agency, Washington, D.C.).

16,713
This is a preliminary report on 8177 ECGs of airline pilots between the ages of 35 and 65. The problems discussed here are primarily those of interpretation without benefit of a history on the patient and of methods used for classification of the findings. A tabulation of certain findings is presented.
T. R 2

16,714
Brown, B.P. & Johnson, H.I. MOVING-COCKPIT SIMULATOR INVESTIGATION OF THE MINIMUM TOLERABLE LONGITUDINAL MANEUVERING STABILITY. NASA TN D 26, Sept. 1959, 46pp. National Aeronautics & Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

16,714
Tests were made on a moving-cockpit simulator (normal acceleration and pitch simulator) to determine the minimum tolerable maneuvering stability. Quantitative measurements of the effects of force gradient, position gradient, aircraft damping, and pitching-motion cues with respect to a formation flying task were presented.
G. I. R 3

16,715
Carter, C.V. & Huff, W.W., Jr. THE PROBLEM OF ESCAPE FROM SATELLITE VEHICLES. Presented at: Fourteenth Meeting of the Flight Test Techniques and Instrumentation Panel, May 11-15, 1959, Athens, Greece, AGARD Rep. 242, May 1959, 15pp. Advisory Group for Aeronautical Research & Development, NATO, Paris, France.

16,715
Certain problems associated with the design of escape systems for manned satellite vehicles are presented. An escape system is defined here as an alternate vehicle that can be utilized in the event the primary vehicle becomes uninhabitable. Specific problems considered are escape 1) prior to take-off, 2) during boost at high dynamic pressure, 3) during exit from and entry to the atmosphere, and 4) during orbit. Design procedures are presented that can be employed to determine a satisfactory escape system configuration.
G. R 7

16,716
Arndt, W. & Voit, E.A. COLOUR PERCEPTION AND THE GLARE EFFECT OF SIGNAL LIGHTS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 14, 15pp. US Coast Guard Headquarters, Washington, D.C. (Philips Zentrallaboratorium, Hamburg, Germany).

16,716
Reported is the investigation on threshold of color perception and thresholds of disability glare produced by various colored signal lights. The main body of the test was conducted in a completely blacked-out room. Both eyes were used by the 14 observers. Lights of different colors, produced by color filters, as well as "white" light were used. Variations of the signal intensities were controlled by neutral filters. The findings were examined and discussed in terms of different atmospheric conditions affecting the thresholds.
T. G. I.

16,718
Consolazio, C.F., Shapiro, R., Masterson, J.E. & McKinzie, P.S.L. CALORIC REQUIREMENTS OF MEN WORKING IN AN EXTREMELY HOT DESERT ENVIRONMENT. Proj. 6X60 11 001, Rep. 246, July 1960, 41pp. USA Medical Research & Nutrition Lab., Fitzsimons Army Hospital, Denver, Colo.

16,718
The effects of solar radiation and extreme heat were studied on eight normal, healthy young men. Three test periods, each for ten days duration, were performed on the men who were on a daily constant activity level with food and water ad libitum. The test periods varied as follows: 1) outside in the sun at 40.5 degrees C, 2) outside in the shade at 40.3 degrees C, and 3) indoors at 26 degrees C. Measurements included daily food consumption on each man, daily energy expenditure and energy balance, daily fluid balance, and calorie gain or loss estimated from body weight, water and nitrogen balance. Energy requirements were compared for differences among the test periods.
T. G. R 26

16,719
Coules, J., Duva, J.S. & Ganem, G. EFFECT OF VISUAL NOISE ON THE JUDGMENT OF COMPLEX FORMS. Proj. 9674, Task 96743, AFCCDD TR 60 40, Nov. 1960, 19pp. USAF Operational Applications Lab., AFCCDD, Bedford, Mass.

16,719
The purpose of this study was to investigate one aspect of the use of complex shapes as coding devices and the effect of visual noise on irregular forms. The effect of viewing time on judged complexity was also examined. The complexity of 20 irregular shapes under varying visual noise and exposure time was judged by 20 observers. The two exposure levels for the forms classified into 4, 8, 12, and 16 point polygon categories were .01 and 1.00 seconds. The three signal/noise levels used were -20, -10, and 0 db. Analyses of variance on each of the polygon categories were calculated and the results were examined and discussed.
T. G. I. R 16

16,720
Crawford, B.M. & Baker, D.F. HUMAN FACTORS IN REMOTE HANDLING: SURVEY AND BIBLIOGRAPHY. Proj. 7184, Task 71586, WADD TR 60 476, July 1960, 36pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

16,720
The state-of-the-art in remote handling is assessed and related to present and future advanced system requirements. Principal features and purposes of the main types of such systems, including sensory feedback provisions, are described. Human engineering considerations related to equipment design, motor and sensory requirements of tasks, and perceptual difficulties together with possible solutions, are discussed. Conclusions derived from experience and experiment are cited. Possible implications of current concepts for planning nuclear-powered systems and space support units are considered. A bibliography from sources in the United States, Canada, Great Britain, and France is included.
I. R 177

16,721
Creelman, C.D. HUMAN DISCRIMINATION OF AUDITORY DURATION. Contract AF19(604) 2277, AFCCDD TR 60 39, Tech. Rep. 114, Oct. 1960, 60pp. The University of Michigan Research Institute, Ann Arbor, Mich.

16,721
A series of related experiments was performed which measured human ability to discriminate durations of auditory signals. A two-alternative forced-choice procedure required the S to state which of two sine-wave signals of identical amplitude and frequency was the longer; the order of presentation was random. Independent variables were the signal voltage, the "base" duration (T), and the increment duration (ΔT). Separate experiments assessed the functional effects of these variables on discrimination. A model of time discrimination was devised from statistical decision theory and predictions derived were compared with the data regarding auditory signals.
T. G. R 64

16,722
Crispino, P.A. & Marcus, N.D. RESEARCH STUDY - AREAS OF EFFECTIVE INSULATION IN COLD CLIMATE FOOTWEAR AND DEVELOPMENT OF THE SECTIONALIZED FOOT CALORIMETER. Contract DA 19 129 QM 1149, Proj. 7 79 10 001 C, Clothing Branch Series Rep. 16, March 1960, 29pp. Foster D. Snell, Inc., New York, N.Y.

16,722
A method of laboratory evaluation of the distribution of effective insulation (by areas, i.e., toe, heel, sole, etc.) in cold climate footwear was developed and tested. The mechanisms operating in the passage of heat through cold climate footwear were analyzed. It was determined that the most practical and useful method of laboratory evaluation would be direct measurement of the rate of heat loss in various areas. A sectionalized foot (or boot) calorimeter was designed and constructed employing the principle of a group of guarded hot plates to measure heat losses. The calorimeter was then used to evaluate boots of diverse design and of different insulating materials.
T. G. I.

16,723
Duntley, S.Q., Rennilson, J.J., Austin, R.W. & Taylor, J.H. A COMPRESSED-SCALE SYSTEM OF PORTABLE VISIBILITY LIGHTS. Contract NOBS 72092, Index NS 714 100, SIO Ref. 60 16, March 1960, 38pp. Visibility Lab., University of California, San Diego, Calif.

16,723
A compressed-scale, battery operated portable system of visibility lights is described. The lights are intended primarily for use at dispersal and other tactical bases where adequate visibility check points are not available.
G. I. R 3

16,724
Edgerton, H.A. THE ACCEPTABILITY AND EFFECTIVENESS OF THE CASUAL USE OF AUDITORY TRAINING AIDS. Contract N61339 373, Tech. Rep. NAVTRADEVCEN 373 1, March 1960, 77pp. USN Training Device Center, Port Washington, N.Y.

16,724
This study was designed to investigate the acceptability and effectiveness of recorded lesson reviews as supplementary aids to instruction in naval schools. The subjects were trainees from two naval schools. One group acted as the experimental, the other as the control group. The major questions investigated were: 1) How much do trainees listen to lesson reviews? 2) Is intellectual ability an important variable in the appeal that the lessons hold for the trainee? and 3) Does availability of lesson reviews aid the trainee in doing better course work? The experimental and control groups were made comparable by comparing the mean scores of the aptitude tests taken by the trainees. The results were discussed and sample lessons included in the report.
T. I. R 3

16,725
Fox, H.M. PSYCHOLOGICAL AND PITUITARY-ADRENAL RESPONSES TO STRESS. FINAL REPORT. Contract DA 49 007 MD 213, Sept. 1960, 12pp. USA Office of the Surgeon General, Washington, D.C. (Peter Bent Brigham Hospital, Boston, Mass.).

16,725
A summary was given of a nine-year research study on the correlation of personality structure with relatively constant homeostatic patterns during periods of ordinary life activity and in response to life stress as measured by certain indices of pituitary-adrenal and hypothalamic function. The Ss were male college students, all of whom were in good health and anticipating eventual military service. Seven pairs of identical twins were included in the S group. Each S was observed over a comparatively long period of time and thus served as his own control. Biochemical indices, neurophysiological methods, and psychological methods were used by experts in each field to measure a variety of responses. The findings were presented and discussed in relation to their usefulness.
T. R 20

16,726
Freedman, S.J. & Held, R. SENSORY DEPRIVATION AND PERCEPTUAL LAG. Percept. Mot. Skills, Dec. 1960, 11, 277-280. (Massachusetts Mental Health Center, Boston, Mass. & Brandeis University, Waltham, Mass.).

16,726
This experiment was designed to test further the evidence that gross distortions of visual perception occur after prolonged sensory deprivation. A perceptual lag test, consisting of a thin black line rotated against a dimly illuminated milk glass screen in a darkened room, was administered to 12 subjects after three exposure conditions. The perceptual lag test was administered at the beginning of the session and at 30 minute intervals over a three hour period. The three sensory deprivation conditions were: 1) diffuse light stimulation, 2) random flash, and 3) blacked-out room. The consequences of controlling the amount of stimulation and the effect of perceptual lag in monitoring tasks were discussed.
G. R 11

16,727
George Washington University. WORK PROGRAM FOR FISCAL YEAR 1960. PERSONNEL MANAGEMENT: TRAINING METHODS; MOTIVATION, MORALE, AND LEADERSHIP. Proj. 095 50 000, June 1959, 90pp. Human Resources Research Office, George Washington University, Washington, D.C.

16,727

Task statements and summary charts are presented to outline work to be done in 1960. Twelve studies in the training methods division include training for electronics repair and trouble shooting. The divisions and representative studies are as follows: Army Human Research Units: studies of armor, performance in task gunnery; Leadership: combat training and effects of isolation on performance; Infantry: training for combat proficiency; Air Defense: job analysis and training for missile operations personnel; Aviation: training for air surveillance, integrated contact, instrument training; Director's Office: a study of methods for training and motivation research.

16,728

Jacobius, A.J., Kenk, R., Marrow, E., Plavnieks, Ilga M., et al. AEROSPACE MEDICINE AND BIOLOGY. AN ANNOTATED BIBLIOGRAPHY. VOLUME III. CHIEFLY 1954 LITERATURE. 1960, 542pp. Science and Technology Div., Library of Congress, Washington, D.C.

16,728

The third volume of the bibliography of Aerospace Medicine and Biology is compiled chiefly of literature published in 1954. It contains informative abstracts of journal articles, reports, and monographs and includes the authors, titles, volume, issue number, place of publication, etc. Some subjects included in the bibliography are: acceleration, accident proneness, age, adaptation, biological rhythms, blood pressure, brain activity, clothing, cockpits, deafness, decompression sickness, flying personnel, human engineering, hypoxia, mental stress, and vision. A sample of titles is as follows: "Psychological Aspects of Survival," "Noise and Means of Combating It," "Expansion Space for Liquid Oxygen Converters," "Aircrew at Altitudes," and "Psychological Factors of Morale."

16,729

Jacobs, G.J. (Ed.). PROCEEDINGS OF CONFERENCE ON RADIATION PROBLEMS IN MANNED SPACE FLIGHT JUNE 21, 1960, WASHINGTON, D.C. NASA TN D 588, Dec. 1960, 99pp. National Aeronautics & Space Administration, Washington, D.C.

16,729

This conference was concerned with the effects of radiation on the biological system. It met to discuss space radiation problems and to gain better understanding of the role of the physicist and biologist in solving these problems. The four problem areas discussed were: 1) What is the present status of the physical measurements of radiation in the space environment? 2) What interpretation of these physical measurements of radiation in the space environment may be given in terms of biological effectiveness? 3) What further studies are needed to define the radiation problems in manned space flight? and 4) How may additional studies of these radiation problems best be accomplished?
T. G. R 13

16,730

Kaehler, R.C. & Meehan, J.P. HUMAN PSYCHOMOTOR PERFORMANCE UNDER VARIED TRANSVERSE ACCELERATIONS. Contract AF 33(616) 5407, Proj. 7222, Task 71746, WADD TR 60 621, Aug. 1960, 50pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio. (School of Medicine, University of Southern California, Los Angeles, Calif.).

16,730

To study human performance capabilities under conditions of positive and negative transverse acceleration, five subjects were observed. The apparatus consisted of four consoles with five representative aircraft-type controls, a lap control, and a control panel which measured response time, reach time, and adjustment time. The controls, a horizontal lever, vertical trim wheel, rotating knob, toggle switch, and push-to-test button were located in various positions in the human centrifuge simulating a 180 degree horizontal and 90 degree vertical workplace. Measures were made for both left and right hand operations in the typical total workplace area.
T. G. I.

16,731

Karpovich, P.V. ELECTROGONIOMETER FOR MEASURING DEGREE OF FOREARM ROTATION. Contract DA 49 007 MD 889, Sept. 1960, 13pp. Dept. of Physiology, Springfield College, Springfield, Mass.

16,731

A new rotary electrogoniometer, called for short a rotary elgon, was developed for measuring the amount of rotation of the forearm. The instrument allows measurements to be made during physical activity. The instrument, validating data, and its uses are described.
T. G. I.

16,733

Kiessling, R.J. PERFORMANCE IMPAIRMENT AS A FUNCTION OF NITROGEN NARCOSIS. Proj. NS185 005, Subtask 5, Test 12, Res. Rep. 3 60, June 1960, 19pp. USN Experimental Diving Unit, Naval Weapons Plant, Washington, D.C.

16,733

To develop a procedure that could determine whether performance decrement appears in divers at simulated depths as shallow as 100 ft., to evaluate the relation between amounts of decrement and complexity of task, and to investigate performance efficiency as a function of duration of exposure at constant pressure, ten Navy divers individually performed air dives in a high-pressure chamber for 40 minutes at a simulated depth of 100 ft. The Ss had been trained to a constant level of performance in choice reaction time, motor coordination, and reasoning tests. Performance measures were taken at sea level preceding the diving, during three periods at a pressure equivalent to 100 ft. of sea water, and, finally, at ten ft. during decompression stop. Comparisons were made of these data for performance impairment. T. G. I. R 25

16,734

Knapp, R.R. THE EFFECT OF ENVIRONMENTAL FACTORS ON THE PERFORMANCE OF MARINE CORPS PERSONNEL. PILOT STUDY: THE USE OF PERFORMANCE TESTS AND QUESTIONNAIRES TO DIFFERENTIATE BETWEEN TYPES OF BODY ARMOR - A PRELIMINAR INVESTIGATION. Res. Proj. Task NM 41 03 09, IX, 267-292, June 1959, USN Medical Field Research Lab., Camp Lejeune, N.C.

16,734

A preliminary investigation was undertaken to determine the feasibility of using performance tests and questionnaires to differentiate between various types of body armor and load-carrying systems in terms of changes in efficiency of performance and of user acceptability. Ten Marine Corps Ss performed a field problem of one hour's duration requiring relatively strenuous exercise under five conditions: one control with no weight carried, over that of rifle, helmet, and field clothing; and four experimental wherein the weight carried was varied from 16 to 36 lbs. Performance tests were given before and after the exercise and the questionnaires after exercise. Difference scores between pre- and post-exercise tests were subjected to analysis of variance for differences among conditions. T. I. R 7

16,735

Koski, T.H. PASSIVE TRACKING SIMULATOR. Contract DA 36 039 SC 78281, Tech. Memo. EDL M297, July 1960, 20pp. Electronic Defense Laboratories, Sylvania Electric Products Inc., Mountain View, Calif.

16,735

A versatile simulator for the purpose of providing pulse signals for testing passive tracking systems (defined as a system to track a signal emanating from a target which has a beacon located within it--may be a missile or a plane) employing conical scanning is described. Results obtained during tests of tracking accuracy on an actual system are included.
T. G. I. R 3

16,736
Krasno, L.R. & Kidera, G.J. THE BALLISTOCARDIOGRAPHIC AND PLETHYSMOGRAPHIC RESPONSE OF "NORMAL" AND CARDIC PATIENTS TO NITROGLYCERIN. Aerospace Medicine, Nov. 1960, 31, 925-932. (Medical Dept., United Air Lines, Chicago, Ill.).

16,736
A new technique physiologically identifying the possible presence of an early arteriosclerotic process based on relative changes occurring in the ballistocardiogram and plethysmogram following the hemodynamic response to nitroglycerin is described. The increased validity of this procedure due to the control of biophysical and physical variables is indicated. An attempt to identify physiologically the arteriosclerotic process by this procedure is described.
T. G. I. R 8

16,738
Lit, A. EFFECT OF TARGET VELOCITY IN A FRONTAL PLANE ON BINOCULAR SPATIAL LOCALIZATION AT PHOTOPIC RETINAL ILLUMINANCE LEVELS. J. opt. Soc. Amer., Oct. 1960, 50(10), 970-973. (Vision Research Labs., University of Michigan, Ann Arbor, Mich.).

16,738
This experiment is concerned with the analysis of the major stimulus factors that influence the magnitude of the Pulfrich Stereophenomenon. The experiment provides quantitative data on localization errors for transverse oscillating targets observed under conditions of equal binocular retinal illuminance. The effect of target velocity is systematically investigated at each of three photopic levels of retinal illuminance. Two observers were used with a total of six experimental sessions for each observer. Five pairs of equality settings were obtained at one retinal illuminance level for each of the ten target velocities.
G. I. R 10

16,739
Lucier, R.O. & Parker, E.J. HUMAN FACTORS CONSIDERATIONS IN THE DESIGN OF ECLECTRONIC COMPUTERS FINAL REPORT. Contract DA 36 039 SC 75047, DA Proj. 3 28 01 201, PR & C 58 ELC/D 4457, Rep. AD6OUR1, June 1960, 44pp. Institute for Cooperative Research & Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Penn.

16,739
This report is primarily concerned with the human element in the design of computer equipment with particular emphasis on the application of the human element to the design of the FIELDATA System. The report is divided into three parts: 1) panel design of the operators' console, 2) human factors and producers of electronic computers, and 3) consideration of electronic computers. The automatic data processing personnel problem is discussed as are some of the present approaches to the problem.
T. R 8

16,740
Luebbert, W.F. INFORMATION HANDLING AND PROCESSING IN LARGE COMMUNICATION SYSTEMS. Contract NONR 225(24), Proj. NR 373 360, Tech. Rep. 099 1, July 1960, 278pp. Stanford Electronics Labs., Stanford University, Stanford, Calif.

16,740
This report presents an analysis of large communication systems, their organization, control, and supervision. Considered is the way information is handled and error controlled. The need for a common language is recognized and a detailed design of a system information common-language alphanumeric code is presented. This code is used by both data processing and communications systems and has been standardized for joint service use.
T. G. I. R 9

16,741
Maddox, R.L. (Proj. Officer). ANGLE-OF-ATTACK INFORMATION FOR INSTRUMENT FLIGHT. FINAL PROJECT REPORT. Proj. TR&D 59 6, Oct. 1959, 13pp. USAF Instrument Pilot Instructor School, James Connally AFB, Tex.

16,741
To investigate the uses that can be made of angle-of-attack information during instrument flight, 26 flights totaling 76 hours were flown by 12 pilots with the Project Officer. A typical simulated instrument flight included instrument take-off, climb to altitude, cruising flight, holding, Instrument Landing System approach, missed approach, and radar approach to a full stop landing. Prior to flight, pilots were briefed on the principles of angle-of-attack, on operation of the indicating system, and on reference indices (previously worked out) to be used. Notations of pilot reaction and control of aircraft were made during flight and a post-flight debriefing was conducted. Findings were discussed under each phase of the flight.
I.

16,742
Malmo, R.B. & Surwillo, W.W. SLEEP DEPRIVATION: CHANGES IN PERFORMANCE AND PHYSIOLOGICAL INDICANTS OF ACTIVATION. Psychol. Monogr., 1960, 74(15), 1-24. (Allan Memorial Institute, McGill University, Montreal, Quebec, Canada).

16,742
To observe changes in physiological and performance measures as a function of sleep deprivation under conditions designed to be highly alerting (instructions to guard against falling asleep and with various techniques involving continuous feedback of information about performance), three separate 60-hour vigils were held with each of three healthy young male Ss. During each vigil, ten one-hour recording sessions were held several hours apart. In each session, the following measurements were recorded continuously while the S performed on a tracking task (five-minute trials; one-minute rests): EEG, EMG from various muscles, respiration, palmar conductance, and heart rate. Level of activation and sleep deprivation were related in analysis and discussion.
T. G. I. R 42

16,743
Matlin, A.H. STUDIES ON DRIVE AND INCENTIVE IN PERCEPTION II. THE EFFECT OF DRIVE PRODUCED BY PROPNOCEPTIVE STIMULATION ON GENERALIZED RESPONSES TO LOUDNESS AND PITCH. USAF Office of Scientific Research Grant AF 49(638) 367 & National Science Foundation Grant G 4951, Tech. Rep. 6, July 1960, 32pp. Research Center for Group Dynamics, University of Michigan, Ann Arbor, Mich.

16,743
To determine the validity of the hypothesis that perceived stimulus intensity is a function of drive multiplied by the physical stimulus intensity, the effects of proprioceptive stimulation (muscle tension achieved by means of a spring dynamometer) on perceived intensity of sound was investigated. Each of 40 Ss were trained to respond to a particular tone at a given drive level (muscle tension) and then tested on the same tone and on tones softer or louder under different drive levels. The first experiment used tones varying in loudness; the second used variations in pitch. The findings were discussed in relation to predictions derived from the above hypothesis.
T. G. R 32

16,744
Mooney, C.M. RECOGNITION OF SYMMETRICAL AND NON-SYMMETRICAL INK-BLOTS WITH AND WITHOUT EYE MOVEMENTS. Canad. J. Psychol., 1959, 13(1), 11-19. (Defense Research Medical Labs., Toronto, Ontario, Canada). (Proj. D77 94 35 29 (HR 162), Rep. 142 2).

16,744

The present study was based on the hypothesis that memorability, as measured by subsequent recognizability, of novel visual configurations is enhanced by visual inspection rather than a single brief glance. Twenty-four Ss participated in an experiment of factorial design, permitting six replications. Each S was tested twice; two series of ink-blots were used, 16 symmetrical and 16 non-symmetrical, one test presenting one series at .07 sec. exposure allowing a single brief glance, the other test presenting the other series at a five second exposure allowing visual inspection. There were 32 presentations (16 initial and 16 subsequent appearances) in each test. Two kinds of errors, non-recognitions and false recognitions, were analyzed.
T. G. I. R 1

16,745

Morris, G.O., Williams, H.L. & Lubin, A. MISPERCEPTION AND DISORIENTATION DURING SLEEP DEPRIVATION. A.M.A. Arch. gen. Psychiat., March 1960, 2, 247-254. (USA Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D.C.).

16,745

To investigate the nature, development, and relations among changes in perception, thinking, and speech during prolonged wakefulness, the results from two studies of sleep loss, involving 24 and 50 Ss respectively, were analyzed. The experimental setting and general procedure of both studies provided a noncoercive atmosphere with a minimum of heavy work with 72 and 98 hours of sleep deprivation. The results reported here relied on two sources of information: 1) informal observations, reports of nurses and medical corpsmen; and 2) a series of intensive interviews with each of 26 selected Ss, one during the baseline period and two during sleep deprivation.
T. G. R 17

16,746

Moser, H.M. RESEARCH AND RELATED OPERATIONAL SERVICES FOR SIMPLIFIED INTERNATIONAL AERONAUTICAL LANGUAGE. FINAL REPORT. Contract AF 19(604) 4575, RF Proj. 882, AFCRC TR 60 33, Sept. 1960, 5pp. Ohio State University Research Foundation, Columbus, Ohio.

16,746

Included in this final report are the problems investigated and the progress made during the contract period as well as abstracts of the research and studies. The abstracts include: "The Evolution and Rationale of the ICAO Word-Spelling Alphabet," by H.M. Moser; "The Effect of Auditory Stimulation on the Pronunciation of English Words by Non-Native Speakers," by H.M. Moser, H.J. Oyer, et al.; "A Laboratory-Standard Signal-to-Noise Equalizer," by A.K. Newman; "Number Telling," by H.M. Moser, W.C. Fotheringham, et al.; and "Vowel Discrimination Among Foreign Nationals," by H.M. Moser, H.J. Oyer, et al. The personnel appointed on the contract are also listed.

16,747

Moser, H.M., Oyer, H.J., Fotheringham, W.C. & Henderhan, R.C. VOWEL DISCRIMINATION AMONG FOREIGN NATIONALS. Contract AF 19(604) 4575, RF Proj. 882, Tech. Rep. 57, AFCRC TN 60 39, Sept. 1960, 22pp. Ohio State University Research Foundation, Columbus, Ohio.

16,747

To study the ability of foreign nationals to discriminate between English vowels, the following were examined: 1) whether phonetic training enhances a person's ability to discriminate between English vowels, 2) whether a difference exists between foreign groups in English vowel discriminative ability, 3) whether a difference exists between American groups in English vowel discriminative ability, and 4) whether a difference exists between listeners with English-language and those with foreign-language backgrounds in English vowel discriminative ability. Four speakers of general American dialect recorded stimuli, a paired-comparison test utilizing same or different vowels and diphthongs. This test was given to several listening groups of American and foreign nationals. Recommendations were made. T. G. R 5

16,750

Peistrup, C.F. RETROREFLECTIVE MATERIALS ON AIDS TO NAVIGATION. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 5 1, 32pp. US Coast Guard Headquarters, Washington, D.C.

16,750

It is necessary to have quantitative data to predict the visual range of a given material as well as to know whether one type of retroreflective material is quantitatively superior to another. This report attempts to accomplish: 1) introduction of definitions of terms used in photometric theory and measurement, 2) presentation of one method of test procedure and test results, 3) discussion on retroreflective theory with the effects of physical parameters on visual range, and 4) application of photometric data to the retroreflector design problem.
T. G. I. R 8

16,751

Petrie, A. SOME PSYCHOLOGICAL ASPECTS OF PAIN AND THE RELIEF OF SUFFERING. Ann. N.Y. Acad. Sci., March 1960, 86(Article 1), 13-27. (Harvard Medical School, Boston, Mass. & Boston Sanatorium, Boston, Mass.).

16,751

The association between tolerance for pain and the tendency to reduce the perceived intensity of a series of juxtaposed stimuli is outlined. Certain aspects of personality and perceptual style, which are changed by a prefrontal lobotomy carried on for relief of pain, have been related by earlier studies to those individuals who tolerate pain well and those who suffer greatly from it. The aspect of satiability (reduction of intensity of subjective perception after stimulation by a more intense perception) is here examined experimentally for kinesthetic perception to see if a parallel exists between the two areas. Sex differences and drug effects are also studied.
T. G. I. R 18

16,752

Polis, B.D. HORMONAL DETERMINANTS OF MAMMALIAN TOLERANCE TO ACCELERATION STRESS. Proj. TED ADC RS 7045(5915 M), Task MR005.15 0002.7, Rep. II, Rep. NADC MA 6025, Aug. 1960, 13pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

16,752

To define hormonal determinants of mammalian tolerance to acceleration stress, deviation from the normal caused by experimental procedures of hypophysectomy and adrenalectomy was studied. Male rats were divided into control and operated groups of hypophysectomized or bilaterally adrenalectomized rats. At least three weeks elapsed between operation and exposure to acceleration stress. The physiological endpoint for the rat's tolerance to acceleration stress was obtained by determining the time to reduce the heart rate from eight to two beats per second at 20 g.
T. G. R 7

16,753

Pollack, I. & Decker, L. CONSONANT CONFUSIONS AND THE CONSTANT RATIO RULE. Language Speech, Jan.-March 1960, 3(Part 1), 1-6. (USAF Operational Applications Lab., AFCCDD, Bedford, Mass.).

16,753

The constant-ratio rule of Clarke summarizes the results of a confusion analysis of speech sounds by stating that the ratio among specific confusion-matrix response probabilities is invariant with the size of the matrix. This rule is evaluated with spoken initial English consonants heard against noise: /f, h, l, r, w, y/; the cluster /hw/; and the absence of the initial consonant /#/. The average deviation between observed consonant confusions for three sets of four by four matrices and confusions predicted on the basis of the constant-ratio rule from an eight by eight matrix is examined. A tentative representational structure for the selected consonants is presented.
T. I. R 7

16,754

Projector, T.H. EFFECTIVE INTENSITY AND EFFICIENCY OF FLASHING LIGHTS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 15, 18pp. US Coast Guard Headquarters, Washington, D.C.

16,754

Because measurement techniques should allow description of properties of flashing lights in a manner comparable to that for steady lights, analogous methods, based on the Blondel-Rey equation, for computing intensity, flux, and efficiency of flashing lights are discussed. These methods have been widely applied in aviation and marine lighting.
G. R 23

16,755

Robie, R.R., Lovell, F.W. & Townsend, F.M. PATHOLOGICAL FINDINGS IN THREE CASES OF DECOMPRESSION SICKNESS. Aerospace Med., Nov. 1960, 31, 885-896. (USAF Aerospace Pathology Branch, Armed Forces Institute of Pathology, Washington, D.C.).

16,755

Three fatal cases of decompression sickness were presented and discussed. Case 1 represented a typical history and typical pathologic findings of decompression sickness. Case 2 represented a typical history but nonspecific pathologic picture. Case 3 represented atypical history and nonspecific pathologic picture. Reasons for the diagnosis of death caused by decompression sickness were presented.
T. I. R 15

16,756

Robinette, Joan C. (Ed.). BIBLIOGRAPHY ON AEROMEDICAL RESEARCH WITH ABSTRACTS. Dec. 1959, 104pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,756

The following areas are covered in a bibliography on aeromedical research: engineering psychology, training psychology, bioacoustics, biophysics, physiology and engineering. Abstracts are included.

16,757

Rohles, F.H., Jr., Belleville, R.E. & Grunzke, M.E. THE MEASUREMENT OF CONCEPT FORMATION IN THE CHIMPANZEE AND ITS RELEVANCE TO THE STUDY OF BEHAVIOR IN SPACE ENVIRONMENTS. Proj. 6893, Task 68930 & Task 68931, AFMDC TR 60 20, July 1960, 11pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

16,757

This report described a task given to two female chimpanzees and aimed toward measuring higher intellectual functioning during space flight. Each chimpanzee was placed in a steel chamber and given the task of learning to press a lever in response to an illuminated symbol. The equipment used was fully automatic, thus eliminating continuous monitoring by the experimenter and applicable for similar research during space flight.
T. G. I. R 8

16,758

Rubenstein, H. & Aborn, M. PSYCHOLINGUISTICS. Annu. Rev. Psychol., 1960, 11, 291-322. (USAF Operational Applications Lab., AFCCDD, Bedford, Mass. & National Institutes of Health, Bethesda, Md.).

16,758

Reviewed here are the recent works that have been conducted in the field of psycholinguistics. Included in the review are the areas of: language segment, word association, recognition of speech sound, labelling, measures of meaning, the Wharfian Hypothesis, universal phonetic symbolism, language learning, language disturbances, language statistics, and books relevant to the problems of psycholinguistics.
R 155

16,759

Ruppersberg, H. STUDIES OF THE RECORDING OF THE METEOROLOGICAL VISIBILITY. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 4 5, 18pp. US Coast Guard Headquarters, Washington, D.C. (Institute for Aeronautical Meteorology, German Gliding Research Centre, Darmstadt, Germany).

16,759

Studies are reported on the use of instruments to make physical recordings of atmospheric turbidity. Such instrumental recording could then lead to automatic control of the operation of maritime signals. Two Foitzik transmissometers were used to make recordings of meterologic visibility in the open air. Visual observations were made by experienced observers to check their meterological value. The setup and measuring procedures are described in detail along with the development of a diffusometer (device to measure standard meterologic visibility from diffused light of a primary luminous flux). Results are discussed and further testing is projected.
G. I. R 8

16,762

Schuknecht, H.F. & Tonndorf, J. ACOUSTIC TRAUMA OF THE COCHLEA FROM EAR SURGERY. Laryngoscope, April 1960, LXX(4), 479-505.

16,762

The nature and extent of cochlear damage caused by high energy acoustic signals, such as those created by a blast in the air or a blow on the head, are discussed and related to lesions produced by surgical procedures and experimental procedures used on animals. A new concept is then developed concerning the mechanism of acoustic trauma. Experimental data on cochlear models are used to reinforce the concept.
G. I. R 18

16,763

Siebert, W.M. PROCESSING NEUROELECTRIC DATA. Tech. Rep. 351, July 1959, 121pp. Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.

16,763

This technical report consists of three chapters, each prepared by a different group of scientists. Each chapter consists of discussions concerning certain measures for the data processing of neuroelectric activity. The study treats the nervous system as a communications system. These chapters are concerned with: 1) quantification of neuroelectric activity, 2) evoked responses, and 3) two techniques for the processing of EEG data. The appendix includes the description of random processes, mathematical statistics, and a description of computers.
G. I. R many

16,764
Slater, L.E. (Proc. Ed.). 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, 165pp. Foundation for Instrumentation Education and Research, New York, N.Y.

16,764
To help emphasize the need for new and improved instrumentation in bio-astronautics, a clinic was held which covered the following areas: the survival of man in space, necessary measurements, measurement techniques, and the integration of man into space systems.
T. G. I.

16,765
Talkin, W.H. THE ROLE OF INSTRUMENTATION: INSTRUMENTATION FOR BIOLOGY AND LIFE SUPPORT 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, 9-12. Foundation for Instrumentation Education and Research, New York, N.Y. (National Aeronautics and Space Administration, Washington, D.C.).

16,765
The necessity of physiological instrumentation of man to provide safety in space flight is discussed. Man is being instrumented because data do not exist on the effects of the conditions to which he will be exposed. The present space technology needs improvement. Human monitoring instrumentation will be expected to explore the effects of long-term weightlessness. Further applications of the achievements of physiological and biological instrumentation beyond their initial purpose once man is familiar with his space environment are discussed.

16,766
Taylor, R.C. THE HUMAN EQUATION: HUMAN FACTORS ANALYSIS IN SPACE 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, 13-16. Foundation for Instrumentation Education and Research, New York, N.Y.

16,766
A methodology has been devised to logically introduce the human factors analysis into early system studies rather than after the design of the system. The historical development of a system was investigated from the general operational requirements through the first system studies by the prime contractor and into the detailed study analysis of the subcontractor. A hypothetical system has been worked out and discussed to illustrate this methodology.

16,772
Simon, G.B. MEASURING INTELLECTUAL ABILITY IN MAN UNDER HIGH ACCELERATION. 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, 106-116. Foundation for Instrumentation Education and Research, New York, N.Y.

16,772
To study the effects of high acceleration on the intellectual abilities of man, a device consisting of a circular drum, 12 inches in diameter, mounted in a console with two window openings for viewing the test items, was developed. The response mechanism was a stick with push buttons. The following tests of intellectual functions were given: vocabulary, numerical operations and approximations, analogies, number and letter series, encoding and decoding, and matching. Individual responses, reaction times, and total testing times were recorded automatically. Questions and comments were included.
I.

16,774
Smedal, H.A., Creer, B.Y. & Wingrove, R.C. PHYSIOLOGICAL EFFECTS OF ACCELERATION OBSERVED DURING A CENTRIFUGE STUDY OF PILOT PERFORMANCE. NASA TN D 345, Dec. 1960, 57pp. National Aeronautics and Space Administration, Washington, D.C.

16,774
This study was designed to investigate the pilot's ability to perform a meaningful task while in moderately high varied fields of acceleration for prolonged periods of time and seated in a forward-facing position. The NADC, AMAL centrifuge was used as a flight simulator and operated as a closed loop system. Six Ss were required to carry out a complex tracking problem. A special restraint system was designed to increase the pilot's acceleration tolerance. The effects of acceleration on the cardiovascular, respiratory, and visual functions of the pilot were discussed.
T. G. I. R 15

16,775
Smedal, H.A., Holden, G.R. & Smith, J.R. Jr. A FLIGHT EVALUATION OF AN AIRBORNE PHYSIOLOGICAL INSTRUMENTATION SYSTEM, INCLUDING PRELIMINARY RESULTS UNDER CONDITIONS OF VARYING ACCELERATIONS. NASA TN D 351, Dec. 1960, 23pp. National Aeronautics and Space Administration, Washington, D.C.

16,775
A compact physiological instrumentation system capable of being used in either aircraft or ground-based simulators was developed. This system was able to record the electrocardiogram , pulse rate, respiration rate, and the systolic and diastolic blood pressures of the S. The system was designed for use during control studies at various acceleration levels to monitor the pilot's well-being and to obtain data to study relationships between various physiological functions and performance capability. Seven flights were made in a T-33 aircraft to record physiological data and evaluate the reliability of the system.
G. I. R 7

16,776
Smith, A.G. EXTRATERRESTRIAL NOISE AS A FACTOR IN SPACE COMMUNICATIONS. Proc. IRE, April 1960, 48(4), 593-599. (Dept. of Physics, University of Florida, Gainesville, Fla.).

16,776
Present-day refinements in communication systems make it appear that extraterrestrial noise sources may establish a fundamental limitation on long-range communications. The various cosmic and solar system radio sources are considered with respect to their intensities, spectral distributions, and temporal characteristics. A table of estimated maximum values of the interference which may be produced at position earth by the various sources (galactic noise, radio stars, solar and planetary radiation) is presented. The direction of best development for long-range communication systems is indicated.
T. G. I. R 22

16,778
Stevens, P.J. THE PATHOLOGIST AND THE APPRAISAL OF SAFETY EQUIPMENT. Ca. 1960, 3pp. RAF Institute of Pathology and Tropical Medicine, Halton, Aylesbury, Bucks, England.

16,778
The increasing need for accurate assessment of the operation of safety equipment is discussed and the role of the pathologist in making retrospective appraisals after lethal accidents have occurred is presented. A number of examples of pathological appraisals leading to definite information about equipment performance are presented and discussed. Such information can lead to accident prevention in many cases.

16,779
Stewart, G.M. EYE PROTECTION AGAINST HIGH-SPEED MISSILES. Proj. 4C99 02 002, Tech. Rep. CRDLR 3007, July 1960, 24pp. USA Chemical Research and Development Labs., Army Chemical Center, Md.

16,779
The resistance of lenses and of rabbits' eyes to penetration by small missiles at high velocities was investigated. Eyes were removed from rabbits varying in age from five to seven months and mounted in gelatin for ballistic evaluation. Lenses included heat-treated glass, unheat-treated glass, laminated glass, and plastic CR-39 Allyl casting of two base curves (9 and 12) and three thicknesses (2.5, 3.0, and 3.5 mm). The missiles were spheres, cubes, and cylinders in the weight range of 4.1 to 14,645 mg. Based on the results of the ballistic tests, recommendations were made for the best material for protective lenses.
T. G. I. R 3

16,780
Tonndorf, J. RESPONSE OF COCHLEAR MODELS TO APERIODIC SIGNALS AND TO RANDOM NOISES. J. acoust. Soc. Amer., Oct. 1960, 32(10), 1344-1355. (University Hospitals, Iowa City, Iowa).

16,780
The systematic investigation of the responses of cochlear models to aperiodic signals was conducted. Also studied were responses to random noises. A model containing a single scala vestibuli was used with high-speed motion pictures used to gain information of the phenomenon of the traveling bulge as a time-space sequence. Parameters included in this study are: propagation velocity, asymmetrical transient, location of maximal displacement, and response to random noises.
T. G. I. R 18

16,782
Green, D.M. PSYCHOACOUSTICS AND DETECTION THEORY. J. acoust. Soc. Amer., Oct. 1960, 32(10), 1189-1203. (Massachusetts Institute of Technology, Cambridge, Mass.)

16,782
Detection theory is reviewed as it relates to certain psychoacoustic data. The author views detection theory as the combination of decision theory and the concept of the ideal observer. Thus, the auditory threshold process is treated as an instance of hypothesis testing. There are at least two determinants in this process: detectability of the signal and criterion level of the observer. The model is viewed as both a source of hypotheses and a standard against which to evaluate experimental results.
T. G. R 37

16,783
Hanna, T.D. ENVIRONMENTAL REQUIREMENTS OF SEALED CABINS FOR SPACE AND ORBITAL FLIGHTS - A SECOND STUDY. PART 5: SOME PHYSIOLOGICAL MEASURES ON CONFINED SUBJECTS BREATHING RECYCLED GASES FOR EIGHT DAYS. Proj. TED NAM AE 1403, Rep. NAMC ACEL 417, Sept. 1960, 28pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,783
To study the effects of confinement, six men were isolated for eight days in a simulated space capsule of approximately 75 cubic ft. per man at sea level while rebreathing the same air via a closed cycle oxygen generating system. Bioelectric measures were obtained during seven of the eight days: continuous records were obtained for the plantar electrical skin conductance; measures of heart rate, respiration rate, and forehead skin temperature were recorded every 20 minutes. The interpretation of physiological measures was discussed, and recommendations were made.
T. G. R 80

16,784
Harrison, J.O., Jr. & Lee, E.M. THE STRATSPIEL PILOT MODEL. ORO TP 7, Aug. 1960, 93pp. Operations Research Office, Johns Hopkins University, Baltimore, Md.

16,784
This study, one in a set of three war games, supports a study of Army requirements for situations short of general war. The problem is to devise a pilot model strategic game including political and military factors and to explore the use of a computer for bookkeeping, computing, and communication purposes in strategic gaming. The model represents a two-sided struggle (between "neutral" and "Red" nations) over a period of time. Political control and condition are the principal variables; each player also has available a spectrum of force. The players try to attain their objectives over a series of incidents or wars. Sixteen plays were conducted with 16 players participating. Possible future developments are discussed.
T. G. I. R 6

16,785
Hegenwald, J.R., Jr., Maddon, J.F. & Penrod, P.R. X-15 RESEARCH AIRCRAFT EMERGENCY ESCAPE SYSTEM. AGARD Rep. 243, May 1959, 36pp. Advisory Group for Aeronautical Research & Development, NATO, Paris, France.

16,785
The design and development of an emergency escape subsystem which is compatible with the configuration and mission profiles of the X-15 Research Airplane are described. Requirements, component descriptions, performance characteristics, diagrams, and photographs are included. An open ejection seat in conjunction with a full pressure protective garment best satisfies the requirements.
G. I.

16,786
Hilton, D.A., Mayes, W.H. & Hubbard, H.H. NOISE CONSIDERATIONS FOR MANNED REENTRY VEHICLES. NASA TN D 450, Sept. 1960, 13pp. National Aeronautics & Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

16,786
Noise measurements pertaining mainly to the static firing, launch, and exit flight phases are presented for three rocket-powered vehicles in the Project Mercury test program. Both internal and external data from on-board recordings are presented for a range of Mach numbers and dynamic pressures and for different external vehicle shapes.
G. I. R 11

16,787
Hirai, S., Fuchita, K., Kobayashi, M. & Harashima, O. APPLICATIONS OF NOCTOVISION AS AIDS TO NAVIGATION IN THE NIGHT AND THRU FOG. Presented at: "Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Sept.-Oct. 1960, Washington, D.C.", Rep. 5 4 3, Sept. 1960, 15pp. US Coast Guard Headquarters, Washington, D.C.

16,787
Investigations on performances of Noctovision, a device to see in darkness under near-infrared illumination, in the night and under conditions of smoke, haze, fog, and rain are reported. The principle and construction of the Noctovision equipment are described. Results of field tests and laboratory experiments, as well as those of comparison experiments between infrared and visible rays, are discussed.
T. G. I. R 3

16,788
Hirai, S. DECREASE OF A SOUND SIGNAL ON THE SEA. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 6 1 1, 10pp. US Coast Guard Headquarters, Washington, D.C. (Engineering Section, Navigational Aid Div., Maritime Safety Board, Japan).

16,788
Measurements of the propagation of sound on the sea 1200 meters off the shore in Tokyo Bay were made. The sound signal was created by an audio-frequency oscillator and, after amplification, was emitted by a loud-speaker. The sound loudness level was measured both at point of origin and at the distant point (1200 meters) by meters. Temperature, humidity, and wind direction and velocity were also measured. Attenuation coefficients were analyzed and examined for the effect of all the variables.
T. G. I.

16,789
Burns, N.M. & Gifford, E.C. HUMAN ENGINEERING INVESTIGATIONS OF AIRCRAFT COCKPIT VISUAL DISPLAYS PART 1: TIME ESTIMATION AND ANXIETY. Proj. TED NAM AV 43001, Rep. NAMC ACEL 424, Jan. 1960, 15pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,789
To test the hypothesis that individuals with a high level of manifest anxiety will have difficulty in withholding a response, scores from ten male Ss on the Manifest Anxiety Scale were compared with those on a time estimation (TE) test. The nature of the TE test was such that overestimating the passage of time was equivalent to an ability to withhold a response. Scores were correlated for each of the four intervals (15, 90, 180, 300 seconds) in the TE test. Implications of the findings for flight procedures, monitoring of displays, and selection procedures were discussed.
T. G. I. R 16

16,790
Bryan, G.L., Rigney, J.W., Bond, N.A., Jr., LaPorte, H.R., Jr., et al. THE ROLE OF HUMANS IN COMPLEX COMPUTER SYSTEMS: PROGRAMMING. Contract NONR 228(02), Proj. Desig. NR 153 093, Tech. Rep. 25, Jan. 1959, 74pp. Dept. of Psychology, University of Southern California, Los Angeles, Calif.

16,790
This research was undertaken to develop and organize information about the role of humans in programming digital computers. Programming practices and problems were discussed and special attention was paid to the selection, training, and utilization of programmers. Information was collected by visiting computer centers engaged in business, scientific, and military data-processing. Interviews, questionnaires, and direct observations were among the techniques used. A list of 50 summary statements was presented in the concluding section of the report.
T. G. R 4

16,791
Breckenridge, F.C. A CORRELATION OF SIGNAL COLOR RECOGNITION TESTS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 22, 28pp. US Coast Guard Headquarters, Washington, D.C. (Photometry and Colorimetry Section, National Bureau of Standards, Washington, D.C.).

16,791
This paper translates the results of four research studies on the chromaticities that provide different degrees of certainty for the recognition of signal lights into a common form of expression. This makes possible better comparisons of their significance from both the practical viewpoint of specifying the chromaticity of signal lights and the theoretical viewpoint relating to color vision theory. Typical results (perceptions of chromaticities) are presented in Rectangular-Uniform-Chromaticity-Scale coordinates.
T. G. I. R 7

16,792
Boardman, L.J. SOME RECENT ADVANCES IN RADIOACTIVE SELF-LUMINOUS AIDS TO NIGHT MILITARY ACTIVITY. Proj. N3 674 100, NRL Prob. N95 01, BuShips S 1828, NRL Rep. 5241, Dec. 1958, 12pp. USN Research Lab., Washington, D.C.

16,792
The characteristics and properties of some recently developed radioactive self-luminous sources of light excited by the radioactive isotope krypton-85 are described. Of particular interest are the railway switch light, the hand lanterns, and flashlights. Also discussed are uses such as deck and personnel markers and exit and emergency signs. The ability of the eye when fully dark adapted to read or work in a dark room with these light sources has been determined as well as the distances that such sources are visible in the dark. Radioactive hazards are discussed.
T. G. I. R 6

16,793
Stevens, S.S. THE PREDICAMENT IN DESIGN AND SIGNIFICANCE. Contemp. Psychol., Sept. 1960, V(9), 273-276. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.)

16,793
This article presents a review of Lancelot Hogben's book: Statistical theory: the relationship of probability, credibility and error. An examination of the contemporary crisis in statistical theory from a behaviorist viewpoint, (New York: W.W. Norton, 1958). According to the reviewer, Hogben's complaint about statistics concerns only the fundamentals, in particular the assumptions made when the algebraic theory of probability is taken to be validly representative of one or another aspect of the real world. When are these assumptions appropriate and when are they inappropriate? The reviewer adds a postscript concerning his own questions about conditions that determine the legitimacy of a given statistic.
I. R. 4

16,794
Bell Helicopter Corporation. HUMAN FACTORS QUARTERLY PROGRESS REPORT ARMY-NAVY INSTRUMENTATION PROGRAM APRIL 1 THROUGH JUNE 30, 1960. Contract NONR 1670(00), June 1960, 6pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,794
This report summarizes the work of the Human Factors Group on the Army-Navy Instrumentation Program (Helicopter) during the period April 1 through June 30, 1960. It covers progress in the following areas: 1) vertical display, 2) situation display, 3) auxiliary display, 4) RH-1 program, 5) RH-2 program, 6) obstacle identification and display, and 7) dynamic platform.
I.

16,795
Bell Helicopter Corporation. HUMAN FACTORS QUARTERLY PROGRESS REPORT ARMY-NAVY INSTRUMENTATION PROGRAM. Contract NONR 1670(00), March 1960, 7pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,795

This report covers the work of the Human Factors Group on the Army-Navy Instrumentation Program (Helicopters) during the period January 1 through March 31, 1960. It covers progress in the following areas: 1) vertical display, 2) situation display, 3) auxiliary display, 4) RH-1 program, 5) RH-2 program, 6) obstacle identification and display, and 7) dynamic platform.
I.

16,797

Baron, P. & Prueras, J. DETERMINATION OF THE ACOUSTIC CHARACTERISTICS OF SOUND SOURCES. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 6 1 7, 35pp. US Coast Guard Headquarters, Washington, D.C.

16,797

An experimental investigation of the conditions under which the characteristics of sound sources may be determined was conducted and then applied to a given sound source (a siren in this case). A theoretical study of the necessary conditions preceded the actual testing of the siren in open air.
T. G. I.

16,798

Baron, P. & Prueras, J. RESULTS OBTAINED WITH A GROUP OF SOUND SOURCES. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 6 1 8, 16pp. US Coast Guard Headquarters, Washington, D.C.

16,798

To investigate (at a distance) the finding that a substantial strengthening of a sound in the median horizontal plane was obtained (near the source) by using several identical vibrators set on a vertical line at intervals of half a wave length and operating in phase, measurements were made of a facility in operation at distances from 60 to 2000 meters. The measuring equipment was placed on a tug boat which could be maneuvered over the water for the required distances from the lighthouse. At a given distance, the results obtained with n vibrators operating simultaneously and individually were compared.
T. G. I. R 1

16,799

Baker, P., McKendry, J.M. & Grant G. ANTHROPOMETRY OF ONE HANDED MAINTENANCE ACTIONS SUPPLEMENT III. Contract N61339 330, NAVTRADEVCEN TR 330 1 3, April 1960, 34pp. USN Training Device Center, Port Washington, N.Y. (HRB-Singer, Inc., State College, Penn.).

16,799

In examining present and anticipated maintenance tasks with particular reference to the problem of accessibility, the need for anthropometric data on the space envelopes for dynamic tasks was encountered. Four basic types of dynamic maintenance activities were isolated: 1) the motion required to turn screwdrivers and spintites; 2) the action required to grasp, remove, and replace plug-in units; 3) the action required to grasp, turn, and cut with pliers and wirecutters; and 4) the motion required to turn wrenches. The space envelope required for each of the above actions was determined by a photographic process using Ss with 95th percentile hand sizes. The dimensions for each envelope were obtained. Factors determining these dimensions were discussed.
T. G. I. R 7

16,800

Anast, J. ADVANCED COCKPIT INSTRUMENTATION. Presented at: Joint Meeting of the Flight Test Panel and Aeromedical Panel, Athens, Greece, 11-15 May 1959, Rep. 235, 21pp. Advisory Group for Aeronautical Research & Development, NATO, Paris, France. (Lear Incorporated, Grand Rapids, Mich.).

16,800

This report described development work by the U.S. Government and Lear, Incorporated on an integrated cockpit instrumentation system to meet the changing requirements of high-altitude, high-speed flight. The primary effort had been in the development of all-attitude instrumentation systems to meet the demands of all-weather flight. The Standard and Phase II GI (Vertical Gyro Indicator) Systems were discussed and their limitations indicated. Other indicators (Three-Axis, Two-Axis Flight-Director, and Three-Axis Flight-Director) were described. Application of the integrated display to helicopters, command and remote standby instrumentation, and verticality errors were discussed.
I.

16,801

Hartshorne, F.A. (Supervisor). A PREDICTION OF AN/FPS-3 RELIABILITY. Contract AF 30(602) 1623, Proj. 4526, Task 45155, RADC TN 58 19 & Rep. R 2 57, Oct. 1957, 60pp. Government Service Dept., RCA Service Company, Inc., Camden, N.J.

16,801

To provide a specific example demonstrating the random sampling technique of reliability prediction for complex systems, the AN/FPS-3 Search Radar equipment was analyzed. The random sampling technique is an attempt to advance the art of reliability prediction by reducing time and cost factors. Through this approach the mean life (mean time between random failures) and probability of survival values for the overall AN/FPS-3, tower groups, and building groups equipments are estimated. The concepts, terminology, and premises associated with reliability prediction are presented.
T. G. R 5

16,802

Hardy, J.D., Clark, C.C. & Gray, R.F. ACCELERATION PROBLEMS IN SPACE FLIGHT. Proj. TED ADC AE 1412, Task MR 005.12 0005.6, Rep. 4 & Rep. NADC MA 5909, Oct. 1959, 34pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

16,802

The present state of knowledge in the area of acceleration and its effect on man is discussed with particular reference to space flight. The terminology used is first specified in such a way as to eliminate descriptive terms. The problem of weightlessness is treated briefly followed by a more detailed discussion of exposure to high levels of acceleration for long periods of time, methods of experimentation, and the various means of protection that have been used. The use of water immersion to protect man against the effects of high acceleration is discussed together with presentation of some experimental findings.
G. I. R 30

16,803

Fitzpatrick, J.T. & Wilcox, R.S. PROPERTIES OF DAYLIGHT FLUORESCENT COLOR SYSTEMS PERTINENT TO THE CONSIDERATION OF THEIR USE ON NAVIGATION AIDS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 21, 32pp. US Coast Guard Headquarters, Washington, D.C.

16,803

This study reviewed information pertinent to the selection of target colors for navigation aids with particular emphasis on the area of daylight fluorescent color. In order to complete existing data and establish a more firm basis for choice, a series of observations, over 700 in total, were made. Target colors selected were international orange, yellow, white, and yellow-orange (Blaze Orange). Two observers viewed the targets on measured courses and both detection and recognition ranges were determined against a wide variety of backgrounds under varying atmospheric conditions and facing the four points of the compass. The results were presented in a series of tables and graphs.
T. G. R 7

16,804
Enoch, J.M., Fry, G.A. & Townsend, C.A. MODIFICATION OF SEARCH BEHAVIOR WITH SPECIAL EMPHASIS ON FEEDBACK ENHANCEMENT TECHNIQUES. Contract AF 30(602) 1580, Proj. 1763, Task 39855, RADC TN 59 368 & OSURF Proj. 696, TP(696) 25, July 1959, 35pp. Mapping and Charting Research Lab., Ohio State University Research Foundation, Columbus, Ohio.

16,804
To determine the degree to which natural visual search tendencies may be modified, eye movement photographs were made for a group of eight subjects as they searched for designated symbols on complex display material (experimental serial maps). Four conditions of search were investigated and compared: 1) free search, 2) forced pace automatic scanning, 3) and 4) a boustrophedonic search pattern with and without the addition of an after-image for enhancement of feedback. Durations of fixations, extents of eye movement, patterns of eye movements, and uniformity of coverage were examined for the effect of these conditions of search with special emphasis on the potential uses of feedback enhancement.
T. G. I. R 11

16,805
Eichmeier, J. & Rheinstein, J. INVESTIGATION OF THE POSSIBLE INFLUENCE OF ATMOSPHERIC IONS ON HUMAN REACTION TIME FINAL TECHNICAL REPORT 1959. Contract DA 91 591 EUC 1035, Dec. 1959, 51pp. Institut fur Technische Elektronik, Technische Hochschule, Munich, Germany.

5,805
A series of experiments investigating the effect of rtificially generated atmospheric ions upon push-button eaction time were conducted. Variables studied included he level of ionization and method of exposure (absorption hrough skin and breathing through the mouth or nose), and ocality of experimentation. In addition, some work was one toward establishing the fact that the results were ctually due to artificially generated atmospheric ions. he possibilities of the elimination of atmospheric small ons in a sealed room were examined and improvement of he small-ion counter equipment was considered.
. G. I. R 166

16,806
Doelling, N., Pearsons, K.S. & Bolt Beranek and Newman, Inc., Cambridge, Mass. ACOUSTICAL EVALUATION OF A B-58 RUN-UP PEN AT CONVAIR-FORT WORTH. Contract AF 33 (616) 3938, Proj. 7210, Task 71708, WADC TN 57 389, Oct. 1958, 57pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio.

16,806
Noise measurements were made at Convair, Fort Worth, in order to obtain an acoustical evaluation of the run-up pen as an aircraft noise suppressor. Data were presented that show noise reduction, in db, in each quadrant of the pen and were related to hearing protection provided to personnel in adjacent pens. The noise characteristics of the B-58 aircraft were also presented.
T. G. I. R 4

16,807
Clark, C.C. & Gray, R.F. A DISCUSSION OF RESTRAINT AND PROTECTION OF THE HUMAN EXPERIENCING THE SMOOTH AND OSCILLATING ACCELERATIONS OF PROPOSED SPACE VEHICLES. Proj. TED ADC AE 1412, Task MR 005.12 0005.6, Rep. 5 & Rep. NADC MA 5914, Dec. 1959, 50pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

16,807
This paper discusses the need for "packaging" the crew during rocket travel to reduce or prevent the body distortions and involuntary control motions which would otherwise occur in response to acceleration. Simulation of space flight by human centrifuge is described. Acceleration effects of vehicle design with specific reference to the X-15 research aircraft and three proposed orbital vehicles are discussed along with various experimental methods for protection against these effects. Water immersion with lung pressurization as a method to prevent body distortions is discussed. It is pointed out that as protection against short term effects of acceleration is developed, increased study of long term effects will be needed.
T. G. I. R 8

16,808
Ciccolella, J.A. MOST ECONOMICAL FLASH LENGTHS FOR MINOR LIGHTS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 18, 18pp. US Coast Guard Headquarters, Washington, D.C.

16,808
The most economical flash length for small, battery-operated lights was determined by theoretical calculations. By most economical flash length was meant that duration of contact closure of the flasher mechanism which results in maximum visibility per unit of battery energy expended during the flash. A few laboratory measurements were described in which the results were compared with theoretically predicted results.
T. G. R 3

16,810
Chang, S.S.L., Harris, B., Hauptschein, A., Hoffman, D., et al. EVALUATION AND OPTIMIZATION OF DIGITAL COMMUNICATION SYSTEMS SUMMARY SCIENTIFIC REPORT JANUARY 15, 1958 TO JUNE 15, 1958. Contract AF 19(604) 1964, AFCRC TN 58 363, June 1958, 93pp. Research Div., College of Engineering, New York University, New York, N.Y.

16,810
An evaluation and comparison of digital communication systems are summarized and a number of suggestions presented for improving the performance of such systems in the presence of interference and propagation anomalies. In particular, the theories of null-zone reception and communication feedback are emphasized and certain coding concepts are considered. A critical review of work accomplished on this study is included with an outline of promising areas for future investigation.
T. G. I. R 37

16,811
Chang, S-H. & McHugh, P.G. AN EXAMPLE AND EXTENSION OF CAPACITY CALCULATION OF A CERTAIN DISCRETE CHANNEL WITH MEMORY SCIENTIFIC REPORT 2. Contract AF 19(604) 3053, AFCRC TN 59 569, Aug. 1959, 24pp. Electronics Research Project, Northeastern University, Boston, Mass.

16,811
The capacity of a certain binary channel with finite memory has been studied and reported in a previous document. This document illustrates the method of capacity calculation by devising a channel that possesses two types of imperfections: 1) distortion due to memory and 2) contamination due to noise. This example demonstrates the relative effects of noise and memory, the increase of capacity by tolerating a greater interdigital interference and the use of pulse weighting to counteract the effect of memory. The method of calculation is further extended from the binary channel to the m-nary channel.
G. I.

16,812
Chambers, R.M. TRANSFER OF TRAINING AMONG COMPONENTS OF A COMPLEX VELOCITY CONTROL TASK. ARDC Proj. 7707, Task 27052 & Task MR 005.15 1003.1, Reps. 3 & NADC MA 5920, Dec. 1959, 20pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

16,812
To test the application of the "transfer of training among task components" principle to the learning and performance of complex rate control task, tests were conducted on six experimental groups of airmen, who were given specific practice on parts of the task, and three control groups. The portions of the task practiced were the most difficult, the moderately difficult, the easiest, or combinations of these. One control group received whole-task practice and the other two had no practice. Then each subject in all groups received eight test trials on the total task. Deviations between pre-test and post-test performance scores were used to evaluate transfer of training effects.
T. G. I. R 12

16,813
Charipper, B.A. SHIP CONTROL X TRACKING IN THE HORIZONTAL PLANE WITH A CONTACT ANALOG DISPLAY. Contract NONR 2512(00), Proj. P59 125, Tech Rep. SPD 59 083, Aug. 1959, 12pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

16,813
To determine how well operators of a simulated submarine can follow a prescribed path in the horizontal plane (course dimension only) using a contact analog roadway, five inexperienced Ss were required to perform this task for five sessions. The roadway was approximately 137.4 scale ft. wide and 100 scale ft. below the submarine The contact analog was mounted in the Electric Boat Submarine Simulator which provided the vestibular/kinesthetic cues of roll and the equations of motion of a SKIPJACK class submarine traveling at 16 knots. On the fifth day, photographic records were taken at one-second intervals of the position relative to the white center line of the roadway.
T. G. I. R 7

16,814
Barthol, R.P. ERRORS IN VISUAL SIZE-MATCHING IN THE FLEXIBLE GUNNERY TASK. Proj. 512 024 0001, Res. Note FG 52 2, July 1952, 14pp. USAF Human Resources Research Center, Lackland AFB, Tex.

16,814
To examine the possibility that certain size-matching (or equating of visual stimuli) tasks that appear quite simple may have hidden complexities that cause performance to be inadequate, a paper-and-pencil test consisting of 78 representations of aircrafts centered in the sights of a gunnery, some correct, some under- and some over-framed, was devised and administered to two groups of gunnery trainees. One group had received 12 weeks of training, the other had not yet started training. The task chosen for investigation was one called "framing" (measuring the apparent wingspan of a target plane with the RETICLE of a sight) in aerial gunnery. Number of errors were analyzed for differences due to training and to banking angle of aircraft factors in perceptual organization that may cause errors were discussed. T. R 2

16,815
Kupferberg, S. STATISTICAL ESTIMATION AND TEST OF HYPOTHESES AS APPLIED TO NON-DETERMINISTIC MODELS. Contract AF 33(616) 3274, IAWR Rep. 58 7, Aug. 1958, 125pp. Institute for Air Weapons Research, University of Chicago, Chicago, Ill.

16,815
The application of the classical statistical theory to problems of estimating and testing which may arise from nondeterministic machine models is discussed. For the case in which the underlying distributions are either normal or exponential, point estimators and confidence intervals for the mean and standard deviation are described along with tests for their equality. Various problems in determining sample size to meet necessary criteria are discussed. A table and some charts not readily available in the literature are included to aid in sample size determination. Various functions that may be evaluated by these techniques are mentioned.
T. G. R 11

16,816
Kallenbach, W., Schroeder, H.J. & Grutzmacher, Dr. NOISE-LEVEL MEASUREMENTS ON BOARD OF SEA-GOING VESSELS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 6 1 4, 12pp. US Coast Guard Headquarters, Washington, D.C.

16,816
Measurements of the noise level and of the frequency composition of noise on the bridge of a considerable number of German sea-going vessels are reported. The one-third octave band-curves of motor-ships, turbine-ships, and steam-ships are stated; average curves for the states "engine stop" and "full speed" are derived. The spread of the measurement values is indicated. Using results of subjective observations of signals masked by ship-noise, those signal-threshold-levels are stated that are necessary for detectability on 83 percent of the vessels by 90 percent of the observers.
T. G.

16,817
Kallenbach, W., Schroeder, H.J. & Grutzmacher, Dr. SOUND-LEVEL MEASUREMENTS OF FOG SIGNALS ON BOARD OF SEA-GOING VESSELS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 6 1 5, 32pp. US Coast Guard Headquarters, Washington, D.C.

16,817
To determine the sound pressure of fog signals from light vessels as a function of the distance to the source as well as of the strength and direction of the wind, the field distribution of air-born sound sources was investigated. The measurements were made on the bridge of sea-going vessels from Hamburg to Bremen and return. Signals, from the four light vessels passed, were recorded by magnetic tape; distances were measured by radar as well as the steered course. Wind strength and direction were also recorded. Analysis of the taped records were performed and the results were presented graphically.
T. G. I.

16,818
Jainski, P. SURFACE COLOURS FOR SIGNALS COLOURS, COLOUR BOUNDARIES, COLOUR TESTS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 12, 17pp. US Coast Guard Headquarters, Washington, D.C.

16,818
This study attacked the problems of specifying the most suitable surface colors for signals under conditions of observation existing in navigation practice, of setting color tolerances, and of testing such tolerances. Existing recommendations were reviewed. Tests were carried out during the summer months under conditions of observation that corresponded to the practice and under natural lighting and atmospheric conditions as they occur in one day. Color samples were observed against gray and colored surrounding fields by a group of 20 observers. Those colors were considered which are used for German maritime signals. Methods for testing color surfaces were given in detail.
T. G. I. R 9

16,819
Jainski, P. THE OPERATION OF BEACON-LIGHTS BY DAY IN HAZY WEATHER. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 10, 12pp. US Coast Guard Headquarters, Washington, D.C.

16,819
The question, whether the available beacon lights could be operated efficiently and economically by day in hazy weather in order to provide an additional aid to navigation, was investigated. A numerical evaluation of luminance values (surrounding luminance in both clear and hazy weather) was needed to calculate the range of beacons; observations were carried out on some beacon lights from the sea and under various conditions of weather and visibility. The results provided some clues for the order of magnitude of surrounding luminances which may be then used in established equations for calculations needed to answer the question.
T. G. R 6

16,820
Jainski, P. THE USE OF COLOURED PLASTIC FILTERS FOR MARITIME NAVIGATIONAL LIGHTS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 9, 9pp. US Coast Guard Headquarters, Washington, D.C.

16,820
Colored plexiglass filters for maritime lights were evaluated by testing for the specified requirements according to their colorimetric, photometric, and mechanical properties. In addition, the economic factor (lower purchasing price than the usual silicate glass filters) was considered. A summary of the findings was presented along with recommendations.
T.

16,821
Jainski, P. CALCULATION OF LUMINOUS INTENSITIES OF LIGHT SIGNALS AT GREAT SURROUNDING BRIGHTNESS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 1 11, 6pp. US Coast Guard Headquarters, Washington, D.C.

16,821
For the calculation of the luminous intensities of maritime lights for assumed ranges, an equation is used in which the luminous intensity as related to range, to the threshold of the eye, and to atmospheric transmissivity is expressed. In this equation the threshold of vision is relative to very small targets and to very low surrounding brightnesses. Since light signals for use by day are increasingly used, the calculation of luminous intensities for this condition is dealt with here.
T. R 5

16,822
Hirai, S. THE RATED RANGE OF A SOUND FOG SIGNAL. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 6 1 6, 10pp. US Coast Guard Headquarters, Washington, D.C.

16,822
This paper dealt with the definition of the rated range of a sound fog signal and the method of its calculation which was presented in an earlier paper (M.R. Ginoechis, "Defining and Calculating the Rated Range of a Sound Signal"). Several questions were raised and only partially answered by experimental data: Is the intensity or stress of a sound signal accurately defined by measuring loudness level at ten meters distance from the source Is the value of atmospheric transmission coefficient correct? Is it proper to assume that a decrease of sound is in proportion to the distance to the minus square? and Is 70 db a proper value for the minimum audible sound with noise background?
I. G. I. R 1

16,823
Hobbs, C.F. THEORETICAL CAPACITY OF INFORMATION SYSTEMS. AFCRC TN 57 106, Dec. 1957, 12pp. USAF Components & Techniques Lab., AFCRC, Bedford, Mass.

16,823
Use is made of the channel capacity formula $C=W \log (1+S/N)$ in comparing the relative effectiveness of increasing bandwidth or signal power on the channel capacity of an information system. Two cases are treated: 1) constant noise-per-unit bandwidth and 2) constant channel noise.
G.

16,824
Hoban, C.F., Lucier, R.O. & Flood, R. HUMAN FACTORS AFFECTING CONSOLE DESIGN IN THE FIELDATA SYSTEM FINAL REPORT. Contract DA 36 039 SC 75047, DA Proj. 3 28 01 201, PR&C 58 ELC/D 4457, Rep. AD59UR1, July 1959, 31pp. Institute for Cooperative Research & Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Penn.

16,824
The role of human factors in systems development in general with particular reference to their position and treatment in the Army FIELDATA system is studied. After a general discussion of the need for human factors personnel in all large system development projects, the relative emphasis on human factors by several Army technical services is examined. The console design of the FIELDATA system is commented upon and specific problems are discussed along with recommendations for improvement in design. Finally, some suggestions for the Ss of immediate and long range studies by human factors personnel are made.

16,825
Henderson, P. PERSONNEL RESEARCH AND EQUIPMENT DESIGN IN ELECTRONICS MAINTENANCE. Tech. Memo. 116, April 1959, 17pp. Clothing & Stores Experimental Establishment, Ministry of Supply, London, England.

16,825
This memorandum presents a brief survey of the literature on problems of electronics maintenance. Personnel selection and training are covered briefly with major emphasis placed upon design of equipment for maintenance. Features of design which will facilitate the work of maintenance personnel, thus leading to more effective use of manpower, are recommended.
I. R 22

16,826
Hawley, M.E. & Touger, M.L. (Leaders). STUDY OF COMMUNICATION IN HIGH-LEVEL AMBIENT NOISE FIELDS FINAL REPORT PHASE I NOISE ANALYSIS AND EQUIPMENT PERFORMANCE. Contract DA 36 039 SC 64469, SIGEL CWB Projs. 132B & 843D, Spec. SCL 1502, File 94 PH 91(4307), May 1955, 148pp. Radio Corporation of America, Camden, N.J.

16,826
This was the first report on Phase I of a research program designed to obtain design information leading to significant improvements in Signal Corps voice communication systems used in the high-level noise environments encountered in many armored vehicles and helicopters. In this first phase, the noise spectra in armored vehicles and helicopters were determined and analyzed; the performance of present Signal Corps equipment in high-level sound fields was evaluated; and a system was synthesized to provide the improved performance required. Interim measures for improvement of present equipment were recommended.
I. G. I.

16,827
Mills, B.J. EMERGENCY ESCAPE CAPSULE STUDIES. 1960, 7pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

16,827

The use of escape capsules as a means of emergency egress from high altitude aircraft demands the study of aircrew survival after descent into a water environment. In support of the capsule development program, a series of flotation and human habitability studies were conducted by the Aerospace Medical Laboratory which were reviewed briefly herein. These tests included air-exchange requirements, clothing design, and survival equipment packaging and design; flotation and habitability tests of prototype capsules in both warm and cold waters; and similar tests with redesigned capsules. The reliability of the equipment was discussed.

16,828

Miller, A.J. PHYSICAL FITNESS FOR STRENUOUS WORK IN RELATION TO THE SURVIVAL SITUATION IN A COLD ENVIRONMENT. Proj. XIV, April 1948, 7pp. USAF Medical Corps, Wright-Patterson AFB, Ohio.

16,828

To evaluate the role of physical fitness in relation to a simulated survival situation, 18 men, divided into four groups, lived outdoors under simulated survival circumstances. The maximum temperature experienced was 10 degrees F and the minimum was -40 degrees F, the weather conditions becoming progressively more severe until the test was terminated at ten days for three groups and six and one-half days for one group. Caloric intake for the ten-day group was 4000, 2100, and 950 respectively; the last group had no food. The "Pack test" of physical fitness was administered to each S before and after the test. Weight losses were recorded and observations made on morale.

16,829

Meehan, J.P. RENAL RESPONSES TO POSITIVE ACCELERATION. Contract AF 33(616) 5407, Proj. 7222, Task 71746, WADD TR 60 637, Sept. 1960, 17pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

16,829

To better define the physiologic responses of the kidney to positive acceleration, the para-amino hippurate clearances, creatinine clearances, and urine flows of three young male subjects exposed to positive acceleration on a centrifuge were studied. The first series of experiments used exposures of three g for ten minutes; the second series used three g for a period of time determined by the subject's comments as to his ability to tolerate the stress.
T. I. R 12

16,830

McDonald, J.E. & Green, Christine R. A COMPARISON OF RANK-DIFFERENCE AND PRODUCT-MOMENT CORRELATION OF PRECIPITATION DATA. J. Geophys. Res., Jan. 1960, 65(1), 333-336. (University of Arizona, Tucson, Ariz.).

16,830

A large sample (4650 cases) of comparisons of the Spearman rank-difference correlation coefficient r' and the Pearson product-moment correlation coefficient r is presented. The correlation data are 50-year records of winter and summer half-year precipitation totals for 220 stations, well distributed throughout the United States. The results are examined in light of the usefulness of r' as a measure of correlation in geophysical data.
T. R 8

16,831

Mayeda, W. MAXIMUM FLOW THROUGH A COMMUNICATIONS NETWORK. Contract DA 11 022 ORD 1983, Projs. 5B99 01 004, TB2 0001 & 1571, Tech. Rep. 13, Feb. 1959, 23pp. Electrical Engineering Research Lab., University of Illinois, Urbana, Ill.

16,831

Networks having branches which are communication channels of limited capacity but capable of transferring information within this limit in either direction are considered. The first part of the paper shows the calculation of terminal capacities (amount of information which can be transferred from one vertex to another) in the give information network. The second part defines the capacity matrix which represents the terminal capacities between every pair of vertices in a network. Properties of this matrix are given. Finally a synthesis of information networks from a given capacity matrix is shown. Possible extensions of its mathematical properties are outlined.
I. R 3

16,833

Neil, C.McK. THERMAL RADIATION BURNS IN RABBITS VI. THE EFFECT OF THE IMMEDIATE APPLICATION OF COLD TO "FLASH"-TYPE BURNS ON SEVERITY AS MEASURED BY RADIOACTIVE PHOSPHORUS UPTAKE. Proj. NM 007 081.03.07, Vol. 16, 55-64, Jan. 1958. USN Medical Research Institute, Bethesda, Md.

16,833

To determine whether the application of cold immediately after burning has a beneficial effect in reducing severity of burns, 18 young adult, albino rabbits under ether anesthesia were subjected to radiant energy, "flash" type burns of both ears. One ear of each rabbit was cooled by covering it with ice-filled plastic bags within ten seconds of burning. Approximately ten minutes after exposure, each rabbit was given intracardially an aqueous solution of radioactive phosphorous. Determinations of radioactivity in each burn were made daily for the first five days to compare differences between treated and untreated ears in each rabbit. Practical benefits to be expected from cold treatment were discussed.
T. G. R 3

16,834

Jensen, R., Gordon, J.J., Sipple, W., Zabelicky, R., et al. NADC BIOLOGICAL INSTRUMENTATION SYMPOSIUM OF 10 DECEMBER 1958; SEVENTH LETTER REPORT CONCERNING BUREAU OF NAVAL WEAPONS PROJECTS TED ADC AE 1412.1 AND TED NAM AE 1403.1. Proj. TED ADC AE 1412.1 & Proj. TED NAM AE 1403.1, Task MR 005.15 0002.2, Rep. NADC MA L6021, July 1960, 7pp. USN Air Development Center, Johnsville, Penn.

16,834

This was a preliminary report of tests carried out on the Aviation Medical Acceleration Laboratory (AMAL) Bioinstrumentation package during which six channels were transmitted on an assigned frequency of 234.4 mc from the package mounted in the AMAL centrifuge gondola to the AMAL monitoring and recording system. Three physiological parameters were measured from the S: the electroencephalogram, the electrocardiogram, and respiration. Sample recordings were displayed.
G. I. R 7

16,835

USN Special Devices Center. BIBLIOGRAPHY OF HUMAN ENGINEERING REPORTS REVISED 1 JANUARY 1955. NAVEXOS P 530 1, Revision 5, Jan. 1955, 195pp. USN Special Devices Center, Port Washington, N.Y.

16,835

This volume is a Special Devices Guide. It contains a bibliography of human engineering reports sponsored by the Special Devices Center in addition to an enumeration of existing training devices of various kinds together with information about these devices.
I. R 350 (approx.)

16,836

Moody, D.J. SUMMARY OF PERSONAL SURVIVAL EQUIPMENT IN AIRCRAFT ACCIDENTS 1 JANUARY 1958 - 31 DECEMBER 1959 PUBLICATION REVIEW. Rep. 8 60, July 1960, 16pp. USAF Directorate of Flight & Missile Safety Research, Norton AFB, Calif.

16,836

The availability, use, and function of selected items of personal and survival equipment (parachute, life raft, life preserver, signalling equipment, some form of shelter) for the period 1 January 1958 to 31 December 1959 were summarized. The information was compiled from "Air Force Reports of Aircraft Accidents" and from questionnaires completed by crewmembers who had made emergency escapes. Survival situations were identified as either land or water and analyzed as to 1) type of injury and function of personal and survival equipment, 2) time before rescue, 3) type of rescue, and 4) conditions subsequent to water immersion and types of terrain. Implications for corrective action were discussed.
G. I.

16,837

Pattishall, E.G. & Banghart, F.W. (Proj. Dirs.). PROCEEDINGS OF THE SECOND TRI-SERVICE CONFERENCE ON BIOLOGICAL EFFECTS OF MICROWAVE ENERGY 8, 9, 10 JULY 1958. Contract AF 18(600) 1792, ARDC TR 58 54, Sept. 1958, 264pp. Div. of Educational Research, University of Virginia, Charlottesville, Va.

16,837

The papers included here represent the research conducted on the biological effects of microwave energy. These papers were presented at the 1958 Tri-Service Conference on Biological Effects of Microwave Energy. Leaders from the fields of biology, physics, medicine, engineering, and psychology contributed papers which included: "Physical Characteristics of Microwaves as Related to Biological Effects"; "Discussion of Long-Range Development Plans in the Air Force"; "Molecular Response Characteristics to Ultra High Frequency Fields"; "New Concepts in Personnel Protection"; "The Pathology of Hyperpyrexia"; and "Radio Frequency Hazards Aboard Naval Ships."
T. G. I. R many

16,838

Parentoau, W.A. & Beuter, N.C. SYSTEMS PROBLEMS IN EVOLVING AN AIR TRAFFIC CONTROL COMPUTER FOR THE NEW YORK AREA. Contract AF 19(604) 2272, AFCRC TN 57 750 & Tasker Instruments Corporation Rep. 101 1, Dec. 1957, 310pp. Tasker Instruments Corporation, North Hollywood, Calif.

16,838

The air traffic control problem relative to the New York City area is examined in detail with a view to later investigate the feasibility of high speed electronic computation to expedite terminal area traffic flow. The major divisions of the report are as follows: 1) description of air traffic control--basic aspects of air traffic, flight rules and procedures, airways structure of New York area, air route traffic control center, and other procedures; 2) air traffic movements--distributions for various time periods, types of operations and of aircraft, directional flow, and densities of holding fixes; 3) aircraft performance characteristics--normal flight and speed change response; 4) meterological factors; 5) capacity of system; 6) communications; etc.
T. G. I. R 48

16,839

Rosenblatt, F. PERCEPTRON SIMULATION EXPERIMENTS (PROJECT PARA). Contract NONR 2381(00), Rep. VG 1196 G 3, June 1959, 34pp. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.

16,839

The perceptron is a theory of a new brain model. It is a minimally constrained "nerve net" consisting of logically simplified neural elements and has been shown to be capable of learning to discriminate and recognize perceptual patterns. This paper reports a series of digital simulation experiments which were carried out on the perceptron using the IBM704 computer. Both "forced learning" and "spontaneous learning" performances were investigated and some insight gained into conditions under which different systems break down or deviate from typical biological learning phenomena.
G. I. R 8

16,840

Rademacher, H.J. & Grutzmacher, Dr. THE AUDIBILITY OF SIGNALS ON SHIPS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 6 1 3, 16pp. US Coast Guard Headquarters, Washington, D.C.

16,840

To determine how loud a sinusoidal signal must be in order to be heard in the presence of noise on the bridge of ships, a laboratory study was conducted using magnetic tape recordings of ship noise. Eight observers were tested separately for audibility judgments of signal tones of varied frequencies (from 100 to 1000 cps) over 15 different ship-noise recordings. Results were presented graphically as differences between signal threshold levels and noise level in the surrounding frequency band.
G.

16,841

Pullen, K.A., Jr. PRINCIPLES OF INFORMATION ENGINEERING. DA Proj. 503 06 011 & ORD Proj. TB3 0538, Memo. Rep. 1193, Feb. 1959, 15pp. USA Ballistic Research Labs., Aberdeen Proving Ground, Md.

16,841

The problem of efficient utilization of information is one of growing importance, both in system design and system utilization. The relation of information utilization to information theory and the practical use of communication systems are examined in this report and some of the guiding principles of information engineering explained.

16,842

Prichard, A.C. SPEECH SECURITY FOR TACTICAL OPERATIONS. DA Task NR 3 55 00 200, USASRDL TR 2044, May 1959, 7pp. USA Signal Research & Development Lab., Fort Monmouth, N.J.

16,842

Technical and systems aspects of speech scrambling are considered. A system used during World War II, known as the time division of speech system, is described and its usefulness considered in the light of present day requirements for tactical message security. Recommendations are included for further development.

16,843

Pletcher, K.E. & Neely, S.E. USAF EMERGENCY ESCAPE EXPERIENCE 1950-1959. AFR 11 30, Rep. 10 60, Aug. 1960, 11pp. USAF Directorate of Flight Safety Research, Norton AFB, Calif.

16,843

The actual hazards connected with emergency escape as revealed by statistical data from the compiled aircraft accident reports for the past ten years (1950-1959) are established. In addition, those hazards which experience has shown to be of less importance than the amount of attention they have received are discussed. The following topics are treated: the population subject to risk, variables in declining accident rates, effectiveness of ejection seats, type of emergency precipitating action, terrain clearance, aircraft attitude and speed, difficulties initiating ejection and after egress, survival after ejection, cause of ejection fatalities, and ejection in the future.
T. G.

16,844

Pattishall, E.G. PROCEEDINGS OF TRI-SERVICE CONFERENCE ON BIOLOGICAL HAZARDS OF MICROWAVE RADIATION, 15-16 JULY 1957. Contract AF 18(600) 1180, Proj. 57 13, ARDC TR 58 51, Sept. 1957, 122pp. George Washington University, Washington, D.C. (University of Virginia, Charlottesville, Va.).

16,844

The series of papers presented here was given at a meeting of scientists interested in the biological effects of microwave radiation. The major purpose of the meeting was to effect an understanding of activities and accomplishments in radiation hazard. Summaries of the work in the three services are presented along with plans for further research. The appendices contain several additional reports and two bibliographies: 1) biological effects of radio frequency energies, 1940-1957, and 2) microwaves and their biological effects.
T. G. I. R 285

16,845
Stevens, J.C. & Stevens, S.S. THE GROWTH OF SUBJECTIVE MAGNITUDE WITH STIMULUS INTENSITY. From: "Second Symposium on Physiological Psychology, USN School of Aviation Medicine, Pensacola, Fla., March 19-21, 1958." ONR Symposium Rep. ACR 30, 41-50. USN Physiological Psychology Branch, ONR, Washington, D.C. (Harvard University, Cambridge, Mass.).

16,845

For a large class of perceptual continua, subjective magnitude grows as a power function of the physical level of the stimulus. The psychophysical methods by which this relationship has been demonstrated are described: 1) magnitude estimation, under which observers assign numbers proportional to the apparent magnitude of various stimuli; and 2) ratio production, under which observers set one stimulus to some prescribed apparent fraction or multiple of another stimulus. The power law is then illustrated by concentrating on studies of loudness and brightness, with reference to other continua such as heaviness, velocity, duration, and electric shock.
G.

16,846
Bishop, G.H. A SECOND LOOK AT THE SENSORY SYSTEMS, END ORGAN TO CORTEX. From: "Second Symposium on Physiological Psychology, USN School of Aviation Medicine, Pensacola, Fla., March 19-21, 1958." ONR Symposium Rep. ACR 30, 77-88. USN Physiological Psychology Branch, ONR, Washington, D.C. (Washington University, St. Louis, Mo.).

16,846

Two themes are considered: sensory fiber size and its phylogenetic significance and the evolution of cortical mechanisms. Comparing two sensory systems (visual and somesthetic), as examples, many similarities indicate a parallel evolution; but although the visual system is presumably all one modality, the somesthetic system contains several modalities. These are at present conventionally related to fiber diameter. Recent work is cited to show that this latter concept does not hold. Fiber size is shown to be related to evolutionary stages of the cortex development. Certain conclusions are presented that appear justified by the evidence.
G. I. R 11

16,847
Graham, C.H. & Hsia, Y. DISCRIMINATIONS OF A UNILATERALLY COLOR-BLIND SUBJECT. From: "Second Symposium on Physiological Psychology, USN School of Aviation Medicine, Pensacola, Fla., March 19-21, 1958." ONR Symposium Rep. ACR 30, 177-184. USN Physiological Psychology Branch, ONR, Washington, D.C. (Columbia University, New York, N.Y.).

16,847

An S whose color-mixture and hue-discrimination functions show that her right eye is normal and her left eye is dichromatic has been examined. The color characteristics for each eye are described in some detail. The results of tests on 1) sensitivity loss and 2) the seeing of wavelengths above 502μ as yellow are considered theoretically. Certain proposals are set forth to account for some discrepancies in theory and test results.
G. R 14

16,848
Yntema, D.B. & Mueser, G.E. REMEMBERING THE PRESENT STATES OF A NUMBER OF VARIABLES: III. WHY IT IS DIFFICULT TO KEEP TRACK OF SEVERAL VARIABLES WITH THE SAME SET OF STATES. Contract AF 19(604) 5200, Rep. 58 G 0013, Aug. 1960, 13pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

16,848

Keeping track of the current states of a number of variables has been found to be more difficult in the case where the variables are the same attribute of several nonsensical objects (in which case all variables have the same set of states) than in the case where the variables are different attributes of one nonsensical object (in which case each variable has its own distinct set of states). In an attempt to discover whether the reason for the difference was intereference, the present experiment used a task in which each variable had its own set of states (so that interference could not occur) but this was disguised so that the subject could not identify the variables from the names of their states. The number of attributes (from six to one) were also compared.
T. R 2

16,850
Wolf, E. RECIPROCITY INEQUALITIES, COHERENCE TIME AND BANDWIDTH IN SIGNAL ANALYSIS AND OPTICS. Contract AF 19(604) 1717, AFCRC TN 57 553 & Rep. EM 106, June 1957, 21pp. Division of Electromagnetic Research, Institute of Mathematical Sciences, New York University, New York City, N.Y.

16,850

This paper is concerned with establishing a rigorous reciprocity relation of the Heisenberg type between the coherence time and the bandwidth of polychromatic radiation. Following upon an observation by Gabor that the usual formulation of the reciprocity inequality relating the effective duration of a signal and its effective bandwidth is unsatisfactory for signals that are intrinsically real, a modified version is presented. It is shown that this formulation is restricted to signals with zero mean value and there is no evidence of inequality. A definition of the coherence time of light is proposed and investigated for reciprocity inequality of the required type.
R 13

16,851
Wiener, F.M. ON THE PROPAGATION OF AUDIBLE SOUND OVER WATER IN FOG. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 6 1 2, 24pp. US Coast Guard Headquarters, Washington, D.C. (Bolt Beranek and Newman Inc., Cambridge, Mass.).

16,851

In the course of a basic study of signalling over ocean waters in fog by means of audible signals, an extensive series of field experiments was undertaken at Great Duck Island Light Station, Maine. These experiments consisted of sound transmission measurements over water in a variety of atmospheric conditions, including fog, and extensive micrometeorological measurements. This paper presented representative samples of the sound attenuation characteristics obtained, together with a short description of the instrumentation used, followed by a brief analysis of the results. A short discussion of the physics of sound propagation through the lower atmosphere in the light of available theory was presented.
G. I. R 8

16,852
van Oosterom, T. MEASUREMENTS ON THE RELATION BETWEEN MAGNITUDE AND DURATION AND ON THE RATE OF APPLICATION OF THE CONTROL FORCES ACHIEVED BY PILOTS IN SIMULATED MANOEUVRES. Presented at: Fourteenth Meeting of the Flight Test Techniques and Instrumentation Panel, Athens, Greece, 11-15 May 1959, Rep. 241, 26pp. Advisory Group for Aeronautical Research & Development, NATO, Paris, France. (National Aeronautical Research Institute, Amsterdam, Holland).

16,852

To obtain data on desirable control characteristics of aircraft, the following measurements were made on 27 military and civil pilots on: 1) maximum control forces which could be exerted at various positions of the controls with respect to the pilot's seat; 2) forces that could be maintained during various periods of time with the controls in the optimum position; and 3) rate of increase of pedal forces. To gain basic information for establishing structural strength requirements, a second series of measurements were made on 135 Ss. The maximum rate of increase of the control forces, maximum control force that can be achieved, and the shape of the curves giving control force as a function of time in sudden maneuvers were determined.
T. G. I. R 7

16,853

Unger, H.R. & Turner, W.F. RECURRENT DYSBARISM IN FLIGHT: A CASE REPORT. 1960, 13pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,853

The increasing occurrence of dysbarism (a pathological syndrome resulting from exposure to reduced or changing barometric pressure) in the present mass transition program from reciprocating to jet aircraft is discussed. Since it is felt that many cases of dysbarism are either unrecognized or unreported, the problem is presented by way of a case study of a 36-year-old senior pilot in the U.S. Air Force who experienced two separate episodes in flight. The pattern of symptoms and altitude conditions at time of occurrence are described as are the results of subsequent physical examinations and laboratory tests. The prevention of symptoms through process of denitrogenation was demonstrated and suggestions offered for avoiding dangerous inflight situations.

16,855

Smith, J.E.K. & Klem, Laura. THE RELIABILITY OF EMPIRICAL WAITING-TIME DISTRIBUTIONS. Contract AF 19(604) 5200, Group Rep. 58 6, Aug. 1959, 15pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

16,855

To determine for a very simple queuing system how large a sample is required for a given degree of accuracy in measures of system efficiency, an IBM 704 electronic-computer was programmed to simulate a one-server queue with random arrivals at an average rate of α customers per unit time. Service time was constant at one unit (system load $=\alpha$) with a first-come-first-served discipline. The measure of efficiency used was the conditional waiting-time distribution. System load was varied over 100 units with 25 sample distributions for each load (from 0.25 to 0.95), each based on 4000 and 1000 non-zero waits. For each load and sample size the 25 distributions were based on either 100,000 or 25,000 observations.
G. R 4

16,856

Smith, G.P., Bradford, C.E., Iocca, L.J. & Dickey, H.R. PROTECTION OF STRUCTURES FROM CHEMICAL, BIOLOGICAL AND RADIOLOGICAL (CBR) CONTAMINATION. ENCR Rep. 30, June 1959, 127pp. USA Chemical Corps Engineering Command, Army Chemical Center, Md.

16,856

Basic technical information is presented on items of equipment and techniques developed by the Chemical Corps for obtaining Chemical, Biological, and Radiological (CBR) protection in permanent structures. The various chapters cover basic design considerations for providing CBR protection to permanent structures, details on the operation of a CBR protective structure, and equipment needed and available to provide CBR protection. The various CBR consulting services available throughout the Chemical Corps are described.
T. G. I. R 24

16,857

Smith, E.K., Anastasio, F.J., Kalustyan, B.C., Snyder, R.B., et al. METHODS OF PRESENTING MOVING OBJECTS IN POINT LIGHT SOURCE VISUAL DISPLAYS. Contract NONR 1628(00), NAVTRADEVCEN TR 1628 5, June 1959, 61pp. USN Training Device Center, Port Washington, N.Y. (The deFlorez Company, Inc., Englewood Cliffs, N.J.).

16,857

The results of an investigation to discover and analyze methods and systems whereby moving objects may be presented in point source projected visual displays were described. An analysis was made of the nature of movement in the real world as a frame of reference for movement to be produced in the world of visual displays. Various solutions to the problem were devised and were examined critically for the degree of applicability to typical tasks. Recommendations for the display requiring moving object presentation were made.
I. R 2

16,858

Simonnard, M.A. TRANSPORTATION-TYPE PROBLEMS THEORETICAL FOUNDATION AND COMPUTATIONAL ASPECTS OF THE SIMPLEX METHOD OF SOLUTION FUNDAMENTAL INVESTIGATIONS IN METHODS OF OPERATIONS RESEARCH INTERIM TECHNICAL REPORT 11. Contract DA 19 020 ORD 2684, Projs. DA 599 01 004, ORD TB 0001, OOR 968 (Rev.) & DSR 7125, OOR Rep. 968:24, Jan. 1959, 83pp. School of Industrial Management, Massachusetts Institute of Technology, Cambridge, Mass.

16,858

A class of linear programming problems is discussed. These problems are very simple extensions of the classical Hitchcock-Koopmane transportation problem; the latter is included as an important special case. Only the simplex method of solution of linear programming problems is considered. A number of points that are particular to the classical "transportation problem" are derived from the very simple nature of the matrix of the coefficients in the constraints. This theoretical foundation allows a justification of the well-known "stepping-stone" algorithm. All the results are then extended to the general problem.
I. R 32

16,859

Silverman, R.A. & Chang, S-H. TOPICS IN THE THEORY OF DISCRETE INFORMATION CHANNELS. Contracts AF 19(604) 5238 & AF 19(604) 3053, AFCRC TN 60 366 & Res. Rep. EM 152, April 1960, 42pp. Div. of Electromagnetic Research, Institute of Mathematical Sciences, New York University, New York, N.Y.

16,859

This article discusses various topics in the theory of discrete information channels. The following topics are dealt with in separate sections: information sources and information rate, channels and mutual information rate, channel capacity, the general binary channel, channels with fading, cascaded channels and channels with memory.
I. R 17

16,860

Shock, N.W. (Ed.). AGING SOME SOCIAL AND BIOLOGICAL ASPECTS. Symposia Presented at the Chicago Meeting of the American Association for the Advancement of Science, December 29-30, 1959, AAAS Publ. 65, 1960, 427pp. Horn-Shafer Company, Baltimore, Md. (Baltimore City Hospitals, Baltimore, Md.).

16,860

This volume contains papers given at a symposium which was called to consider the problems of the aging in terms of their broad implications for society, for the integrated organism, for tissues and cells, and for theoretical formulations. The aim was to review briefly the current status of research on various aspects of aging and to identify problem areas for research. The papers from another symposium on "Oral Aspects of Aging" are included among the 23 papers.
I. G. I. R 400 (approx.)

16,861
Shannon, R.H. USAF SEAT EJECTIONS REPORT PERIOD: 1 JANUARY 1959 - 31 DECEMBER 1959. Rep. M 12 60, July 1960, 29pp. USAF Directorate of Flight & Missile Safety Research, Norton AFB, Calif.

16,861
The data in this report were compiled from questionnaires completed by crew members who used the ejection seat as a means of escape during inflight emergencies and from aircraft accident reports submitted on accidents involving ejection during 1959. The major purpose of the compilation of data was to inform research and development agencies of current problem areas and to provide operating personnel with an analysis of ejection experience. In addition to a general statistical summary, the causes of fatal ejections, type and cause of major injuries, altitude, speed and altitude, helmet and oxygen mask loss, difficulties in ejection procedures, causes of emergencies, and other factors were discussed.
T. G.

16,862
Schoenfeld, W.H. & Kaune, H. DEVELOPMENT OF AN INSTRUMENT FOR OBJECTIVE MEASURING AND RECORDING OF THE REFLECTION PROPERTIES OF RADAR TARGETS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 9 3 8, 27pp. US Coast Guard Headquarters, Washington, D.C. (Institute for High Frequency Engineering, Hanover Technical College, Hanover, Germany).

16,862
This report deals with the design and development of an instrument for objective measuring and recording of the reflection properties of radar targets for use on shipboard for navigation purposes. Aspects considered for the basic conception are listed. The characteristics of the instrument are discussed as follows: 1) principle of measuring, 2) marking of target area, 3) modes of echo representation, 4) operation together with a radar equipment, and 5) calibration.
G. I.

16,864
Ruben, H. ON THE GEOMETRICAL SIGNIFICANCE OF THE MOMENTS OF ORDER STATISTICS AND OF DEVIATIONS OF ORDER STATISTICS FROM THE MEAN IN SAMPLES FROM GAUSSIAN POPULATIONS. Contract NONR 266(59), Proj. 042 205, CU 9 59 NONR 266(59) MS, Sept. 1959, 15pp. Columbia University, New York, N.Y.).

16,864
This is a mathematical investigation of the distribution of $\xi_{r/n}$ (the rth largest observation in a random sample of n observations from a normal population with zero mean and unit variance) and that of $\xi_{r/n}-\bar{\xi}$ (the deviation of the rth order statistic from the sample mean, $\bar{\xi}=\sum_{r=1}^{N}\xi_{r/n}/N$) from the point of view of the moments of these distributions. The geometrical significance of the moments of these distributions are assessed.

16,866
House, A.S. FORMANT BAND WIDTHS AND VOWEL PREFERENCE. J. Speech Res., March 1960, 3(1), 3-8. (Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.).

16,866
To investigate the subjective importance of the half-power bandwidths of vowel formants, five common vowels were generated by an electrical synthesizer. Seven variants of each vowel were synthesized, paired in all combinations, stored on magnetic tape, and presented to listeners for evaluation. The eight normal-hearing listeners were asked to decide whether the second sound in each pair was a better or worse representation of the vowel than the first sound. Preferential rankings of the bandwidth conditions for each vowel as well as a graphic analysis were presented. The bases for the exhibited preferences were discussed.
I. G. R 11

16,867
Weinrauch, H. & Pattishall, E. THE AIR FORCE AND THE APPLICATION OF COMPUTERS TO MEDICINE AND BIOLOGY. Milit. Med., March 1958, 122(3), 178-180. (USAF Aviation Medicine Branch, ARDC, Baltimore, Md. & Div. of Educational Research, University of Virginia, Charlottesville, Va.). (ARDC TR 58 50).

16,867
This paper reports the first organized attempt to explore the applicability of computers to medicine and biology. The Air Force Research and Development Command, which has had a leading role in encouraging such applications, sponsored a series of regional conferences between outstanding representatives from the fields of computer technology and the medical sciences. From already existing computer applications, two areas of importance were suggested: 1) the speeding up of mathematical calculations inherent to a particular biological problem and 2) simulation of a biological system by an electrical system. Other possible applications such as use of rapid data handling machinery for storing clinical and laboratory information in hospitals were discussed.
I.

16,868
Lerner, R.M. DESIGN OF SIGNALS. Contract AF 19(604) 5200, Group Rep. 36 42, Feb. 1960, 45pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

16,868
This document develops the foundations of the art of designing signals for use in communication channels having additive disturbances. Full use is made of the results of analysis but the basic philosophy is not obscured with mathematics; thus many results are stated rather than proved. There are four major sections: 1) the place of signal synthesis in system engineering, 2) principles of signal design for additive Gaussian noise, 3) "colored" Gaussian noise and the appropriateness of the Gaussian-noise model to actual communication circuits, and 4) signals appropriate for channels disturbed by additive impulse noise.
G. I. R 15

16,869
Powe, W.E., Carrier, W.M. & Skandera, D., Jr. HUMAN FACTORS IN THE MAINTENANCE AND OPERATION OF THE IM-99A SYSTEM. APGC Proj. 200AY1, APGC TN 60 10, April 1960, 86pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

16,869
The IM-99A Weapon System (Bomarc) is a pilotless, high-speed interceptor system; it includes the interceptor missile together with equipment, facilities, and personnel needed to assemble, test, service, and install the missile in an individual launcher shelter. This study was made to determine the compatibility of Air Force speciality descriptions with projected position requirements for maintenance and operation, to evaluate the personnel structure as it relates to assignment of duties and responsibilities, to evaluate the design of operator stations and maintenance of test equipment, and to determine environmental hazards. Based on time-line analyses, data from questionnaires, checklists, individual interviews, and job performance, conclusions have been drawn and recommendations made for improving system performance. T. G. R 8

16,871
USSR Hydrographic Service of the Navy. THE THEORY OF VISUAL RANGE OF AIDS TO NAVIGATION. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 4 6, 44pp. US Coast Guard Headquarters, Washington, D.C.

16,871

A formula is presented for calculating the visual range of objects at sea and on the ground. The formula is said to hold for any conditions of observation--by day, at twilight, and at night. The major portion of the report is devoted to proving the formula.
T. G. R 17

16,872

USSR Hydrographic Service of the Navy. CHROMATIC AND ACHROMATIC THRESHOLDS OF POINT LIGHT SOURCES UNDER FIELD CONDITIONS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 4 7, 14pp. US Coast Guard Headquarters, Washington, D.C.

16,872

An investigation of the sensitivity of the eye to white, green, and red light signals when observed against a sky near the horizon during twilight and night hours under field conditions is described. Judgments were obtained from 12 observers in a series of 12 observations of the time of appearance of the light signal and also its time of extinction at a distance of 12 meters as the intensity of the signal was increased or decreased. The threshold data were analyzed as a function of background (sky) brightness and related to visibility ranges for signal lights at sea.
G. I. R 9

16,873

USSR Hydrographic Service of the Navy. VISION INERTIA AS APPLIED TO THE OBSERVATION OF NAVIGATION LIGHTS. Presented at: Sixth International Technical Conference on Lighthouses and Other Aids to Navigation, Washington, D.C., Sept.-Oct. 1960, Rep. 5 4 8, 22pp. US Coast Guard Headquarters, Washington, D.C.

16,873

A mathematical expression is derived which, with a table of values based on experimental data, describes all the performance of precise computations of effective or threshold point brilliance of flashing lighthouse lights of any duration while taking into account the actual observation conditions. A formula for the preliminary computation of the effective luminous intensity is given together with an experimentally verified value for inertia time of the eye.
T. G. R 19

16,874

Joyce, W. & Mallett, F. NAVIGATION TECHNIQUES AND DISPLAYS FOR INTERPLANETARY SPACE FLIGHT FINAL REPORT. Contract AF 33(616) 5524, Proj. 9(610 6190), Task 50786 & OSURF Proj. 813, Rep. 813, Dec. 1959, 75pp. Ohio State University Research Foundation, Columbus, Ohio.

16,874

This report represents a continuation of work on a research study of navigational techniques and displays for interplanetary space flight. It adds 82 items to a general bibliography reported earlier; surveys unclassified literature relating to midcourse optical navigation for interplanetary flight (215 items); and carries on various investigations as follows: 1) an initial evaluation of a vibrotactile display in complex control tasks, 2) midcourse optical navigation on interplanetary space flight (Appendix II), 3) use of navigational information for in-course corrections on orbits (introductory, Appendix III).
G. I. R 299

16,875

Jones, M.B. SIMPLEX THEORY. Mono. Series 3, June 1959, 106pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

16,875

This monograph develops and describes an approach to a correlation matrix called "molar correlational analysis" in which the analyst looks for correlation patterns, for structural wholes, and for an empirical theory to integrate his structural solution. One structural pattern, the simplex (a sequence of stages each one of which is stacked within the next like sections in a telescope) is developed further. The history of the simplicial form in the study of learning is reviewed. The string model as a way of reconstructing the training process or the manner in which stages of training are put together is presented with models taken from naval air training. A final chapter is devoted to the operations involved in simplicial analysis.
T. I. R 24

16,876

Jones, L.V., Bock, R.D., Shuford, E.H. & Johnson, E.S. PREFERENCE FOR FOOD COMBINATIONS. Contract DA 19 129 QM 1045, File P 1113, Rep. 5 (Final), Jan. 1959, 31pp. USA Quartermaster Food & Container Institute for the Armed Forces, Chicago, Ill. (University of North Carolina, Chapel Hill, N.C.).

16,876

The power of a model for the prediction of choice of simple menus consisting of three food items was evaluated in a field trial with 307 army enlisted personnel. Predictions based on individual food items and for pairs of constituents were derived. Data for both types of preferences were added to account for the major variance in the preference scale values of the menus. The results are interpreted with regard to the value of preference data for individual foods in predicting acceptability of menus, interactive effects in preference for food combinations, and the predictive value of preference data for food pairs. Use of the model in optimizing institutional menus is suggested.
T. I. R 10

16,877

Jacoby, Joan E. & Harrison, S. EFFICIENT EXPERIMENTATION WITH SIMULATION MODELS. Contract AF 33(600) 35190, Tech. Rep. 60 2, June 1960, 68pp. OMEGA, Technical Operations, Inc., Washington, D.C.

16,877

This paper discusses some modifications and extensions of the classical principles of experimental design which may be used in effective analysis of simulation models. The impetus for the research is the Air Battle Model (a large two-sided, global air war game) and the Attrition Damage Assessment Model (one-sided air war game). Part I demonstrates a few modifications of the old classical designs as well as new concepts to aid in the solution of the multi-variable experimentation model; Part II introduces some analytical aids for increasing the compactness and sensitivity of the experiment; and the appendix gives detailed information regarding the [illegible], set-up, and methods of analyses for the above techniques.
T. I. R 18

16,878

Iwanski, E.C. & Wiedermann, A. FEASIBILITY STUDY OF PERSONNEL CLOSURES. FINAL REPORT: Contract DA 44 009 ENG 3550, Proj. 8 12 75 001 & ARF Proj. D161, Aug. 1959, 72pp. Armour Research Foundation, Illinois Institute of Technology, Chicago, Ill.

16,878

A theoretical and experimental study was conducted to determine the most suitable device, or devices to be used for personnel shelter closures exposed to the environment of a nuclear explosion. Various types of materials and several different methods of application were evaluated. Material selection was based on the attenuation that a shock wave underwent in passing through the material as well as on ultimate strength and weight of the material. Closure systems selected as most feasible were membrane-type doors; double-diaphragm doors with either air, dirt, or water filling; and a flat-plate door constructed with a honeycomb core.
T. G. I. R 3

16,879
Hynek, J.A. ON THE EFFECTS OF IMAGE MOTION ON THE ACCURACY OF MEASUREMENT OF A FLASHING SATELLITE. Contract AF 19(604) 41, Spec. Rep. 33, Feb. 1960, 4pp. Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.

16,879
Artificial satellites carrying flashing lights that can be triggered by internal programming or by command from the earth have been proposed as a means of fixing the linear position of the satellite to within 25 ft. thus increasing the geodetic usefulness of such satellites. Salient astrometric facts relating to atmospheric unsteadiness and image motion, which can cause the instantaneous photographic position of the satellite image to differ from its true position by as much as two or three sec. of arc, are discussed in this paper.
I. R 1

16,880
Hawkes, G.R. & Warm, J.S. COMMUNICATION BY ELECTRICAL STIMULATION OF THE SKIN IV. DISCRIMINATION OF DURATION. USAMRL Proj. 6X95 25 001, Task 05, Rep. 447, Oct. 1960, 20pp. USA Medical Research Lab., Fort Knox, Ky.

16,880
To determine differential discrimination of electrical cutaneous stimulus duration as a function of the standard stimulus intensity level and duration, two highly trained observers made threshold judgments. Three stimulus durations (0.5, 1.0, and 1.5 sec.) were used at each of three intensity levels (120, 160, and 200 percent of the RL current value). Stimulus onset (or offset) time was also varied; in one condition it was 25 msec., in another, 0.4165 msec. Mean threshold values for each intensity level and onset-offset condition were analyzed as a function of duration. Implications of the findings for signaling purposes were indicated.
R 15

16,881
Bastian, J. (Princ. Investigator). RESEARCH ON AUDIBLE OUTPUTS OF READING MACHINES FOR THE BLIND. Contract V1005M1253, Prog. Rep. 4, June 1960, 46pp. Haskins Laboratories, New York, N.Y.

16,881
This study is concerned with finding types of audible outputs that will best meet the needs of a blind user and that can be generated by conceivable reading devices. The initial phase, directed to the use of synthetic speech as audible output, has stressed the formulation and testing of rules for making synthetic speech, given a phonetic transcription. These rules are fairly well formulated although not fully completed. Research on the problem of recording spoken words which can be combined (by the Word Reading Machine) into acceptable utterances is also reported.

16,882
Harris, J.D. AUDITORY FATIGUE FOLLOWING HIGH FREQUENCY PULSE TRAINS. Proj. NM 22 03 20.02 01, Rep. 306, XVIII (1), Jan. 1959, 1-8. USN Medical Research Lab., New London Submarine Base, Conn.

16,882
To explore temporary threshold shifts and possible auditory damage from brief repetitive high-frequency sound, large groups of young men were exposed to high intensity pulse trains at 2.5 kc and examined continuously for subsequent acuity changes at four kc. Duty cycle varied from 1.4 to 100 percent tone-on, train length from 1 to 25 minutes, and SPL from 90 to 120 db. A new unit, the NOX, representing total cumulative fatigue over a ten-minute interval, was invented to describe the results. These data specified the damage risk criteria and levels of ear protection necessary for such auditory situations.
T. G. R 13

16,883
Hardy, J.D. (Chm.). PANEL ON ACCELERATION STRESS (PANEL 5) OF THE ARMED FORCES-NRC COMMITTEE ON BIO-ASTRONAUTICS. Minutes of Third Meeting, Woods Hole, Mass., 28 Aug. - 2 Sept. 1960, 52pp. National Academy of Sciences - National Research Council, Washington, D.C.

16,883
This report presents the minutes of the third meeting of the Panel on Acceleration. The meeting was concerned with a review of certain aspects of present and planned research. The adequacy of present simulators and acceleration devices was considered in terms of present and future needs. Problems of evaluating the long term medical consequences to subjects of human acceleration research were considered and a set of principles of safety monitoring of hazardous research was approved. Reports in preparation were noted.
R 27

16,884
Hardy, J.D. (Chm.). PANEL ON ACCELERATION (PANEL 5) OF THE ARMED FORCES-NRC COMMITTEE ON BIO-ASTRONAUTICS. Minutes of First Meeting, Woods Hole, Mass., 14-24 July 1959, 12pp. National Academy of Sciences - National Research Council, Washington, D.C.

16,884
These minutes of the first meeting of a Panel on Acceleration define the mission of the Panel as being "to review and report upon the research and development problems concerned with the biological effects of mechanical forces which may be of interest in the area of bio-astronautics." The principal areas of interest and the problem of concern to the Panel are listed. The discussions in these minutes are primarily concerned with descriptions of present and proposed facilities and uses of human acceleration devices and motion simulators. Recommendations for future work are included.

16,885
Hardy, J.D. (Chm.). PANEL ON ACCELERATION STRESS (PANEL 5) OF THE ARMED FORCES-NRC COMMITTEE ON BIO-ASTRONAUTICS. Minutes of Second Meeting, Indialantic, Fla., 5-8 May 1960, 13pp. National Academy of Sciences - National Research Council, Washington, D.C.

16,885
This document contains the minutes of a meeting of the Panel on Acceleration Stress, Armed Forces-NRC Committee on Bio-Astronautics. The chief mission of the Panel is "to review and report upon the research and development problems concerned with the biological effects of mechanical forces which may be of interest in the area of bio-astronautics." Review articles written or in process are listed. Various sessions were devoted to discussing the following problems: possible dangers involved in human experimentation under acceleration stress, acceleration terminology, Johnsville Human Centrifuge, bibliographic index of acceleration research, rotation devices and experiments, impact devices and research, and vibration and whole body oscillation.

16,886
Harcum, E.R. VISUAL RECOGNITION ALONG VARIOUS MERIDIANS OF THE VISUAL FIELD DATA TABLES. Contract DA 36 039 SC 52654, Proj. MICHIGAN, Memo. 2144 432 R, March 1960, 411pp. Willow Run Labs., University of Michigan, Ann Arbor, Mich.

16,886
A series of data tables applicable to a set of 12 studies in the Vision Research Laboratories of the University of Michigan are presented here. The essence of these studies is presented in the Project Michigan Report. They are concerned mainly with the capacity of the retina to recognize accurately various visual targets. The data presented are from the following studies: "Patterns of Blackened Circles in an Eight-Circle Template," "Nine-Element Typewritten Targets," "Linear Binary Patterns of Thirty-Six Orientations," "Effects of Target Length Measured in Angular Units," "Binary Patterns Along Twelve Meridians," etc.
I.

16,887
Gray, R.F. & Webb, M.G. HIGH G PROTECTION. Proj. TED ADC AE 1411, Task MR005.12 0007.2, Rep. 7 & NADC MA 5910, Feb. 1960, 18pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

16,887
This paper is concerned with various methods for increasing human tolerance to positive acceleration with primary emphasis on the principles of water immersion utilizing increased air pressure in the chest. The theoretical considerations of water protection were explored using a mechanical model analogous to the circulatory system within the thorax. Tests on human subjects followed and the results are described: the Mayo Tank tests and the G Capsule tests. Other methods of g protection are listed and the opinions of the experimenters concerning their efficacy are given.
G. I. R 10

16,888
Grave, C., II. ENVIRONMENTAL PROTECTION EQUIPMENT FOR AIR AND GROUND CREWS AND HUMAN ENGINEERING ASPECTS OF PILOT'S COCKPIT. AN EVALUATION OF F-101B AIRCRAFT. APCG Proj. 217AY5, APGC TN 60 34, July 1960, 29pp. USAF Human Factors Office, Eglin AFB, Fla.

16,888
A study of the human factors aspects of the F-101B weapon system (twin-engine, two-place, supersonic, all-weather interceptor) has been made. This report, one of two, is concerned primarily with environmental protection equipment for air and ground crews but also includes some aspects of the pilot's cockpit. Information was gathered by questionnaires to test personnel, interviews with pilots, personal observations, and special tests. Equipments studied were: 1) air crew equipment including the pressure suit, survival kit, oxygen equipment, etc.; 2) the ejection system; and 3) ground crew equipment for noise and fuel handling. Deficiencies and recommendations are listed for equipment and cockpit.
I. R 4

16,889
Gordon, J., Jensen, R., Sipple, W. & Squires, R. NADC BIOLOGICAL INSTRUMENTATION SYMPOSIUM OF 10 DECEMBER 1958; FIFTH LETTER REPORT CONCERNING. Projs. TED ADC AE 1412.1 & TED NAM AE 1403.1, Task MR 005.15 0002.2, Rep. NADC MA L6012, May 1960, 9pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

16,889
This report deals with the problems of fabrication, testing, and selection of biomedical electrodes suitable for use on human Ss during flight or simulated flight conditions. Electrocardiographic electrodes and EEG electrodes, skin preparation, ECG electrode restraint systems, and EEG restraint systems are discussed. Some tracings obtained with these electrodes and restraint systems are shown.
G. I. R 5

16,890
Goldstein, M.H., Jr. A STATISTICAL MODEL FOR INTERPRETING NEUROELECTRIC RESPONSES. Information and Control, March 1960, 3(1), 1-17. (Dept. of Electrical Engineering & Research Lab. of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.).

16,890
This study attempts to relate by means of a mathematical model statistical characteristics of evoked responses (neuroelectric activity recorded after presentation of a controlled stimulus), recorded by gross electrodes, to the statistical activity of the neural elements that contribute to the responses. The model postulates one or more populations of elements which, when they fire, contribute elemental waveforms to a gross response in which these waveforms are linearly summed. The statistical behavior of the elements in a population is described by their instantaneous firing rate which is a function of time. The model is an extension of the shot-noise model to time-variant phenomena.
R 19

16,891
Goffard, S.J., Heimstra, N.W., Beecroft, R.S. & Openshaw, J.W. BASIC ELECTRONICS FOR MINIMALLY QUALIFIED MEN: AN EXPERIMENTAL EVALUATION OF A METHOD OF PRESENTATION. Tech. Rep. 61, Feb. 1960, 26pp. Human Resources Research Office, George Washington University, Washington, D.C.

16,891
To devise and evaluate methods and techniques of presenting training materials that might make technical training 1) easier for men whose aptitudes are just barely adequate for such training by present standards and 2) feasible for those with submarginal aptitudes, the principle of functional context was applied to the basic electronics section of the Field Radio Repair Course. The Course was presented to seven consecutive classes by the conventional method and to the next 13 by the experimental method. At the end of instruction, a battery of tests covering the whole field in basic electronics was given. Test scores were evaluated in terms of achievement of submarginal, marginal, intermediate, and high aptitude groups. Recommendations were included.
T. G. I. R 5

16,892
Fernandez, C., Alzate, R. & Lindsay, J.R. EXPERIMENTAL OBSERVATIONS ON POSTURAL NYSTAGMUS LESIONS OF THE NODULUS. Rep. 60 23, Jan. 1960, 17pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (University of Chicago, Chicago, Ill.).

16,892
To study the occurrence and form of nystagmus after ablation of the flocculonodular lobe, and to study the effects of deafferentation of vestibular centers upon disturbances of both equilibrium and eye movements, 24 healthy adult cats were used as Ss. The observation consisted in exploring responses before and after removal of the nodulus on the following tests: standing and motor performance, spontaneous nystagmus, postural nystagmus, righting reflexes, and rotatory test.
I. R 22

16,893
Erskine, D.G. & Philips, W.D. INTEGRATED AIRBORNE CNI CONTROL AND DISPLAY EQUIPMENT PROGRAM. Contract AF 33(600) 35175, WADC TR 59 271, June 1959, 80pp. USAF Wright Air Development Center, Wright-Patterson AFB, Ohio. (Bendix Radio Div., Bendix Aviation Corporation, Ann Arbor, Mich.).

16,893
This is the final report of a research program designed to develop and demonstrate the operational feasibility of an integrated communication-navigation-identification (CNI) control subsystem for present-day high-performance aircraft which would reduce the total amount of critical cockpit area required and relieve the pilot of some of his tasks. The development of the subsystem was described in detail and test results comparing it with present CNI controls were discussed. Possibilities of controlling the subsystem from the ground by data link were studied as a move toward further reducing pilot load. The feasibility of an integrated control subsystem for use in any high-performance aircraft was discussed in relation to the present development.
I. G. I.

16,894
Crow, E.L. & Gardner, R.S. CONFIDENCE INTERVALS FOR THE EXPECTATION OF A POISSON VARIABLE. NOTS TP 2436, NAVORD Rep. 7044, March 1960, 18pp. USN Ordnance Test Station, China Lake, Calif. (National Bureau of Standards, Boulder, Colo.). (Reprinted from: Biometrika, Dec. 1959, 46(Parts 3 and 4), 441-453.).

16,894
A general method of constructing shortest two-sided confidence intervals for continuous parameters of random variables taking discrete values is applied to the Poisson distribution. The discussion includes an analysis of the improvement achieved over earlier, approximate methods for constructing similar confidence intervals, and the report concludes with a table of confidence intervals for coefficients 80, 90, 95, 99, and 99.9 percent and range 0-300 for the observed value of the variable.
T. G. R 14

16,895
Clark, W.C., Courtney, D. & Colman, K.W. CAPABILITIES AND LIMITATIONS OF THE PILOT OPERATING IN A TERMINAL AREA WITHOUT TOWER CONTROL. (TECHNICAL REPORT). Contract FAA/BRD 27, Proj. N, Rep. 31, Nov. 1959, 98pp. Courtney and Company, Philadelphia, Penn.

16,895
This study examines the factors that contribute to the ability of pilots to maintain separation and establish high landing rates at uncontrolled airfields for possible application to the more complex situation where the air traffic controller has become a necessity. The information in the report is based on an analysis of the relevant psychological literature, air observations at controlled and uncontrolled airfields using a typical light aircraft, and ground observations of typical "fly-ins" by several private pilots at uncontrolled airports. The major analyses are devoted to the pilot's perceptual and psychological capabilities and to additional factors such as regulations, airfield and aircraft characteristics, and the control loop.
I. R 104

16,896
Cheatham, T.E., Jr. & Letts, M.H. SIMULATION LANGUAGE SYSTEM TWO (SL-2). Contract AF 33(600) 35190, Tech. Memo. 58 2, Feb. 1958, 16pp. OMEGA, Technical Operations, Inc., Washington, D.C.

16,896
This report describes the development of a program system called "Simulation Language System Two" (SL-2) in response to the needs of digital computer programs for simulating certain aspects of real world situations. These needs are discussed in relation to SL-2. An example of the use of this program is given.
I.

16,897
Chang, S.S.L., Harris, B., Hauptschein, A., Hoffman, D., et al. EVALUATION AND OPTIMIZATION OF DIGITAL COMMUNICATION SYSTEMS. FINAL SCIENTIFIC REPORT. Contract AF 19(604) 1964, AFCRC TR 59 110, Feb. 1959, 23pp. Research Div., College of Engineering, New York University, New York, N.Y.

16,897
Work on a contract calling for evaluation of digital communication systems and their optimization under practical criteria and constraints is summarized. The work accomplished includes: 1) an analysis of the effects of noise in the feedback channel of communication systems; 2) a general theory of digital communication systems with fading, interference, and feedback; 3) the extension of null-zone reception to systems employing envelope detection of a pulsed carrier, including frequency shift keying systems; and 4) the performance of an experimental null-zone reception system with unidirectional and decision-feedback channels. Suggestions for future research are given.
G. I. R 24

16,898
Chang, S.S.L., Harris, B., Hauptschein, A., Hoffman, D., et al. EVALUATION AND OPTIMIZATION OF DIGITAL COMMUNICATION SYSTEMS FOURTH SCIENTIFIC REPORT. Contract AF 19(604) 1964, AFCRC TN 57 971, Jan. 1958, 111pp. Research Div., College of Engineering, New York University, N.Y.

16,898
This progress report describes work accomplished on the evaluation and optimization of digital communication systems. Two main classes of systems, unidirectional and bidirectional, are being considered. The first problem considered here is that of transmitting information through a noisy unidirectional channel in finite time with the least error. A large portion of this report pertains to the bidirectional or feedback systems: the effect of truncation of the decision processes of a cumulative decision feedback system is considered; the advantages of cumulative decision feedback are discussed; a coded information-feedback system is devised; and experimental data are obtained from a model of an uncoded, non-feedback, null-reception system.
T. G. I. R 15

16,899
Chang, S.S.L., Harris, B., Hauptschein, A., Morgan, K., et al. EVALUATION AND OPTIMIZATION OF DIGITAL COMMUNICATION SYSTEMS PART II THIRD SCIENTIFIC REPORT. Contract AF 19(604) 1964, AFCRC TN 57 769(II), Oct. 1957, 124pp. Research Div., College of Engineering, New York University, New York, N.Y.

16,899
A study of n-station communication networks has been initiated, and various techniques for analyzing and rating networks are summarized. Linear programming is shown to be a general method for the synthesis of optimal networks which are subject to linear constraints on demand and capacity, transportation and flow techniques being simply special cases of linear programming. General expressions are developed for the information rate and reliability of n-station networks, and illustrative examples of the method are presented for series and parallel networks. The application of the null reception and decision feedback concepts to the scatter-multipath problem is considered further.
G. I. R 22

16,900
Chaffee, J.W. ANTHROPOMETRIC CONSIDERATIONS FOR ESCAPE CAPSULE DESIGN. Contract AF 33(600) 36200, Internal Furnishings Rep. 302, Jan. 1960, 118pp. Convair, General Dynamics Corporation, Fort Worth, Tex.

16,900

The problem of determining the amount and configuration of the packaging space required within an escape capsule for the human operator of a high-performance aircraft is discussed. A method, based upon photogrammetric techniques, of locating human body components in three-dimensional space is introduced. Means, standard deviations, and 5th and 95th percentile statistics are presented for each of the Cartesian coordinates of a large number of body dimensions collected on 24 Ss while in body attitudes representative of the emergency abandonment sequence. Three-dimensional graphic summaries of design ranges are included along with suggestions for application.
T. G. I. R 39

16,901
Cacoullos, T. TWO PROBLEMS OF ESTIMATION: BINOMIAL VARIANCE AND TRUNCATED POISSON MEAN. Contract NONR 266(33), Proj. NR 042 034, CU 39 60, 1960, 34pp. Columbia University, New York, N.Y.

16,901

This paper deals with the estimation of the binomial variance and the mean of the truncated Poisson distribution. Admissible and approximately median-unbiased estimators and numerical examples are provided for both problems. In the binomial case, a uniformly most accurate median-unbiased estimator is obtained. For the construction of an admissible estimator, a theorem in Lehmann is employed. In the Poisson case the distribution of the sufficient statistic is derived by elementary combinational methods without the use of characteristic functions. In both problems, the notion, construction, and use of a "confidence curve" is illustrated.
T. G. R 11

16,902
Burch, G.E. & Gerathewohl, S.J. SOME OBSERVATIONS ON HEART RATE AND CARDIODYNAMICS DURING WEIGHTLESSNESS. Reports Control Symbol CSCRD 16 5, Nov. 1959, 28pp. USA Biogastronautics Research Unit, Redstone Arsenal, Ala.

16,902

A survey was made of the efforts made during the last decade to determine the biomedical effects (cardiovascular functions in particular) of subgravity and zero-g. Animals and men were exposed to short and moderate periods of weightlessness and their behavior, respiration, and cardiovascular functions were recorded during aircraft and rocket trajectories. The obtained records were discussed and a generalized survey of the cariodynamic effects was given in tabular form. These findings were discussed in relation to the ability of man to tolerate space flight.
T. G. I. R 18

16,903
Buckner, D.N. & Harabedian, A. HUMAN PERFORMANCE AS A FUNCTION OF THE JOINT EFFECTS OF DRIVE AND INCENTIVE MOTIVATION. Contract NONR 2453(00), Proj. NR 145 120, Dec. 1959, 62pp. Human Factors Research, Incorporated, Los Angeles, Calif.

16,903

To investigate the joint effects of the Hull-Spence motivational construct, D or generalized drive, and incentive motivation, K, on human performance, an effort was made to produce variations in K by giving one-half the Ss (apprentice seamen) an opportunity to obtain a three-day liberty dependent upon their performance on a nine-choice disjunctive reaction time (RT) task and not giving the other half a similar opportunity. Two levels of D were produced by giving one-half of the Ss conditioning trials in which a 1000 cps tone was paired with an electric shock and then the tone was presented to all Ss on all test trials. Thus, there were four experimental groups. Speed and accuracy (information transmission) on the RT tasks were analyzed for differences among the various DK groups. T. G. I. R 18

16,904
Boyle, A.J. COMPARATIVE EVALUATION OF ARMORED VEHICLE CREWMAN'S HELMETS REPORT OF PROJECT NR 2074. DA Proj. NR 7 80 05 001, ATBBJ P 2074, March 1960, 23pp. USA Armor Board, Ft. Knox, Ky.

16,904

Tests were conducted to determine which of the following helmets would be most suitable for Army use: QMC T56-6 Developmental Combat Crewman's Helmet; Tank Crewman's Helmet, World War II type; and Wilson Football Helmet equipped with communications equipment. Sample helmets were issued to tank crewmen who wore them while conducting normal tank crew duties and while firing. Each individual was questioned regarding functional characteristics and relative comfort. Physical characteristics of the helmets were examined with regard to Army requirements. Recommendations were included.
I. R 3

16,905
Bosee, R.A. DETERMINATION OF TEST INSTRUMENTATION REQUIREMENTS FOR BIOLOGICAL AIRBORNE AND ASTRONAUTICAL TESTS. Proj. TED NAM AE 1403.1, March 1960, 9pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,905

A description is given of electrodes suitable for obtaining electrocardiographic records when worn under protective clothing during prolonged exposures in adverse environmental conditions. The manner of applying the electrodes to the surface of the body is also indicated.

16,906
Bose, R.C. & Ray-Chaudhuri, D.K. ON A CLASS OF ERROR CORRECTING BINARY GROUP CODES. Contract AF 49(638) 213, AFOSR TN 59 1240, Mimeo. Series 240, ca. 1960, 14pp. Department of Statistics, University of North Carolina, Chapel Hill, N.C.

16,906

A general method of constructing error correcting binary group codes is obtained. A binary group code with k information places and n places is called an (n,k) code. Explicit methods of constructing t-error correcting (n,k) codes are given for $n=2^n-1$ and $k=2^n-1-nt$ for general t. An example is worked out to illustrate the method of construction.
T. R 5

16,907
Bartlett, R.G. & Phillips, N.E. A DEVICE FOR THE HUMIDIFICATION OF INSPIRED DRY OXYGEN AND THE PREVENTION OF HYPERVENTILATION. Proj. TED PEN AE 5100.1 & Proj. MR005. 13 3100, Subtask 6. Rep. 1, March 1960, 11pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

16,907

To design a reliable means of humidifying oxygen after it leaves the storage tank but before it is used by the aviator and to prevent (or reduce) hyperventilation, a breathing mask was developed. This mask transfers moisture from the expired breath to the inspired dry oxygen. The problem of hyperventilation is solved by bringing about an increase in depth of breathing through the addition of dead space thus increasing the CO_2 tension of inspired air. The mask and its operation are described in detail and some results of laboratory evaluations are discussed.
I.

16,908
Banghart, F.W. (Princ. Investigator). BIOLOGICAL PAYLOADS IN SPACE FLIGHT. Contract AF 18(600) 1792, ARDC TR 58 58, Nov. 1958, 41pp. Division of Educational Research, University of Virginia, Charlottesville, Va.

16,908
This report presents the results of a working group conference concerned with planning biological experiments that would provide data from which the feasibility of a manned space flight could be determined. The major considerations treated were 1) behavioral factors, 2) instrumentation factors, 3) ecological factors, and 4) physiological effects of the space environment. In each area the problems were defined and a suggested research program outlined.
I.

16,910
Andrews, W.H. & Holleman, E.C. EXPERIENCE WITH A THREE-AXIS SIDE-LOCATED CONTROLLER DURING A STATIC AND CENTRIFUGE SIMULATION OF THE PILOTED LAUNCH OF A MANNED MULTISTAGE VEHICLE. NASA TN D 546, Nov. 1960, 26pp. National Aeronautics and Space Administration, Washington, D.C.

16,910
The control problems associated with piloting multistage vehicles to orbital conditions were investigated with static and dynamic simulators. A three-axis controller was used for primary control. Presented are design details of the controller, pilot opinions concerning its operation, and other data pertinent to the design and use of a controller of this type.
T. G. I. R 5

16,911
Allen, T.H., Krzywicki, H.J. & Isaac, G.J. ENERGY REQUIREMENTS AND PHYSICAL ACHIEVEMENTS ACCORDING TO BODY COMPOSITION OF YOUNG SOLDIERS OFFERED FOOD TO SATIETY. Proj. 6 60 11 020, Rep. 243, Feb. 1960, 30pp. USA Medical Research and Nutrition Lab., Fitzsimons Army Hospital, Denver, Colo.

16,911
Initial and final measurements of body weight, water, and density indicate the changes in body composition in 75 Ss who were satiated with measured quantities of food for a period of 28 days. The effect of body "protein" and fat can be anticipated from regression equations on 1) food intakes for the period of study, for days when contest marches were held, and for days of rest; 2) heat outputs when walking a horizontal treadmill and when in the basal state; and 3) physical achievement scores in physical training, pulse rate (step) tests, and in contest march times. From the calculations, estimations of daily energy requirements for various body weights and levels of physical activity may be made.
T. G. R 18

16,912
Adorno, D.S. THE ASYMPTOTIC THEORY OF CONTROL SYSTEMS; I. STOCHASTIC AND DETERMINISTIC PROCESSES. Contract NASW 6 & Tech. Release 34 73, June 1960, 17pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

16,912
The asymptotic behavior of a particular class of control systems is studied, with particular emphasis on the questions of convergence and the steady-state forms of the loss function and of the system itself. The concept of policy equivalence is introduced and used to show that a stochastic, linear, first-order control system with quadratic loss function is policy equivalent to the deterministic system which depends only on the expected states of the system. Therefore, only deterministic systems are considered in the remainder of the paper.
R 5

16,913
Abramson, L. A MODIFICATION OF THE WALD SEQUENTIAL PROBABILITY RATIO TEST AS APPLIED TO RADAR DETECTION. Contract AF 19(604) 1572, AFCRC TN 58 395 & Tech. Rep. T 10/133, Aug. 1958, 30pp. Electronics Research Labs., Columbia University, New York, N.Y.

16,913
For a fixed false alarm probability, a, and a fixed miss probability, B, the Wald sequential probability ratio test (SPRT) minimizes the average time, T, to decide between signal-plus-noise and noise alone. Since the SPRT is designed to detect a fixed signal although the true signal may vary over a large range, a modification of the SPRT was investigated which results in a smaller maximum $\overline{T}$ at the expense of a larger minimum $\overline{T}$. The modification consists of performing a preliminary SPRT and, depending on its outcome, then performing one of two more SPRT's, after which a decision is made. The special case of a constant signal with additive independent Gaussian noise is considered.
T. R 2

16,914
Ziegler, R., Burns, N., Lazo, J. & Gifford, E. THE ROLE OF A FLEXIBLE COCKPIT IN HUMAN ENGINEERING RESEARCH. 1960, 8pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,914
The importance of anthropometry in the design of modern aircraft cockpits and crew stations is discussed. A dynamic measuring device, the flexible cockpit, which can test for optimal work space distances, configurations, and functional characteristics, is described. A brief summary of some completed studies on the restrictions evoked by the wearing of pressure suits on a pilot's work space, work capacity, and visual field is given.
I. R 5

16,915
Weinfeld, F.D., McLaughlin, J.T. & Marks, M.R. STUDIES ON HEIGHT-RANGE INDICATOR OPERATOR PERFORMANCE. Contract AF 19(604) 5616, AFCRC TN 60 54 & PRA Rep. 60 9, April 1960, 25pp. Psychological Research Associates, Inc., Arlington, Va.

16,915
Various studies, tests, and experiments were described which were conducted during an investigation of the human factors involved in Height-Range Indicator Operator (HRIOP) performance. An attempt was made to determine the degree to which negative height replies could be attributed to operator performance as opposed to environmental conditions prevailing within the height-finding system. These studies culminated with an investigation of the degree to which HRIOP performance could be improved as the result of an experimentally induced increase in motivation. Specific recommendations for improving performance were presented.
T. G.

16,916
Warburton, G.B., Jr., Lawrence, K.A. & Marks, M.R. SAGE TASK-EQUIPMENT ANALYSIS: INTERCEPT DIRECTOR INTERCEPT DIRECTOR TECHNICIAN. Contract AF 19(604) 5616, AFCRC TN 59 76 & PRA Rep. 60 4, Feb. 1960, 66pp. Psychological Research Associates, Inc., Arlington, Va.

16,916
The operation of the Intercept Director-Intercept Technician team in the Boston Air Defense Sector of the SAGE System is described. The analysis is concerned with delineating the interface between man and machine or, in other terms, describing the relationship between the equipment to be operated and the task of the operator.
T.

16,917
Wall, P.D. & Cronly-Dillon, J.R. PAIN, ITCH, AND VIBRATION. A.M.A. Arch. Neurol., April 1960, 2, 365-375.

16,917
This paper dealt with the activity of a group of cells in the cat's spinal cord and with some sensory phenomena in man. Experiments were described in which the organization of the system of cells was examined as well as the cell response to light and heavy skin pressure, temperature change, to an itch-producing substance (cowhage), and to a combination of vibration and each of the foregoing stimuli. A further series of experiments on man explored the effect on threshold of perception for touch, temperature, and pain of simultaneous vibration of the skin. The results were related to the hypothesis that the specificity of the stimuli is preserved in the temporal impulse discharge pattern of such a group of cells in the central nervous system.
I. R 17

16,918
Van Horn, J.M., Peltz, F.D., Summerall, C.P., Jr. & Chin, T. AUTOMATIC DATA PROCESSING INPUT-OUTPUT EQUIPMENT STUDY VOLUME I OF FINAL REPORT. Contract DA 36 039 SC 78010, Proj. DA 3 28 01 201, July 1959, 284pp. Melpar, Inc., Falls Church, Va.

16,918
This volume covers one phase of a study of automatic data-processing input-output equipment. Included in this phase are 1) functional requirements of military applications which were generated by analysis of available Army applications, and by personal contact with members of the Army involved in such applications; 2) operational requirements of the applications areas discussed under the four categories of G-1 through G-4 plus a category of non-field applications; 3) equipment and techniques not necessarily available at present but considered suitable; and 4) detailed discussion and evaluation of techniques to fill gaps in current equipment.
T. G. I.

16,919
Wilkerson, L.E. & Matheny, W.G. DISCRIMINATION AND CONTROL OF PITCH, ROLL AND YAW WITH A GRID TO ENCODE THE GROUND PLANE. Contract NONR 1670(00), Tech. Rep. D228 421 003, Jan. 1960, 17pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,919
To determine how well people can control the attitude of a simulated helicopter system when the ground plane is represented by a grid pattern, the performance of 18 flight naive subjects in controlling pitch, roll, and yaw was recorded. The principle independent variable was orientation of the grid or heading (0 degrees, 30 degrees, or 45 degrees) of the aircraft. The task was to "fly" straight and level while maintaining a prescribed heading. Performance data (root mean square and reversals) were analyzed for effectiveness of control and effect of grid orientation. The basic assumptions underlying a contact analogue display were discussed.
T. I. R 4

16,920
USN Aviation Safety Center. INTERIM EJECTION SEAT STUDY. June 1959, 16pp. USN Aviation Safety Center, Norfolk Air Station, Va.

16,920
The ejections from USN aircraft for the period 1 January to 30 June 1959 are reported. Tabular and graphic presentations of the data are made with no interpretation. The complete analysis of the emergency use of the ejection seat will be published in the yearly summary.
T. G. I.

16,921
Townsend, R.L. DETECTION OF NON-GAUSSIAN SIGNALS IN GAUSSIAN NOISE. Contract DA 19 020 ORD 4637, Projs. DA 599 01 004, ORD T132 0001, OOR 2001, Rep. 7967 R 5, June 1960, 8pp. Electronic Systems Lab., Massachusetts Institute of Technology, Cambridge, Mass.

16,921
Considerable difficulty is generally encountered when attempting to determine the structure of a likelihood ratio test for the detection of non-Gaussian signals in the presence of additive Gaussian noise. Consideration is given to the possibility of detecting such signals by suboptimum means. The performance of a class of suboptimum tests which are obtained by averaging over the signal ensemble the optimum test for each ensemble member is evaluated. This class of tests is simple in form and compares favorably with the optimum test for a wide range of signals.
R 7

16,922
USCG Civil Engineering Div. THE USE OF RETRO-REFLECTIVE MATERIALS FOR AIDS TO MARITIME NAVIGATION. Rep. 34, Nov. 1959, 47pp. USCG Civil Engineering Div., Headquarters, Washington, D.C.

16,922
This report provides technical information on the performance of those retro-reflective materials (materials having the property of reflecting light directly back on itself) recommended for use as aids to maritime navigation. The best methods and configurations for the use of these materials are discussed. The following topics are treated in detail: 1) types of material available, 2) theoretical performance of retro-reflectors, 3) visual ranges of retro-reflective materials, 4) colors to be used, 5) materials for use on buoys, and 6) retro-reflective numerals.
G. I. R 3

16,924
Sukhatme, S. RESEARCH IN MULTIVARIATE ANALYSIS NONPARAMETRIC TESTS FOR LOCATION AND SCALE PARAMETERS IN A MIXED MODEL OF DISCRETE AND CONTINUOUS VARIABLES - II. Contract DA 20 018 ORD 14735, DA Proj. 5 B 99 01 004, ORD Proj. T B 2 0001, OOR Proj. 1599, OOR Rep. 1840 15, Interim Tech. Rep. 17, March 1960, 10pp. Michigan State University, Ann Arbor, Mich.

16,924
This paper is a continuation of a previous paper of the same title in which there was a discussion of the Median and Wilcoxon-Mann-Whitney tests for location, and the extension to the o-sample problem. In this paper the Rank Test for Dispersion and the Two Sample Run Test are discussed.
R 3

16,925
Stern, J.A., McDonald, D.G. & Hahn, W.H. PHYSIOLOGICAL STRESS AND FOOD CONSUMPTION. Contract DA 19 129 QM 802, Proj. 7 84 15 007, Rep. 11, April 1960, 11pp. USA Quartermaster Food & Container Institute for the Armed Forces, Chicago, Ill. (Washington University, St. Louis, Mo.).

16,925
A series of studies are reported on the effects of group versus individual housing of rats on self-selection diets and body weight. Another series is being conducted to study the effect of cold stress.
G. R 7

16,926
Smith, H.T.U. (Dir.). PHYSIOGRAPHY AND PHOTO INTERPRETATION OF COASTAL SAND DUNES FINAL REPORT. Contract NONR 2242(00), July 1960, 26pp. Geology Department, University of Massachusetts, Amherst, Mass.

16,926
This report is essentially an advance summary of the general results of a project undertaken to gain additional and more adequate knowledge of the occurrence of coastal sand dunes, with particular reference to the United States, and to outline a general scheme of coastal dune development. Particular attention was given to the collection of information through air photos. Problems of photo-interpretation are considered. Topics treated here are: 1) general survey of coastal dune areas, 2) dunes of nonvegetated and of vegetated areas, 3) special cases of Eolian sands, 4) dunes influenced by sand composition, 5) utilization of coastal dune areas, and 6) photo-interpretation of coastal dunes. Abstracts of completed technical reports are appended.
R 9

16,927
Smith, F.W. & Murch, K.R. CURRENT TRENDS IN NAVAL ELECTRONICS MAINTENANCE. NEL Rep. 972, Sept. 1960, 38pp. USN Electronics Lab., San Diego, Calif.

16,927
A survey was made of maintenance trends and problems on board USS GALVESTON. This information was collated to that gathered from trip reports to various industrial, military, and research establishments and with other reports in the field of electronic maintainenance. Recommendations were presented for 1) the proper stage at which maintainability design should be considered, 2) specialty versus general purpose training for technicians, 3) Naval shipboard equipment design, and 4) needed investigations.
T. I. R 20

16,928
Smith, E.K., Anastasio, F.J., Harac, S., Kalustyan, B.C., et al. THE APPLICATION OF POINT SOURCE PROJECTION TECHNIQUES TO AIR-TO-AIR GUNNERY TRAINING. Contract NONR 1628(00), NAVTRADEVCEN TR 1628 6, March 1959, 39pp. USN Training Device Center, Port Washington, N.Y. (The deFlorez Company, Inc., Englewood Cliffs, N.J.).

16,928
This report describes the results of a study made to determine if a satisfactory visual presentation can be obtained with point light source techniques for application to an air-to-air gunnery trainer. It includes an analysis of the training task to determine the skills to be developed and the cues required for its performance. A proposed point source projector is described along with several limited-scope evaluation experiments. The need for further evaluation is discussed.
I. R 3

16,929
Smith, E.K., Anastasio, F.J., Harac, S., Kalustyan, B.C., et al. THE APPLICATION OF POINT SOURCE PROJECTION TECHNIQUES TO HELICOPTER LOW-ALTITUDE NAVIGATION TRAINING. Contract NONR 1628(00), NAVTRADEVCEN TR 1628 3, March 1959, 43pp. USN Training Device Center, Port Washington, N.Y. (The deFlorez Company, Inc., Englewood Cliffs, N.J.).

16,929
This report described the results of a study to determine if a satisfactory visual presentation can be obtained with point light source techniques for application to a helicopter low-altitude navigational trainer. The scope and important elements of the problem were determined through interviews with pilots as well as from the requirements of the contract specification. A promising point source projection system for the stated training problem was described and recommended for experimental evaluation.
T. I. R 4

16,930
Sinaiko, H.W. & Shpiner, L. EXPERIMENTS ON THE PERFORMANCE OF AN AUTOMATIC AIR DEFENSE SYSTEM. Contract DA 36 039 SC 56695, Subtask 3 99 01 002 & Rep. R 113, Jan. 1960, 31pp. Coordinated Science Lab., University of Illinois, Urbana, Ill.

16,930
Three experiments were conducted with the Cornfield System (a complex computer system in the area of tactical decision-making) operating in an air defense context in a fully automatic mode. In each experiment the system was programmed to do automatic threat evaluation, weapon selection, and weapon control with automatic recording of four aspects of system performance: target penetrations, target kills, kill distance, and weapon assignments. Experiment I studied the effects of target load, defense strategy, and number of weapons on the system. Experiments II and III tested hypotheses about sample size and length of script.
T. G. R 2

16,931
Shuford, E.H. & Wiesen, R.A. BAYES ESTIMATION OF PROPORTIONS: THE EFFECT OF STIMULUS DISTRIBUTION AND EXPOSURE TIME. AFOSR TN 59 1311 & Rep. 23, Dec. 1959, 17pp. Psychometric Lab., University of North Carolina, Chapel Hill, N.C.

16,931
To evaluate predictions from the decision theory model of the behavior of individual Ss in a typical psychophysical experiment, the solution (known as a Bayes strategy) was mathematically derived for the task described below. Twenty-three Ss were required to estimate the percentage of ones in random matrices composed of ones and zeros in varying proportions. The two types of information were experimentally varied by using different stimulus distributions and exposure times. The stimulus distributions were not told to the Ss, who thus had to learn stimulus probabilities during the course of the experiment. Subject estimates were compared with those derived from the model.
T. R 17

16,932
Sheridan, T.B. EXPERIMENTAL ANALYSIS OF TIME-VARIATION OF THE HUMAN OPERATOR'S TRANSFER FUNCTION. From: Preprints of Papers Presented at International Federation of Automatic Control Congress at Moscow June-July 1960, 6pp. Butterworths Scientific Publications, London, England.

16,932
An experimental technique is presented for determining the dynamic characteristics of a linear system with time-variable parameters. The technique is especially appropriate for measuring time changes in the transfer characteristics of a human operator of a control system as he adapts to changes in system and environmental parameters. Certain inherent limitations in continuously measuring time-variable transfer characteristics are discussed. Results are presented in the form of time-variabl polar plots for several experiments where human operators adjusted their own transfer characteristics in adapting to sudden changes in system parameters.
G. I. R 4

16,933
Schwartz, L.S. (Dir.). EVALUATION AND OPTIMIZATION OF DIGITAL COMMUNICATION SYSTEMS. FIFTH SCIENTIFIC REPORT. Contract AF 19(604) 1964, AFCRC TN 58 578, Nov. 1958, 65pp. College of Engineering, New York University, New York, N.Y.

16,933
The problem of transmission of information over a bi-directional communication system with noise in the forward and feedback channels is discussed. A system that prevents nonconservation of message length is described and the results of analysis are summarized. A technical description is given of a model of communication decision-feedback system with noise in the forward and feedback channels. This system prevents nonconservation of message length by reserving, for a given block of message units, a fixed correction interval for repetition of ambiguously received messages. Several correction procedures are analyzed and compared. Comparisons are also made with unidirectional and ideal decision-feedback systems.
G. I. R 14

16,934
Rosenblatt, M. INDEPENDENCE AND DEPENDENCE. Contract NONR 562(29), Tech. Rep. 1, June 1960, 26pp. Division of Applied Mathematics, Brown University, Providence, R.I.

16,934
A stochastic process is commonly used as a model in studying the behavior of a random system through time. This paper examines processes of independent random variables and dependent processes in terms of two problems. The first of these is concerned with reasonable notions of asymptotic independence and what types of processes satisfy them. The second is that of characterizing those processes that can be constructed out of independent processes by a function and its shifts.
R 10

16,935
Rinehart, R.F. AN ESTIMATE OF CURRENT OPERATIONS RESEARCH ACTIVITY IN RUSSIA AND SATELLITE COUNTRIES. Contract DA 31 124 ORD 10 3 and 10 4, Tech. Memo. 60 1, July 1960, 17pp. USA Office of Ordnance Research, Durham, N.C.

16,935
In an endeavor to provide an estimate of the nature and current annual volume of published operations research work in Russia and satellites, about four months work of USSR technical publication and about five months of satellite country publication were screened for articles in this area. The dates of the articles lie mostly in the period July, 1959, to February, 1960. On the basis of the sample, current annual volume of output was estimated. The subject area of primary concern was studied and a sample of 29 titles was listed. Pros and cons of a translation program in operations research were discussed.
R 3

16,938
Renaud, G. THE EFFECTS OF INTERFERENCE ON SPEECH COMMUNICATION. Proj. 4519, Task 45350, RADC TN 60 104, June 1960, 15pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

16,938
An attempt is made to tie together many of the data from the literature on speech interference, which pertain to the ability of the operator to derive intelligence from a speech signal when this signal has been altered by processes that occur or could occur in a communication link. Major areas covered are 1) interfering signals; 2) distortion effects--frequency, amplitude, phase and time; and 3) annoyance effects. These data are examined to see how effective the operator can be as an anti-interference device and to point out the lower limits of system performance which can be tolerated. Implications for the design of voice communication systems are considered.
G. R 14

16,940
Psychological Research Associates, Inc. HUMAN FACTORS STUDIES IN SAGE INTERIM REPORT. Contract AF 19(604) 5616, PRA Rep. 60 7, Feb. 1960, 8pp. Psychological Research Associates, Inc., Arlington, Va.

16,940
This report summarizes the completed and in-progress work performed in a research and development study of SAGE Task-equipment analyses (TEA) for each operator-technician team in the BOADS Direction Center have been completed and the uses of the TEA are discussed. Paper-and-pencil tests have been developed for use in measuring knowledge about the job and have been administered to approximately 250 officers and airmen. Functional tests of performance were developed for the IND/INT team and human factors findings are reported here. An abstract of the findings on height-finding functional tests is also included along with a brief discussion of Direction Center lighting.

16,941
Monty, R.A., Myers, T.I. & Murphy, D.B. EFFECTS OF CORRECT AND INCORRECT KNOWLEDGE OF RESULTS ON ABILITY TO COUNT AUDITORY STIMULI. Rep. 3, March 1960, 18pp. Human Resources Research Office, George Washington University, Washington, D.C.

16,941
This report summarized two experiments conducted for the purpose of developing a measure useful in detecting changes both in utilization of correct information and in susceptibility to misinformation under conditions of minimum stimulation. The subject's task was to count auditory stimuli (blips), varying in number from one to forty, while seated alone in a darkened room. Three phases (180 trials) were administered to control and experimental groups of subjects; in the second phase, the experimental groups were given either correct or incorrect knowledge of results. Error data were analyzed for differences produced by these conditions.
T. G: R 11

16,942
Momiyama, T.S. (Proj. Engineer). EVALUATION OF "CROSSED-LIGHTS" OPTICAL LANDING SYSTEM. Proj. TED PTR SI 5009, Rep. 1, March 1960, 29pp. USN Air Test Center, Patuxent River Air Station, Md.

16,942
The Crossed Lights Optical Landing System was qualitatively evaluated and compared with the Mirror Optical Landing System at USN Air Test Center, Patuxent River, Maryland. Test flights included 31 day and 7 night flights involving nine different types of airplanes and various weather and visibility conditions. Recommendations for improvements were based upon the results of the evaluation, and the advantages of the Crossed Lights over the Mirror Optical Landing System were discussed.
T. I. R 3

16,943
Michel, E.L. & Langevin, R.W. ENVIRONMENTAL REQUIREMENTS OF SEALED CABINS FOR SPACE AND ORBITAL FLIGHTS PART 2 CONTINUOUS EXPOSURE OF HUMAN SUBJECTS TO INCREASED OXYGEN TENSION FOR SEVEN DAYS. Proj. TED NAM AE 1403 Part 2, Rep. NAMC ACEL 384, Sept. 1958, 11pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

16,943
In an attempt to define human limitations to higher than normal oxygen percentages for space flight, six volunteers were confined for a seven-day period (168 hours) in an altitude chamber at 10,000 feet (523 mm Mercury) simulated altitude breathing 80 percent oxygen. This is the equivalent of breathing 55 percent oxygen at sea level since the partial pressure in both cases is 418 mm Mercury. Prior to the study, each subject was evaluated by means of medical history and physical examination. During the study, measurements were made of vital capacity, pulse rate, respiratory frequency, and observations were made as to appearance and activity in general. Follow-up medical and physical examinations were made.
R 12

16,944
Matsuo, T. EXPERIMENTAL ELECTRONIC EQUIPMENT FOR MEDICAL TELEMETRY. NASA TT F 51, TM 51001, Nov. 1960, 20pp. National Aeronautics and Space Administration, Washington, D.C. (Mitsubishi Electric and Mfg. Co., Marunouchi, Tokyo, Japan).

16,944
A report is presented on a project set up to devise a means of observing the action of the human body at a distance by observing the small electrical voltages of the ECG, EEG, etc., with a radio telemetry system. The system would allow the study of the human body or animals in action, the investigation of the unknown cause of accidents under special conditions, the study of the adaptability of a human body, the analysis of the phenomenon of exhaustion, and the discovery of the most suitable ways of maintaining health under variable conditions.
G. I.

16,945
Lloyd, K.E. STUDIES OF SHORT TERM RETENTION: I. RECALL OF UNRELATED ITEMS IN A SEQUENTIAL TASK. Contract AF 49(638) 805, AFOSR TN 60 1057 & WSU Res. Rep. 1, June 1960, 12pp. USAF Office of Scientific Research, ARDC, Washington, D.C. (Dept. of Psychology, Washington State University, Pullman, Wash.).

16,945
Short term retention was studied in a situation requiring subjects to remember familiar letter-word pairs until their recall was requested. During the time the subjects were required to remember these items, they were presented other items or asked to recall previously presented items. A measure of the average number of items recalled upon request (storage load) was investigated as the independent variable. The subject listened to tape-recorded sequences of the letter-word pairs. When they heard a letter alone, they were instructed to recall all words previously paired with that letter. The average number of letter-word pairs learned varied from 2.5 to 12.5. The use of average storage load (number of items recalled) in operational tasks was discussed.
T. G. R 6

16,946
Laurent, A.G. ORDER STATISTICS AND STATISTICAL INFERENCE FOR A MODEL WITH RELIABILITY FUNCTION $S(t) = \exp[1+t-\exp(t)]$. Contract NONR 2575(00), (NR 042 201), Tech. Rep. 4, Nov. 1959, 71pp. Department of Mathematics, Wayne State University, Detroit, Mich.

16,946
This paper discusses the use of order statistics in problems of statistical inference that arise under the assumption that the phenomena under study are correctly represented by the Reliability Function $S(t) = \exp(1+t-\exp t)$, where t is a "reduced" variable. The motivation for the study of the present models arose from a consideration of situations where an aging process takes place and the future performance of the system depends on its age. Expected values, variances and covariances of the order statistics, tables of expected values, and uses of the tables are presented. Minimum variance unbiased estimates of the parameters, confidence limits and tests of hypotheses are described.
T.

16,947
Brown, J. EVIDENCE FOR A SELECTIVE PROCESS DURING PERCEPTION OF TACHISTOSCOPICALLY PRESENTED STIMULI. J. exp. Psychol., March 1960, 59(3), 176-181. (Birkbeck College, University of London, London, England).

16,947
This study investigates whether higher recall of a briefly exposed stimulus field under certain conditions "might be due to more favorable retention conditions rather than to a selective process during perception." Forty-eight subjects were required to report sets of stimuli, presented tachistoscopically, under two conditions: 1) the "critical" instruction was given two seconds before the stimulus field and the "neutral" instruction was given simultaneously with the field, and 2) the order of the two instructions in (1) was reversed. Results were discussed as they relate to whether selection processes occur within perception itself or some other aspect of the situation.
T. R 6

16,948
Fryer, D.I. PHYSIOLOGICAL EFFECTS OF EXPOSURE TO RAM PRESSURES. Presented at: Aerospace Medical Congress, Miami, 1960, 5pp. RAF Institute of Aviation Medicine, Farnborough, Hants, England.

16,948
A new technique for studying the effects on man of dynamic exposure to ram pressure is described, using water as a medium to simulate ejection ram pressure loads. Some results are presented from 58 live experiments carried out by two subjects. Physiological data, mechanical effects, and injury patterns are discussed.

16,949
Fields, M.E. & Cartolano, D.H. MATERIALS INFORMATION CENTERS. Proj. 7381, WADC TN 58 192, Sept. 1958, 22pp. USAF Materials Lab., Wright-Patterson AFB, Ohio.

16,949
Slightly more than 100 information centers known in September 1957 are reported. These centers are engaged in collecting and disseminating information on a variety of materials and hardware. In some cases access to information is restricted to members, supporters, or government organizations; and in other cases all inquiries are met. Brief descriptions are given for each center listed.
T.

16,950
Gebel, R.K.H. LONG FOCAL LENGTH LENSES AND THE PROBLEM OF RESOLUTION. Proj. 7072, Task 70872, WADC TN 59 188, March 1960, 11pp. USAF Aeronautical Research Lab., Wright-Patterson AFB, Ohio.

16,950

A method is presented for modifying the effective focal length of an existing telescope. In most cases the physical length of the telescope is not increased much by the modification; however, the focal length may be increased many times its original value. The modification uses various available lenses or those easily secured from available stockpiles. A theoretical analysis is presented, and basic calculations are developed which permit achieving proper matching of the resolution of the telescope and of the sensor by using one or more additional lens systems between the two. These principles are further illustrated in diagrammatic form.
I.

16,951
Frank, P. THE LOSS OF INFROMATION DUE TO THE GROUPING OF DATA. Contract NONR 266(55), Tech. Rep. 6, Jan. 1960, 24pp. Statistical Engineering Group, Columbia University, New York, N.Y.

16,951

Much of the theory of estimation is based on continuous distributions where it is assumed that observations are real numbers. In the actual world, two observations that fall in the same interval (of real numbers) are identified and the observations are grouped. The question of how much information is lost by grouping is pursued in this paper. The effect of size of groupings on efficiency is analyzed using Fisher's definition of information. Detailed results of computations of "information efficiency" are given for the exponential distribution of several cases. Some derivations of the results are given and a formula is presented for efficiency. Finally some computations are presented for the normal distribution and compared with approximations given by the formula.
T. R 4

16,952
General Electric Company. HUMAN FACTORS ON ANIP FINAL REPORT. Contract NONR 1076(00), Rep. DAC 56 436, June 1960, 39pp. General Electric Company, Ithaca, N.Y.

16,952

This report covers work accomplished on the Contact Analog and associated displays of the ANIP (Army-Navy Instrument Program) from the human factors point of view. The following areas are covered: 1) investigation of the flight ribbon, 2) investigation of strobing phenomenon, 3) investigation of perceptual factors in landing and take-off, 4) development of decision-making model, and 5) support in system evaluation.
T. G. I. R 10

16,953
Montague, R. DETERMINISTIC THEORIES. Contract AF 49 (638) 33, ASOFR TN 58 1113, Aug. 1958, 64pp. University of California, Los Angeles, Calif.

16,953

An analysis of the notions of a deterministic theory and of a deterministic system and an investigation of some of the properties of these notions are presented. The investigations are conducted within metamathematics in the wider sense, construed as including the apparatus of set theory. Definitions of the concept of deterministic theory, the derivative concept of a deterministic system, and several related concepts are given. An inquiry is then made as to whether two specific theories (classical particle mechanics and Newtonian celestial mechanics), often alleged to be deterministic, actually are so. Theorems relating determinism with various other concepts that have been associated with it in the literature are presented. Finally, explicit definability and determinism are discussed. R 30

16,954
Palevsky, G. REPORT ON THE ENGINEERING BIOTECHNOLOGY OF HANDLING WASTES RESULTING FROM A CLOSED ECOLOGICAL SYSTEM HANDLING AIR CONTAMINANTS RESULTING FROM A CLOSED ECOLOGICAL SYSTEM PROGRESS REPORT. Contract AF 18(603) 71, AFOSR Rep. 58 269, July 1957, 16pp. College of Engineering, New York University, New York, N.Y.

16,954

In a closed ecological system, in which humans are present and are required to carry on sedentary work in a confined space for an extended period of time, the atmosphere must be suitable for life and conducive to work. An examination of present knowledge of the control of temperature, humidity, air motion, foreign matter, micro-organisms, and the balancing of the carbon dioxide and oxygen ration is made singly and in relationship with each other. This examination is related to problems of ventilation and air conditioning.
R 29

16,955
Sunderland, J.E. APPRAISAL OF PSYCHOMOTOR PERFORMANCE IN MAN AND DOG. Contract DA19 129 QM 1539, Proj. 7 84 13 002A, Rep. 1 (Progress), April 1960, 4pp. USA Quartermaster Food & Container Institute for the Armed Forces, Chicago, Ill. (Northwestern University, Chicago, Ill.).

16,955

This is a brief summary report of the work accomplished during the initial stages of an appraisal of psychomotor performance in man and dog. The most tangible accomplishments are a review of the literature on the effect of stress upon performance, decisions regarding the order of experimental studies, construction and purchase of equipment, and the adaptation of four experimental dogs.

16,956
Wilks, S.S., Tomashefski, J.F. & Clark, R.T., Jr. PHYSIOLOGICAL EFFECTS OF CHRONIC EXPOSURE TO CARBON MONOXIDE. Proj. 21 1201 0013, Rep. 2, Nov. 1953, 8pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

16,956

To determine the physiological changes that occur in dogs when exposed daily to low concentrations of carbon monoxide, seven dogs were exposed six hours daily for a period of 20 weeks to concentrations of 0.07 to 0.08 percent and thereafter to 0.10 percent for a period approximating six months or until acclimatization. Alveolar and gas tensions were determined before, during, and after acclimatization. The in vitro relationships of CO, O_2, and H were further determined with the blood of five normal, five CO-acclimatized, and five altitude-acclimatized dogs.
T. G. R 18

16,957
Beranek, L.L., Smith, C.P., Fant, C.G.M., Stevens, K.N., et al. SPEECH COMPRESSION RESEARCH FINAL REPORT. Contract AF 19(604) 626, AFCRC TR 57 166, Feb. 1957, 51pp. Acoustics Lab., Massachusetts Institute of Technology, Cambridge, Mass.

16,957

Speech communications research during the period 1953-1956 by this laboratory is discussed. Following a discussion of the general speech-compression problem, the various items of research are described and their relation to the over-all program is indicated. These items include 1) a prototype speech-compressor system, 2) an alternate synthesizer, and 3) studies on speech production and reception.
G. I. R 56

16,958
Sargent, F., II, Sargent, Virginia W. & Johnson, R.E. THE PHYSIOLOGICAL BASIS FOR VARIOUS CONSTITUENTS IN SURVIVAL RATIONS PART III. THE EFFICIENCY OF YOUNG MEN UNDER CONDITIONS OF MOIST HEAT APPENDICES OF METHODS AND ORIGINAL DATA. Contract AF 18(600) 80, Proj. 7156, Task 71805, WADC TR 53 484, Vol. II, April 1958, 1513pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (University of Illinois, Urbana, Ill.).

16,958
From June 22, 1955 through July 27, 1955, 100 volunteer airmen served as subjects in a study of survival rations in moist heat at Camp Atterbury, Indiana. The original data collected during the 36-day period of study are detailed in these appendices. In addition, special studies are reported on renal osmotic regulation and chemical analysis of sweat. A method for analyzing ketone bodies in blood, urine, and sweat is described together with a full report of alterations in ketone body metabolism observed during the 1954 winter study at Camp McCoy and the 1955 summer study at Camp Atterbury.
T. G. R 173

16,959
McCormick, E.J. & Tombrink, K.B. A COMPARISON OF THREE TYPES OF WORK ACTIVITY STATEMENTS IN TERMS OF THE CONSISTENCY OF JOB INFORMATION REPORTED BY INCUMBENTS. Contract AF 41(657) 240, Proj. 7734, Task 17013, WADD TR 60 80, Aug. 1960, 73pp. USAF Personnel Lab., Lackland AFB, Tex. (Purdue Research Foundation, Lafayette, Ind.).

16,959
Three types of work activity statements (tasks, elements, and work actions) were compared for consistency of job information collected through their use in check lists Check lists of activities of two maintenance position types were administered to incumbents and supervisors. These provided for reporting job information on seven scales: 1) frequency of performance of activities, 2) time required for performance, 3) mental difficulty, 4) physical difficulty, 5) type of training received, 6) type of training desired, and 7) type of assistance obtained. Three indexes of rater consistency were used: 1) test-retest reliability of scale responses, 2) test-retest reliability of reports about occurrence of activities, and 3) inter-rater consistency of scale responses.
T. I. R 5

16,960
McCormick, E.J. & Ammerman, H.L. DEVELOPMENT OF WORKER ACTIVITY CHECK LISTS FOR USE IN OCCUPATIONAL ANALYSIS. Contract AF 41(657) 237, Proj. 7734, Task 17013, WADD TR 60 77, July 1960, 84pp. USAF Personnel Lab., Lackland AFB, Tex. (Purdue Research Foundation, Lafayette, Ind.).

16,960
To determine the consistency with which job incumbents respond to a list of task activities, several forms of check lists were completed by job incumbents in three Air Force position types. An identical form was readministered one week later. Consistency was measured by test-retest correlation of scale responses and by the proportion of tasks marked consistently on both administrations. Items in the check list covered frequency of task performance, length of task time, relative proportion of total time per task, and general task difficulty. On some of the check list forms "recall" items asked whether a job had been performed within the past month or the past six months. Two methods of response were also used.
T. I. R 6

16,961
Madden, J.M. FAMILIARITY EFFECTS IN EVALUATIVE JUDGMENTS. Proj. 7734, Task 17015, WADD TN 60 261, Nov. 1960, 9pp. USAF Personnel Lab., Lackland AFB, Tex.

16,961
This report is one of a series dealing with rater bias in job evaluation. To test the hypothesis that judgments of a stimulus series are directly related to the degree of familiarity of the rater with each stimulus, US Air Force officers (12 from each of five specialties) rated five Air Force airman specialties on each of 14 job evaluation factors and on a 15th factor which was a self-rating of degree of familiarity with the specialty being rated. The data were analyzed for variances related to the specialty rated, familiarity level of the rater, and interactions. Regression coefficients for correcting ratings for the contaminating effects of familiarity were given.
T. R 11

16,963
Winterberg, R.P., Wulfeck, J.W. & Wheeler, L. INVESTIGATION OF ADDITIVE COLOR PHOTOGRAPHY AND PROJECTION FOR MILITARY PHOTO-INTERPRETATION I. OPERATIONAL CONSIDERATIONS AND RESEARCH HYPOTHESES. Contract NONR 3137(00), Tech. Rep. 1, Dec. 1960, 31pp. Dunlap and Associates, Inc., Santa Monica, Calif.

16,963
This report describes initial work on a research program investigating the contribution of additive color photography to military photo-interpretation. A familiarization with the operational problem of military photo-interpretation was first undertaken. An analysis of interpretation problems was made in terms of possible means of enhancing military reconnaissance capability. The composite capability of an additive color photography and projection system for black and white, full color, or selective spectrum viewing was studied. Hypotheses were generated for experimental study. Details of the additive color system to be used in experimental study were described in an appendix.
I. R 79

16,964
Beck, J. TEXTURE-GRADIENTS AND JUDGMENTS OF SLANT AND RECESSION. Amer. J. Psychol., Sept. 1960, LXXIII, 411-416. (University of Pennsylvania, Philadelphia, Penn.).

16,964
By means of an optical tunnel, four different texture-gradients were studied. Judgments of slant and recession produced by the texture-gradients, whose cross sections were equivalent to those of noncylindrical objects, were made by 15 Ss in four different series of observations. The gradients were viewed monocularly with fixed head and binocularly in the first two series; in the last two series, the stimuli were viewed through a prism-pseudoscope both monocularly and binocularly. The results were discussed in relation to the hypothesis that binocular disparity eliminates ambiguity of apparent slant and recession.
T. I. R 2

16,965
Conticelli, M. & Ronchi, Lucia. NON UNIFORM ILLUMINATION AND READING TIME. Atti della Fondazione Giorgio Ronchi, July-Aug. 1960, XV(4), 369-380. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

16,965
The relation between luminance and speed of reading either connected or unconnected materials, with variation in brightness contrast, and with the border of the letters more-or-less blurred was investigated. The reading tests consisted of: 1) a series of dots, 2) series of isolated numbers, 3) numbers with two or more digits, and 4) connected material. The charts were read under various luminance levels, under sharp contrast conditions, and under blurred conditions (superimposing one or two diffusing glass plates on the chart); finally, conditions of non-uniform illumination were accomplished by the use of special glasses varying in density along the horizontal axis. Speed of reading, as affected by these conditions, was analyzed.
G. I. R 12

16,966
Davis, T.R.A. EXPERIMENTAL COLD ACCLIMATIZATION IN MAN. USAMRL Proj. 6X64 12 001, Task 08, Rep. 457, Dec. 1960, 8pp. USA Medical Research Lab., Fort Knox, Ky.

16,966
To determine whether or not cold acclimatization can be induced in man by experimental exposure to cold, ten subjects, wearing only shorts, were exposed eight hours daily for 31 days to an air temperature of 11.8 ± 0.46 degrees C in a cold chamber. Measurements included skin and rectal temperatures, shivering activity, and oxygen consumption. These data were analyzed for changes attributable to acclimatization.
T. G. R 19

16,967
Collins, W.E. FURTHER STUDIES OF THE EFFECTS OF MENTAL SET UPON VESTIBULAR NYSTAGMUS. USAMRL Proj. 6X95 25 001, Task 15, Rep. 443, Dec. 1960, 21pp. USA Medical Research Lab., Fort Knox, Ky.

16,967
To determine the influence of different mental sets on the horizontal component of rotation-produced vestibular nystagmus, eight Ss were subjected to a standard rotational procedure on five successive days. During rotational stimulation, Ss were instructed, in different test sessions, to 1) do mental arithmetic, 2) make estimates of subjective velocity, 3) reproduce durations of sound stimuli, and 4) assume a state of reverie. Recordings were made of eye movements and EEG activity during nystagmus. The data (nystagmus output and duration and alpha activity) were analyzed for effect of experimental conditions and discussed in terms of an alertness factor.
T. G. I. R 12

16,968
Ercoles, Anna Maria. ON THE RECOVERY OF SENSITIVITY SUBSEQUENT TO EITHER WHITE OR YELLOW GLARE. Atti della Fondazione Giorgio Ronchi, May-June 1960, XV(3), 264-271. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

16,968
The recovery of contrast sensitivity of the eye following white glare was compared with recovery after yellow glare for different durations (from brief flashes to 160 seconds) of the glare itself. Two subjects were tested under various conditions. Following dark adaptation, the subject fixated a glaring stimulus for a given time, and the time elapsing between offset of glare source and ability to read a given row of letters on an eye chart (recovery time) was recorded. The luminances of both sources were the same in one series but differed in another series in that a yellow filter was placed in front of the eye to obtain the yellow stimulus; luminance values were also varied in different series of tests. The results are related to the practical question of wearing yellow glasses for night driving. G. R 10

16,969
Bittini, Marcella & Ronchi, Lucia. GREEN AND BLUE ELECTRORETINOGRAMS AT LOW LUMINANCES. Atti della Fondazione Giorgio Ronchi, Jan.-Feb. 1960, XV(1), 1-11. (Istituto Nazionale Di Ottica, Arcetri, Firenze, Italy).

16,969
To determine the behavior of the electroretinographic (ERG) response at low luminances, records were picked up from a corneal electrode fitted in a contact lens worn on the right eye of the subject. Single flashes of green (530 millimicron) and blue (Wratten filter, 47) stimuli of 50 milliseconds duration were used to collect about 2000 responses from one subject. Curves were obtained by plotting the height of the b-wave against log luminance and were interpreted in terms of rod-cone interaction.
T. G. I. R 18

16,970
Coulter, N.A., Jr. & West, J.C. NONLINEAR PASSIVE MECHANICAL PROPERTIES OF SKELETAL MUSCLE. Contract AF 33(616) 5780, Proj. 7232, Task 71784, WADD TR 60 636, Aug. 1960, 7pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Ohio State University, Columbus, Ohio).

16,970
The nonlinear, passive mechanical properties of skeletal muscle were investigated. The response of frog gastrocnemius muscle to sinusoidal displacements over a frequency band of 0.5 to 25 cps was determined. From the experimental data a nonlinear differential equation characterizing the passive mechanical behavior of muscle was constructed.
G. I. R 3

16,971
Gaskill, H.V. (Chm.). HEALTH, MEDICAL AND DRUG FACTORS IN HIGHWAY SAFETY. From: Proceedings of the Second Highway Safety Research Correlation Conference, Washington, D.C., April 5-6, 1954, Publ. 328, Sept. 1954, 224pp. Committee on Highway Safety Research, National Academy of Sciences - National Research Council, Washington, D.C.

16,971
These proceedings from the conference on health, medical, and drug factors in highway safety are presented both in summary form and in full. Approximately 20 papers are presented on the following major topics: 1) health and self-medication as traffic accident causes; 2) diabetes, epilepsy, heart attacks, and convulsive therapy on an ambulatory basis as possible traffic accident causes; 3) fatigue, low oxygen, and combustion products as traffic accident causes; and 4) blood alcohol level and extent of traffic accident hazard. Working group recommendations and discussion by the conference are included.
T. G.

16,972
Freeman, H.F. & Rosenberg, I. HIGH ALTITUDE AND HIGH AIRSPEED TESTS OF STANDARD PARACHUTE CANOPIES. Proj. 6068, AFFTC TR 58 32, Oct. 1958, 121pp. USAF Flight Test Center, ARDC, El Centro, Calif.

16,972
To determine the opening characteristics of five standard personnel parachute canopies at various altitudes and air speeds, test drops were made with a torso dummy weighing approximately 200 lbs. Three different pressure altitudes (7,000, 14,000, and 20,000 ft.) were used with increasing velocity increments at each altitude until destruction occurred. Force and events as a function of time were recorded for each of 660 tests. The effects of altitude, airspeed, and parachute design on opening characteristics were reported.
T. G. R 2

16,973
Fierston, S. AUTOMATIC VOICE DATA LINK. Proj. 4360, Task 46604, AFCRC TR 58 126, March 1958, 54pp. USAF Special Systems Lab., AFCRC, Bedford, Mass.

16,973
The automatic voice data link vocally reads out commands to six aircraft under control using digital outputs from the intercept computer (Airmap) and return-to-base computers. It was developed to provide a device for reducing operator errors in the use of multiple intercept computers, such as the Airmap, without requiring additional equipment in the controlled aircraft. A general description, operation, and circuit analysis were given.
T. I.

16,974
Crain, K.J. THE SPECIFICATION AND DESCRIPTION OF SURFACE COLORS. Proj. 8501, Task 85002, RADC TN 58 333, Dec. 1958, 35pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

16,974
An attempt is made to provide all the information needed for the specification and description of surface colors. Analysis is made of colors in terms of the CIE chromaticity diagram and the method for converting from this system of notation (CIE) to the Munsell (and vice versa) is given. In addition, procedures are described for the estimation of degree of perceptible difference between colors.
T. G. R 14

16,975
Camp, R.T., Jr., Tolhurst, G.C. & Greene, J.W. SOUND ATTENUATION CHARACTERISTICS OF THE PROJECT MERCURY PRE-PRODUCTION FULL PRESSURE SUIT HELMET. Spec. Rep. 60 7, Sept. 1960, 13pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

16,975
The sound attenuation characteristics of the Project Mercury preproduction full pressure suit helmet were determined. Psychophysical determinations included measurement of the differences between a trained listener's auditory thresholds for various test tones with and without the helmet under low SPL conditions. Physical measurements were made of differences between sound pressures measured outside the suit and those measured under the right earphone cushion by a probe microphone under high SPL conditions.
T. G. I.

16,976
Gold, J. CALORIE NEUTRALIZATION DURING THERMAL STRESS. Aerospace Med., Nov. 1960, 31, 933-940. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

16,976
To investigate the possible benefits of calorie neutralization during thermal stress, two methods of fluid administration were compared: 1) dispensing body temperature water (37 degrees C) and 2) dispensing ice water (0 degrees C). Three Ss were maintained in an environmental test facility in a sitting-resting state at a vapor pressure of ten mm mercury under two temperature levels: 1) 130 degrees F (54.4 degrees C) for two hours and 2) 160 degrees F (71.1 degrees C) for one hour. Fluids were administered for sweat replacement (method 1) in the first series and for calorie neutralization (method 2) in a repeat series. Measurements made yielded data for calculation of body heat storage values for comparison purposes.
G. R 11

16,977
Bradley, J.V. DISTRIBUTION-FREE STATISTICAL TESTS. Proj. 7184, Task 71581, WADD TR 60 661, Aug. 1960, 378pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

16,977
A large number of distribution-free statistical tests are examined upon the basis of an extensive survey of the literature. Tests are grouped for discussion primarily according to the general type of mathematical derivation or type of statistical "information" used in conducting the test. Each of the more important tests is treated under the following headings: Rationale, Null-Hypothesis, Assumptions, Treatment of Ties, Efficiency, Application, Discussion, Tables, and Sources. Derivations are given and mathematical interrelationships among the tests are indicated. Strengths and weaknesses of individual tests, and of distribution-free tests as a class compared to parametric tests, are discussed.
T. G. I. R 700 (approx.)

16,978
Jensen, R., Gordon, J.J., Sipple, W., Zabelicky, R., et al NADC BIOLOGICAL INSTRUMENTATION SYMPOSIUM OF 10 DECEMBER 1958; SIXTH LETTER REPORT CONCERNING. Projs. TED ADC AE 1412.1 & TED NAM AE 1403.1, Task MR 005.15 0002.2, Rep. NADC MA L6018, July 1960, 9pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

16,978
A summary of investigations carried out on three types of respiration sensor systems is presented. The three systems described are 1) strain gauge chest strap for measuring respiratory excursions and transducing the movements into an electrical signal; 2) differential pressure respiratory flow meter for measuring pressure differential across a pilot's mask with a constant resistance to flow, integration of flow fluctuations with breathing results in tidal volumes and vital capacities; and 3) lip mike thermistor respiration sensor for use when a mask is not used.
G. I. R 6

16,979
Kreider, M.B. & Iampietro, P.F. OXYGEN CONSUMPTION AND BODY TEMPERATURE DURING SLEEP IN COLD ENVIRONMENTS. J. appl. Physiol., Sept. 1959, 14(5), 765-767. (USA Environmental Protection Research Div., QM Research & Engineering Command, Natick, Mass.).

16,979
To investigate the effect of cold on heat exchanges of the body during nighttime sleep, six young soldiers slept at the following ambient temperatures: 25.5 to 26 degrees C (78 to 80 degrees F), 15 to 18.5 degrees C (60 to 65 degrees F), and -32 to -34.5 degrees C (-25 to -30 degrees F). Rectal and skin temperatures were recorded and mean weighted skin temperatures were calculated at rest before sleep and at half-hour intervals every night; oxygen consumption was measured at six-minute intervals on occasional nights. Observations were made as to periods of wakefulness and restlessness during the night. The obtained values were discussed in relation to limits of body cooling compatible with substantially continuous sleep.
G. R 10

16,980
Kekcheev, N.Kh. PSYCHOPHYSIOLOGY OF CAMOUFLAGE AND RECONNAISSANCE. ATI 106 701, Sept. 1942, 290pp. US Central Air Documents Office, Dayton, Ohio. (Lenina Gosudarstvennogo Universiteta, Instituta Psikhologii, Mokovskogo, Russia).

16,980
The object of this book is to analyze the actual meaning of "human factor" under war conditions in the sphere of perception and to point out methods for a better and more advantageous utilization of this factor. The various chapters are 1) contrast sensitivity and the resolving power of the eye, 2) visual stereoperception, 3) visual perception of movements, 4) perception of color, 5) visual perception under conditions of poor illumination, 6) aural perception, 7) tactile, moving, and labyrinth perceptions, and 8) olfactory perceptions. A final portion of the book has not been translated from the Russian due to poor condition of the copy.
T. G. I. R 20

16,981
Lanzetta, J.T. & Kanareff, Vera T. SOME SOCIAL FACTORS AFFECTING THE CHOICE OF AN "IMITATIVE" RESPONSE IN A PROBABILITY LEARNING SITUATION. Contract AF 33(616) 5845, Proj. 7183, Task 71618, WADD TR 60 196, Aug. 1960, 48pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Fels Group Dynamics Center, University of Delaware, Newark, Del.).

16,981

Seven studies are reported concerning the frequency of occurrence of an imitative response in a two-choice probability learning situation as a function of the characteristics of the tasks and the choices ostensibly made by a partner. On each trial the subject had the option of either agreeing or disagreeing with a "partner's" response (actually controlled by experimenter). Over trials one of these modes of behavior would maximize the probability of success. In addition, several methods were used to induce attitudinal sets concerning the legitimacy of the imitative behavior. Predictions deduced from a modified decision theory framework were tested in terms of the results and discussed with reference to the problem of social learning.
T. G. R 26

16,982

Mori, Gina F. & Ronchi, Lucia. ON THE PERCEPTION OF INCOMPLETE BORDERS. Atti della Fondazione Giorgio Ronchi, July-Aug. 1960, XV(4), 3-14. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

16,982

A number of figures enclosed by incomplete contours (consisting of portions of either contrast borders or demarcation lines) were observed under various viewing angle-luminance combinations. The subjects were required to give a judgment about the presence or absence of the figure as a whole. The observed effects are discussed in terms of spreading of excitation at the retina level.
G. I. R 13

16,983

Pipes, W.O., Jr. REQUIREMENTS FOR THE DESIGN OF A CLOSED ECOLOGICAL SYSTEM. Presented at: Aerospace Medical Association Meeting, Miami Beach, Fla., 9-10 May 1960, 13pp. Northwestern Technological Institute, Evanston, Ill.

16,983

A discussion of the requirements of a system for maintaining the proper physical, chemical, and biological environment for the sustenance of human life is presented. Such a life support system, while not a truly closed ecological system in the strictest sense, is the present urgent problem associated with the exploration of space. Data needed for the design of the system and a method for organizing the data are then discussed. Some areas treated are: 1) the need for a detailed description of human metabolism; 2) atmospheric problems of pressure, oxygen requirements, nitrogen gas, and the like; 3) water and dietary requirements; and 4) composition of waste products produced by humans.

16,984

Nickerson, R.S. & Duva, J.S. TARGET POSITION AS A CODING DIMENSION. Proj. 9674, AFCCDD TR 60 41, Nov. 1960, 20pp. USAF Operational Applications Office, AFCCDD, Bedford, Mass.

16,984

To determine the number of discrete positions of a dot in a square which can be utilized as coding symbols, an experiment was conducted in which three variables (time available for viewing the display, size of display, and size of dot relative to display) were manipulated systematically. Subjects were asked to report the positions of dots within a square in terms of where the dots would be located if the square were subdivided into an eight by eight matrix. Results were analyzed in terms of accuracy and information transmission. Estimates were given for the maximum number of discriminable dot positions for various display-size exposure conditions.
T. G. R 10

16,985

Ronchi, Lucia & Toraldo di Francia, G. ON A POSSIBLE IMPROVEMENT OF CONTRAST PERCEPTION BY MEANS OF A SYSTEM WHICH CORRECTS THE CHROMATIC ABERRATION OF THE EYE. Atti della Fondazione Giorgio Ronchi, Nov.-Dec. 1959, XIV(6), 619-626. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

16,985

The effect of correction for chromatic aberration of the eye on the readibility of printed letters was investigated. The contrast between letters and background on a standard acuity chart (Armaignac) was varied systematically and responses before correction were compared to responses after correction by a spectacle lens of chromatic aberration. Conditions yielding improved contrast perception under correction were discussed.
T. G. I. R 11

16,986

Ronchi, Lucia. BLUE-GREEN RESPONSES AT MESOPIC LUMINANCES Atti della Fondazione Giorgio Ronchi, July-Aug. 1959, XIV(4), 384-391. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

16,986

The response of the eye, when stimulated by blue-green light, at mesopic ranges of luminance was investigated. Both electroretinographic and psychophysical measurements were made of the response when the two lights (blue and green) impinged on the retina simultaneously. The results were discussed in terms of retinal mechanisms at work and some practical implications were noted.
R 9

16,987

Putnam, V.K. SOME HUMAN ENGINEERING ASPECTS OF SEVERAL UNCONVENTIONAL AIRCRAFT. Presented at: Fourteenth Meeting of the Flight Test Techniques and Instrumentation Panel, Athens, Greece, 11-15 May 1959, Rep. 244, 12pp. Advisory Group for Aeronautical Research & Development, NATO, Paris, France. (USAF Rotary Wing Engineering Section, Edwards AFB, Calif.).

16,987

Interest by the military services, notably the US Army, in the potential of relatively high speed (compared to helicopters) aircraft that have the capability of vertical take-off and landing (VTOL), has been sufficient to finance the development of experimental testbeds of several types of VTOL aircraft. Several of these aircraft have been flown sufficiently to permit observations to be made on subjective or human engineering characteristics such as control, noise, downwash effects, etc. These characteristics, which are readily apparent to the pilot and strongly affect his opinion of the aircraft, are the subject of this report.
I. R 5

16,988

Lindberg, E.F., Sutterer, W.F., Marshall, H.W., Headley, R.N., et al. MEASUREMENT OF CARDIAC OUTPUT DURING HEADWARD ACCELERATION USING THE DYE-DILUTION TECHNIQUE. Aerospace Medicine, Oct. 1960, 31, 817-834.

16,988

Measurements of cardiac output, heart rate, stroke volume, mean arterial pressure, and systemic vascular resistance were made on six Ss in the seated position during a total of 51 exposures for one minute to 2, 3, and 4 g levels of headward acceleration produced by a human centrifuge. The indicator-dilution technique was used to measure cardiac output. All measurements were made during the period 20 to 40 seconds after the onset of acceleration. Some runs were made with Ss wearing a cutaway type anti-g suit inflated to 200 mm mercury pressure to investigate differences in parameters due to this type protection.
T. G. I. R 18

16,989

Ittelson, W., Landau, M. & Proshansky, H. THEORY AND RESEARCH IN BEHAVIORAL SCIENCE. Contract AF 49(638) 33, AFOSR TN 58 1108, Presented at: Interdisciplinary Behavioral Sciences Research Conference, University of New Mexico, Albuquerque, N.M., June-Aug. 1958, 28pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Brooklyn College, Brooklyn, N.Y.).

16,989

This paper is concerned with an analysis of the following aspects of contemporary behavioral science: 1) the breaking of traditional boundaries among disciplines, 2) the development of conceptual frameworks that cut across boundaries, and 3) an intensification of research effort involving new organizational forms.
R 2

16,990

Mori, F. & Ronchi, Lucia. ON THE FACTORS WHICH AFFECT THE PERFORMANCE OF A RADAR OPERATOR. I. SPEED OF READING AND PULSATING LIGHT AT DIFFERENT LUMINANCES. Atti della Fondazione Giorgio Ronchi, March-April 1960, XV(2), 138-151. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

16,990

To investigate the effect of adaptation conditions of the retinal periphery on speed of reading relative to a foveal test, a series of experiments were performed. In all conditions the subjects (five) viewed a test field composed of two columns of letters (suprathreshold in both size and illumination) and read as many letters as possible during exposure times varying from three to eight seconds. Two adaptation fields, at varying distances from the fovea, were varied to produce the following conditions: 1) incomplete dark-adaptation of the periphery, 2) incomplete light-adaptation of the periphery, and 3) a pulsating peripheral field. The results are discussed with reference to their implications for radar operators.
G. I. R 10

16,991

Ronchi, Lucia & Mori, Gina F. SPEED OF READING AS A FUNCTION OF THE ORIENTATION OF THE TEST. I. SUPRATHRESHOLD CONDITIONS FOR SIZE AND ILLUMINATION. Atti della Fondazione Giorgio Ronchi, Jan.-Feb. 1960, XV(1), 46-52. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

16,991

To investigate the effect produced by changes in orientation of the test on speed of reading, the subject was presented with printed stimulus material (isolated words, structured sentences, pictures, or numbers) and required to read out the test items. The normal position was the first orientation to be used, followed by analogous tests in the reversed (top to bottom) and 90 degree rotation orientations. Illumination was comfortable with adjustments permitted the subjects. The ratio between reading time relative to the test in a position other than normal was calculated. The results were discussed in relation to theoretical expectations.
T. G. I. R 12

16,992

Ronchi, Lucia. ON THE FACTORS WHICH AFFECT THE PERFORMANCE OF A RADAR OPERATOR. II. RECOVERY OF CONTRAST SENSITIVITY AFTER PRE-ADAPTATION TO STIMULI OF VARIOUS SPECTRAL COMPOSITIONS. Atti della Fondazione Giorgio Ronchi, May-June 1960, XV(3), 272-282. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

16,992

The influence on recovery of contrast sensitivity of adding blue to pre-adapting stimuli of various colors was investigated. After 30 minutes in the dark, the subject adapted his eyes (ten minutes) to a yellow, green, orange, and to each of these colors with some blue added. The subject was then required to observe a field containing eight circles, differing from one another with respect to contrast value, and score the circles he perceived during the course of dark-adaptation. Four subjects were tested. The practical applications of the results to radar operation and night flying were discussed.
T. G. R 14

16,993

Moser, H.M. ONE-SYLLABLE WORDS - REVISED AND ARRANGED BY ENDING SOUNDS. Contract AF 19(604) 4575, AFCCDD TN 60 58 & RF Proj. 882, Tech. Note 53, Nov. 1960, 130pp. Ohio State University Research Foundation, Columbus, Ohio.

16,993

A systematic listing of the monosyllabic words in American English according to their ending sounds is presented. It represents a complete revision of an earlier report, "One-Syllable Words," AFCRC TN 55-56, in that all words have been re-examined, errors corrected, a few words deleted, and a number of new words added. The earlier report, however, presents an arrangement according to beginning consonant sounds. Arrangment of the words in this report is according to sound. Items with the same vowel sound are in a single column; the initial or beginning sound is indicated at the extreme left; and the final or ending sound is listed at the right side of the page. There are 16 columns of words, one column for each of the basic vowel and diphthong sounds in English.
T.

16,994

Armour Research Foundation of Illinois Institute of Technology. "INVESTIGATION AND STUDY OF ERROR DETECTION AND CORRECTION FOR DATA LINK" ERROR DETECTION AND CORRECTION SUMMARY REPORT. Contract AF 30(602) 1729, Proj. 4519, Task 45232, RADC TR 58 20, Dec. 1957, 17pp. Armour Research Foundation of Illinois Institute of Technology, Chicago, Ill.

16,994

A summary is presented of work accomplished on a study and investigation of the application of error detection and correction techniques to data communication systems for the purpose of enhancing the reliability of these systems. The discussion for increasing the reliability of binary communications is based upon techniques described in current literature and includes definitions and discussions of error reduction, error detection, and error correction techniques.
R 59

16,995

Becker, H.D. & Lawton, J.G. THEORETICAL COMPARISON OF BINARY DATA TRANSMISSION SYSTEMS. Contract AF 30(602) 1702, Proj. 4519, Task 45232, RADC TR 58 91 & Rep. CA 1172 S 1, May 1958, 69pp. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.

16,995

An analytic study and comparison of certain ground-air communication links is presented. Systems employing frequency-shift keyed (FSK) modulation are first examined and an analysis leading to an optimum detector for a two-state FSK system is presented. The performance of carrier (on-off) keyed FSK and phase-shift keyed (PSK) binary systems operating in an environment of additive, white, Gaussian are analyzed and compared on the basis of the error probability attained as a function of the received signal-to-noise ratio. Finally, an analysis of modulation methods directed at minimum bandwidth PSK systems is presented. Recommendations for future investigation are presented.
G. I. R 125

16,996

Green, D.M. DETECTION OF SIGNALS IN NOISE AND THE CRITICAL BAND CONCEPT. Contract AF 19(604) 2277, AFCRC TR 58 51 & Tech. Rep. 82, April 1958, 78pp. Engineering Research Institute, University of Michigan, Ann Arbor, Mich.

16,996

An attempt was made to use behavioral data as a basis for a mechanistic and mathematical description of the auditory frequency analysis process. The critical band theory is used as an interpretive device in discussing the research. An analytic review of research from the areas of masking, frequency discrimination and loudness is presented and two new experimental studies are reported in detail. The first of these concerns detection of multiple component signals in noise. A model extending the critical band theory is considered in analyzing the results. The second study applies ideas developed in the first to a situation where the signal is a sample of noise. Two parameters of the signal are investigated: bandwidth and duration. A general model of the receiving mechanism is proposed. G. I. R 29

16,997

Kamiya, S. ON THE BIOPHYSICS OF VISION. Bull. math. Biophysics, 1958, 20, 343-373. (Committee on Mathematical Biology, University of Chicago, Chicago, Ill.). (Contract AF 18(600) 1454, AFOSR TN 58 343).

16,997

A photochemical system is considered which is similar to that of Hecht but which includes an intermediate substance between visual purple and visual white. This intermediate is assumed to change the membrane voltage of the photoreceptors. A simple model is presented from which one may calculate the frequency of the impulses resulting from the application of light. It is found that this physicochemical model enables one to account for a considerable number of physiological phenomena of vision, such as light and dark adaptation. By introducing a simple assumption regarding spatial interaction, some psychological variables, such as effect of intensity, can be accounted for. Other phenomena are discussed in terms of the model.
G. I. R 27

16,998

Ingram, W.T. THE ENGINEERING BIOTECHNOLOGY OF HANDLING WASTES RESULTING FROM A CLOSED ECOLOGICAL SYSTEM SKIN EXCRETIONS PROGRESS REPORT. Contract AF 18(603) 71, AFOSR Rep. 58 270, Oct. 1957, 8pp. College of Engineering, New York University, N.Y.

16,998

This report presents a review of skin excretions and offers a range of values, as reported by various research studies, for the various chemical components of sweat. Comments are offered as to unknown quantities as well as to possible effects of skin excretions upon occupants of a closed space. Lines for future investigations are listed.
R 8

16,999

Kunze, A.A., Marks, R.L. & Schermerhorn, J.G. A NEW HORIZON IN COMMUNICATION THEORY - THE POLYPHASE CONCEPT. Proj. 4518, RADC TN 58 6, Jan. 1958, 38pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

16,999

This report attempts to explain the significance of the polyphase concept and its application to communications engineering which, to date, has been treated from a single-phase concept only. The polyphase concept is shown to be of sufficient scope and power to penetrate into every domain constituting communication theory and to provide new applications to old problems such as information theory, modulation, antennas, detection, and circuitry. Further outlined are the possibilities of the application of the polyphase concept to such areas as multiplexing, high-power generation, and interference suppression.
T. G. I. R 24

17,000

Licklider, J.C.R. MAN-COMPUTER SYMBIOSIS. IRE Transactions, March 1960, HFE 1(1), 4-11. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

17,000

This article discusses the closer coupling between human and electronic members of systems. The aim of this closer partnership is to broaden computer function to 1) include the facilitation of formulative thinking and 2) to enable men and computers to "cooperate in making decisions and controlling complex situations without inflexible dependence on predetermined programs." Results of preliminary analysis of performance of such a partnership are discussed.
R 27

17,001

Bush, W.R., Kelly, R.B. & Donahue, V.M. PATTERN RECOGNITION AND DISPLAY CHARACTERISTICS. IRE Transactions, March 1960, HFE 1(1), 11-21. (Radio Corporation of America, Burlington, Mass. & Dunlap and Associates, Santa Monica, Calif.).

17,001

To establish criteria for predicting human operator performance in a map-matching task, 24 Ss were required to recognize which of four patterns belonged to the family of a reference pattern presented simultaneously. Measure of performance was the time in seconds taken to make a selection. Four physical measures emerged which were selected for use in predicting operator performance. Suggestions were made for further research.
T. G. I. R 4

17,002

Deininger, R.L. DESIRABLE PUSH-BUTTON CHARACTERISTICS. IRE Transactions, March 1960, HFE 1(1), 24-30. (Bell Telephone Labs., Inc., Murray Hill, N.J.).

17,002

This paper reported results from a series of studies designed to identify characteristics of push-button keysets which contribute to rapid, accurate, and convenient operation. Performance with several different sets was reported. Preference judgments also were obtained and discussed. The importance of individual differences in keying performance was pointed out.
T. G. I. R 4

17,003
Seidenstein, S. & Birmingham, H.P. THE RELATION OF ELECTRONIC AND OPTICAL DISPLAY GAIN TO SYSTEM PERFORMANCE. IRE Transactions, March 1960, HFE 1(1), 30-32. (USN Research Lab., Washington, D.C.).

17,003
To investigate the effect of adjusting display gain on man-machine system performance in a simple aided tracking system, five Ss were used under conditions in which the effect on error of changing display gain in each of two ways could be observed. The conditions were: 1) manipulation of crt sensitivity to system error (electrical gain), and 2) manipulation of the distance of the display from the operator (optical gain). Results were discussed as they related to predictions from closed-loop control system theory.
T. G. I. R 7

17,004
Brooks, F.A., Jr. OPERATIONAL SEQUENCE DIAGRAMS. IRE Transactions, March 1960, HFE 1(1), 33-34. (Dunlap and Associates, Inc., Stamford, Conn.).

17,004
This brief note describes a method to facilitate the development of complex weapons systems by providing clear definition of the man-machine relationships which are involved. The diagram indicates the essential interactions among operators, stations, equipments, and time.
I.

17,008
Reynolds, G.S. THE EFFECTS OF STRESS UPON PROBLEM-SOLVING. J. gen. Psychol., Jan. 1960, 62(First Half), 83-88. (Dept. of Social Relations, Harvard University, Cambridge, Mass.).

17,008
The differential effects of stress may vary with certain aspects of the intellectual activity which are stressed. The two studies reported here were a further demonstration of these effects. In these studies stress was held constant but the intellectual problem was varied. Ss were assigned to stress or control groups; the experimental group was subjected to stress just prior to administration of a second set of problems. Analysis of variance was used to examine differences in the effect of stress on the two types of problems used (space tests and mirror-drawing); the differences provided hypotheses about the differential effects of stress.
T. R. 9

17,009
Lubin, A. & Osburn, H.G. THE USE OF CONFIGURAL ANALYSIS FOR THE PREDICTION OF A QUALITATIVE CRITERION. Educ. psychol. Measmt, 1960, XX(2), 275-282. (USA Walter Reed Army Institute of Research, Washington, D.C. & Southern Illinois University, Carbondale, Ill.).

17,009
The purpose of this paper was to "derive configural equations appropriate for the case of K dichotomous items and a polychotomous criterion." A polynomial equation, algebraically identical to the equation used for prediction of a quantitative criterion, was developed for prediction of a qualitative criterion.
T. R 9

17,010
Morrill, C.S. & Sprague, Linda T. OPERATOR PREFERENCES FOR MOVEMENT COMPATIBILITY BETWEEN RADAR HAND CONTROL AND DISPLAY SYMBOLOGY. J. appl. Psychol., June 1960, 44(3), 137-140. (MITRE Corporation, Bedford, Mass.).

17,010
To determine whether 1) a radar display is viewed as a functional representation of antenna movement or as a direct representation of hand control movements, and 2) Ss who prefer the direct representation also prefer the direction of movement of azimuth-range symbol compatible with the movement of the elevation symbol, three groups of Ss were presented with display and control incorporating the relationship to be investigated. Preferences were presented in tables together with Chi-square confidence levels.
T. I. R 2

17,011
Mudd, S.A. & McCormick, E.J. THE USE OF AUDITORY CUES IN A VISUAL SEARCH TASK. J. appl. Psychol., June 1960, 44(3), 184-188. (Purdue University, Lafayette, Ind.).

17,011
Fifty subjects were assigned randomly to one of five conditions designed to answer the following questions: 1) Can dimensions of auditory signals significantly reduce search time in a dial-reading task? and 2) Can such auditory cues overcome "newspaper" search patterns? A simulated man-machine display of 32 dials was used. Analysis of variance was used to compare results across the five conditions of the independent variable. Recommendations are made for the use of auditory cues in conjunction with visual search tasks.
T. I. R 9

17,013
Wiener, N. SOME MORAL AND TECHNICAL CONSEQUENCES OF AUTOMATION. Science, May 1960, 131(3410), 1355-1358. (Massachusetts Institute of Technology, Cambridge, Mass.).

17,013
The authors' thesis was that machines "can and do transcend some of the limitations of their designer" with consequences both effective and dangerous. Some of these consequences were discussed as they arose in the programming of game-playing machines and of machines with some capacity to "learn." The slowness with which the human operator must act in comparison with the rapidity of the machine may nullify control of the machine. Issues raised by this disparity in time scales were discussed as they occurred in the situation where simultaneous action was required of machine and human engaged in a joint enterprise requiring constant communication. Quasi-moral issues relating to this situation were raised and discussed.

17,014
Science. BOOK REVIEWS. Science, June 1960, 131(3417), 1880-1883.

17,014
This is a book review of a volume containing chapters on: 1) interplanetary rocket trajectories in which the mathematical problems involved are discussed, 2) interplanetary communications in which laws of communication and recent advances which could lead to interplanetary communication are discussed, 3) power supplies for orbital vehicles, 4) manned space cabin systems in which discussions of the human factor are included, 5) radiation and man in space, and 6) nutrition in space flight. There is an appendix which contains a system for classification or filing of references, technical papers, and other material.

17,015
Notterman, J.M., Cicala, G.A. & Page, D.E. DEMONSTRATIONS OF THE INFLUENCE OF STIMULUS AND RESPONSE CATEGORIES UPON DIFFERENCE LIMENS. Science, April 1960, 131(3405), 983-984. (Princeton University, Princeton, N.J. & International Telephone and Telephone Laboratories, Nutley, N.J.).

17,015
In the present investigation comparative data were collected systematically for representative types of stimulus and response categories to determine difference thresholds for visual velocity discrimination, using the same subjects throughout. Interaction found between types of stimulus and response categories and difference limens were discussed.
G. R 4

17,017
Newell, H.E., Jr. THE SPACE ENVIRONMENT. Science, Feb. 1960, 131(3398), 385-390. (National Aeronautics and Space Administration, Washington, D.C.).

17,017
This article considers: 1) the natural environment of the earth's outer atmosphere--extent, composition, pressure and density, temperature, ionosphere, magnetic fields radiation belt, meteors, and electro-magnetic radiations; and 2) space flight environment, accelerations, heating, visual and aural background, and psychological environment.
G. I.

17,018
Chase, J.M. (Ed.). EDITORIAL: SOME CONCLUSIONS ABOUT MAINTENANCE 1958 AND 1959. Aviat. Mech. Bull., Jan.-Feb. 1959, VI(5), 3-4.

17,018
An editorial, "Some Conclusions About Maintenance," summarizes reports of the work of aviation mechanics during 1958 and 1959. Results of studies of accidents and incidents are summarized, and conclusions made by the men conducting the study are given. Suggestions are given to both management and mechanics for improved performance.

17,019
Vanderplas, J.M. SOME TESTS OF SIGNIFICANCE OF MULTIVARIATE DATA. J. gen. Psychol., April 1960, 62(Second Half), 257-268.

17,019
Two multivariate methods are presented and discussed in terms of their applicability to psychological studies. The methods are Hotelling's T^2 and multivariate analysis of variance based on generalizations due to Wishart and others. There is a note on multivariate analysis of covariance, and cautions in the application of multivariate model are given.
T. R 47

17,020
Callaway, E. III & Alexander, J.D., Jr. THE TEMPORAL CODING OF SENSORY DATA: AN INVESTIGATION OF TWO THEORIES. J. gen. Psychol., April 1960, 62(Second Half), 293-309.

17,020
The authors present evidence concerning two theories of sensory data reduction: the Scan Theory and the Neuronic Shutter Theory. The first theory postulates a continuous sampling of sensory data and was tested in two experiments; the second theory postulates a discontinuous sampling of sensory data. An experiment to test the latter theory was devised and results are discussed.
T. G. I. R 14

17,021
Barlett, C.J., Heermann, E. & Rettig, S. A COMPARISON OF SIX DIFFERENT SCALING TECHNIQUES. J. soc. Psychol., May 1960, 51(Second Half), 343-348.

17,021
This study compared the magnetic board technique with five other scaling techniques. Eighty Ss were randomly assigned to the six scaling techniques and were asked to rate 20 occupations according to the status and prestige the general public would give them. Scale values obtained from the matrix were intercorrelated and the resulting matrix factor analyzed to test the hypothesis that the magnetic board technique would give essentially the same values as would be obtained by the other five methods.
T. R 4

17,022
Petrie, A., Collins, W. & Solomon, P. THE TOLERANCE FOR PAIN AND SENSORY DEPRIVATION. Amer. J. Psychol., March 1960, LXXIII(1), 80-90. (Harvard Medical School, Boston, Mass.).

17,022
This study was designed to investigate whether 1) those aspects of personality changed by pre-frontal lobotomy differentiate persons with high and low tolerance for pain, 2) differences in tolerance for pain are paralled by differences in perception, and 3) differences in tolerance for sensory deprivation are paralled by differences in perception that are the reverse of those associated with tolerance for pain. Seventy-eight subjects participated in the experiments. Subjects were compared in terms of E-scores on the Maudsley Personality Inventory, of perceptual satiation, tolerance for pain, satiability, and perception of time.
T. G. R 18 (approx.)

17,023
Fillenbaum, S. THE EFFECT OF DISTRIBUTIONAL SKEWING UPON JUDGMENT WITH FREE CHOICE OF SCALE. Amer. J. Psychol., March 1960, LXXIII(1), 132-136. (University of North Carolina, Chapel Hill, N.C.).

17,023
To examine the effect on judgment of varying the distribution of stimuli, 76 Ss were required to judge the slimness-broadness of rectangles projected on a screen. Subjects were permitted to start making judgments when ready and to use as many categories as desired. Mean rating given each rectangle during the first and second part of the session was calculated for each S who could be characterized as showing no, upward, or downward shift in adaptation level. Results were discussed in terms of Helson's theory of adaptation level.
T. R 6

17,024
Walls, G.L. "LAND! LAND!". Psychol. Bull., Jan. 1960, 57(1), 29-48. (School of Optometry, University of California, Berkeley, Calif.).

17,024
This article presents a critique of Edwin H. Land's assumption that a new color theory is necessary to explain the phenomenon of producing the color spectrum by using red and white filters only. Possible explanations of the phenomenon compatible with classical color theory are presented.
R 16

17,025
Boneau, C.A. THE EFFECTS OF VIOLATIONS OF ASSUMPTIONS UNDERLYING THE t TEST. Psychol. Bull., Jan. 1960, 57(1), 49-64. (Duke University, Durham, N.C.).

17,025

The lack of power which characterizes nonparametric tests of significance is a decided handicap. Evidence in the literature that the ordinary t and F tests of significance may be nearly immune to violation of assumptions that underlie their use is examined, and a random sampling study is performed on an electronic computer. Results of the sampling study are presented as a series of frequency distributions which provide rapid comparison of the extent to which empirical distributions conform to the theoretical. The following combinations of variance forms were considered: 1) those possible when both samples are from normal distributions but variances and sample sizes vary; 2) samples from non-normal distributions where both samples are from the same type of distribution; 3) samples from two different kinds of population. T. G. R 22

17,026

Humphreys, L.G. NOTE ON THE MULTITRAIT-MULTIMETHOD MATRIX. Psychol. Bull., Jan. 1960, 57(1), 86-88. (University of Illinois, Urbana, Ill.).

17,026

This note is intended to supplement an article by Campbell and Fiske (13,344), and to point out a desirable direction for further research. The author suggests increasing the number of methods which measure a given trait as a potentially useful tool for test construction.
T. R 2

17,027

Wallace, M. & Rabin, A.I. TEMPORAL EXPERIENCE. Psychol. Bull., May 1960, 57(3), 213-236. (Michigan State University, East Lansing, Mich.).

17,027

This review surveys many of the recent studies on 1) time perception and 2) time perspective including the theoretical and methodological aspects of these studies. The major categories of these studies are: 1) developmental aspects of the concept of time and time perception; 2) the passage of time; 3) passage of time and personality variables; 4) temporal experiences in psychopathology; 5) temporal experience under special conditions; 6) physiological correlates of the experience of time; 7) the concept of time perspective. Implications for further investigation of an empirical and experimental nature are discussed.
R many

17,028

Wohlwill, J.F. DEVELOPMENTAL STUDIES OF PERCEPTION. Psychol. Bull., July 1960, 57(4), 249-288. (Clark University, Worcester, Mass.).

17,028

Increasing interest in the problem of the ontogenetic development of perception suggested the timeliness of a review of the literature of this field. The review was limited to experimental studies involving comparisons among two or more age groups. Following a discussion of methodological problems, the studies were reviewed under these headings: sensory thresholds; illusions; orientation and localization; the constancies, depth, form, number, movement time; and perceptual learning. Major developmental trends which were uncovered in the review were discussed.
T. G. I. R 169

17,029

Ryan, T.A. SIGNIFICANCE TESTS FOR MULTIPLE COMPARISON OF PROPORTIONS, VARIANCES, AND OTHER STATISTICS. Psychol. Bull., July 1960, 57(4), 318-328. (Cornell University, Ithaca, N.Y.).

17,029

This paper discusses a general method for multiple comparisons which can be applied to a variety of measures. The "method of adjusted significance levels" uses the "layer" method of testing. The rate of error is controlled experimentwise. Detailed procedures are outlined for the multiple comparison of proportions, variances, and for an example of nonparametric comparison of sample medians.
T. R 9

17,030

Coombs, C.H. A THEORY OF DATA. Psychol. Rev., May 1960, 67(3), 143-159. (University of Michigan, Ann Arbor, Mich.).

17,030

The author proposes to provide a "foundation for models of psychological measurement and classify, systematize, and interrelate them." The methodologies of psychophysics, mental testing, attitude scaling, latent structure analysis, scalogram analysis, preferential choice behavior, rating scales, factor analysis, and multidimensional psychophysics are organized under the proposed schema. Psychological distance observations are classified according to a four-category system. A brief glossary of terms is included.
T. I. R 31

17,031

Kaiser, H.F. DIRECTIONAL STATISTICAL DECISIONS. Psychol. Rev., May 1960, 67(3), 160-167. (University of Illinois, Urbana, Ill.).

17,031

The purposes of this paper were 1) to point out an apparently common logical error in the statistical interpretation given to results of two-sided tests of statistical hypotheses, and 2) to outline an appropriate treatment of the problem with which two-sided statistical tests are concerned and to compare this with the one-sided test. The relationship of the present discussion to the controversy over one-sided vs. two-sided tests was pointed out. Statistical interpretation and development developed primarily from the decision-theoretic position of Wald.
G. I. R 18

17,032

Diamond, A.L. A THEORY OF DEPRESSION AND ENHANCEMENT IN THE BRIGHTNESS RESPONSE. Psychol. Rev., May 1960, 67(3), 168-199. (Psychological Research Center, University of Hawaii, Honolulu, Hawaii).

17,032

The theory presented in this paper sets out to explain psychophysical depression and enhancement in terms of physiological inhibition occurring between on fibers and off fibers. The physiological explanation for the effect is presented and discussed in terms of past studies on the subject. The assumptions and basic formulations of the theory including the physiological assumptions which include elemental concepts of on activity, off spontaneous activity, inhibition of on fibers, inhibition of off fibers, physiological field concepts, and physiological-psychophysical assumptions are also presented. The conclusion reviews both the negative and positive aspects of the theory and the implications of the theory.
G. I. R 24

17,033

Audley, R.J. A STOCHASTIC MODEL FOR INDIVIDUAL CHOICE BEHAVIOR. Psychol. Rev., Jan. 1960, 67(1), 1-15. (University College, London, England).

17,033

A stochastic model is presented which is concerned with the interrelations of response variables observed in choice situations. A mathematical model is derived for a class of experiments: those in which knowledge of outcome or correctness of response is not available to the subject until after the choice has been made. Properties of the model are compared with empirical data from psychophysical discrimination situations, preference and conflict situations, and learning in choice situations. The author's purpose is to "indicate the potentialities of the approach" rather than to make specific tests.
T. R 18

17,034

Murdock, B.B., Jr. THE DISTINCTIVENESS OF STIMULI. Psychol. Rev., Jan. 1960, 67(1), 16-31. (University of Vermont, Burlington, Vt.).

17,034

A simple means for quantifying stimulus distinctiveness was suggested. The method applies only to stimuli which vary in one direction, (magnitude or intensity) in this study. Three experiments were reported. Stimuli were 1,000 cycle tones of varying intensities over a 40 db range. Three related studies were reported from the literature. Predicted percentage of correct responses (D%) was presented as an equal-interval scale and evidence for its validity was presented. Application of the scale to serial learning phenomena was discussed. The D scale and its applications were considered as an approximation of use in studying problems pertaining to distinctiveness of stimuli.
T. R 24

17,035

Pritchard, R.M., Heron, W. & Hebb, D.O. VISUAL PERCEPTION APPROACHED BY THE METHOD OF STABILIZED IMAGES. Canad. J. Psychol., June 1960, 14(2), 67-77. (McGill University, Quebec, Canada).

17,035

Results of studies of the Ditchburn-Riggs effect obtained with stabilized images showed the usefulness of this effect as a new approach to the analysis of visual perception. A collimater device carried on a tightly fitting contact lens was used to compensate for retinal-image motion caused by involuntary eye movements. Control observations were also made in which the same targets were viewed through the contact lens and collimater system by the S but without stabilization of the image. The phenomena observed under these conditions were presented. The phenomena were discussed as they relate to Gestalt theory and to the theory of cell assemblies or trace systems.
I. R 32

17,036

Bryden, M.P. TACHISTOSCOPIC RECOGNITION OF NON-ALPHABETICAL MATERIAL. Canad. J. Psychol., June 1960, 14(2), 78-86. (McGill University, Quebec, Canada).

17,036

Letters have been used as stimulus materials in comparing tachistoscopic perception in right and left visual fields. Results of three experiments using simple geometric forms under various conditions were reported in this study. A total of 84 Ss participated in experiments in which 1) geometric forms were presented in both visual fields simultaneously; 2) geometric forms were presented successively in one field or the other; and 3) the effect of manipulation of order in which S reports the material on recognition scores was studied. Results were discussed as they relate to problems of serial order, role of immediate memory, and use of letters as compared with use of geometric forms.
T. R 6

17,037

Foley, P.J. & Dewis, E.V.T. PACING RATE AND WARNING SIGNAL IN SERIAL SIMPLE REACTION TIME. Canad. J. Psychol., March 1960, 14(1), 7-12. (Defence Research Medical Labs., Toronto, Ontario, Canada).

17,037

This study was designed to investigate whether the foreperiod in a simple reaction time is a true foreperiod effect or a product of the different pacing rates used. Three methods of presentation in a serial reaction time task were used at each of four periods of stimulus presentations. The effect of the foreperiod on the stimulus was defined in terms of the results obtained.
T. G. I. R 4

17,038

Shewchuk, L.A. & Zubek, J.P. A TECHNIQUE OF INTERMITTENT STIMULATION FOR MEASUREMENT OF TACTUAL SENSITIVITY: APPARATUS AND PRELIMINARY RESULTS. Canad. J. Psychol., March 1960, 14(1), 29-37. (University of Manitoba, Winnipeg, Manitoba, Canada).

17,038

Described here is a tactile stimulator and a method of investigating the discriminatory or resolving powers of the skin by means of a "flicker" technique. The procedure consists of producing an interrupted stream of air at a specified pressure whose frequency can be systematically increased until the S reports a constant sensation of pressure on some specified part of the skin. The frequency at which the constant sensation occurs is referred to as a critical frequency of percussion (c.f.p.). Also described is a preliminary study in which the c.f.p. of the fingertips of ten Ss was determined.
G. I. R 3

17,039

Uttal, W.R. THE THREE-STIMULUS PROBLEM: A FURTHER COMPARISON OF NEURAL AND PSYCHOPHYSICAL RESPONSES IN THE SOMESTHETIC SYSTEM. J. comp. physiol. Psychol., Feb. 1960, 53(1), 42-46. (IBM Research Center, Yorktown Heights, N.Y.).

17,039

To determine the actual contribution of the spacing and amplitude of compound action potential to the subjective estimate of intensity, the subjective estimates of a triple electrical stimulus and the actual neural responses in the ulnar nerve of four subjects were recorded under identical conditions. Three stimuli were used on four subjects with the stimuli patterns consisting of 27 spacing configurations. The psychophysical method of magnitude estimation was used. The implications and role of temporal spacing and amplitude on coding were discussed.
T. G. R 7

17,040

Uttal, W.R. INHIBITORY INTERACTION OF RESPONSES TO ELECTRICAL STIMULI IN THE FINGERS. J. comp. physiol. Psychol., Feb. 1960, 53(1), 47-51. (IBM Research Center, Yorktown Heights, N.Y.).

17,040

To explore the interaction of two stimuli impinging upon the fingers, two subjects reported the presence of shock to any of five fingers by naming fingers at which shock was felt. Ninety tests of various combinations of masking and masked fingers were presented five times for a total of 15 sessions for each subject. The results are related to previous experiments in the field of peripheral coding of sensory magnitude with an attempt to relate the physiological and psychophysical data.
G. I. R 10

17,041
White, B.W. & Mueser, Gayle E. ACCURACY IN RECONSTRUCTING THE ARRANGEMENT OF ELEMENTS GENERATING KINETIC DEPTH DISPLAYS. J. exp. Psychol., July 1960, 60(1), 1-11. (Lincoln Lab., Massachusetts Institute of Technology, Cambridge, Mass.).

17,041
The factors that affect the accuracy with which information about the arrangement of objects in depth can be transmitted to human observers through two-dimensional moving displays were explored. Pegs were mounted in a 4x5 rectangular matrix on a turntable and the subjects viewed the moving shadows cast upon a screen as the turntable revolved. Two- and five-element displays in which the elements were identical or different in size and shape and which varied in spacing were used both with and without reference marks. The task was to reproduce the patterns under various display conditions--varied exposure time, speeds of rotation, eccentricity and direction of movement, and giving the subject control vs. experimenter's control of movement.
T. I. R 16

17,042
Yntema, D.B. & Mueser, Gayle E. REMEMBERING THE PRESENT STATES OF A NUMBER OF VARIABLES. J. exp. Psychol., July 1960, 60(1), 18-22. (Lincoln Lab., Massachusetts Institute of Technology, Cambridge, Mass.).

17,042
To study some aspects of memory, eight Ss were required to remember the present state of 2, 3, 4, 6, or 8 variables. In one case all variables had the same set of four possible states; in the other, each variable had its own exclusive set of four states. A series of messages, each giving the state of one variable, was read to the S, who recorded the information on a board containing a space for each variable. A door covered the space and was opened only for recording purposes. At random intervals during the messages, questions were asked as to what was behind one of the doors. The fraction of questions answered correctly was analyzed as function of number of variables, kind of attributes, and number of intervening questions and messages.
T. G. R 6

17,043
Kaess, W. & Zeaman, D. POSITIVE AND NEGATIVE KNOWLEDGE OF RESULTS ON A PRESSEY-TYPE PUNCHBOARD. J. exp. Psychol., July 1960, 60(1), 12-17. (University of Connecticut, Storrs, Conn.).

17,043
To study the influence of positive and negative knowledge of results and the importance of behavioral feedback on learning, a modified Pressey-type punchboard was used to answer multiple-choice test items concerned with the definition of psychological terms. One set of 30 items, repeated five times in varying sequences, made up five trials. Negative information was manipulated by varying the number of item-choices (one through five) for the first trial; all following trials had five item-choices. Equated groups of subjects were assigned to each condition. In a second experiment, reinforcement value of actually punching on the board was manipulated by presenting the correct choice underlined in red for the first trial versus punching the correct choice. Rate of learning was analyzed. T. G. R 8

17,044
Jarrard, L.E. THE ROLE OF VISUAL CUES IN THE PERFORMANCE OF ERGOGRAPHIC WORK. J. exp. Psychol., July 1960, 60(1), 57-63. (Carnegie Institute of Technology, Pittsburgh, Penn.).

17,044
To determine the extent to which muscular tension and ergographic performance are affected by set toward amount of work to be done, two experimental and four control conditions which involved lifting blocks of equal weight but different volumes were used. The experimental conditions were: 1) visual cues altered with large-size weight presented first with change to small-size weight, and 2) small-size weight presented before large-size weight. The control conditions were: 1) no visual cues of weights lifted, 2) constant visual cues with all large-size weights, 3) no visual cues, and 4) constant visual cues with all small-size weights. A discussion of the results and the psychological and physiological aspects of the study followed.
T. R 9

17,045
Shelly, M.W., II. EFFECTS OF INCREMENTS OF REINFORCEMENT IN HUMAN PROBABILITY LEARNING. J. exp. Psychol., June 1960, 59(6), 345-350. (USN Office of Naval Research, Washington, D.C.).

17,045
To investigate how the relative frequency of a response which has some fixed probability of a reinforcement is affected when there are variations in the probability of reinforcement of alternative responses, 170 Ss were presented with three alternatives and required to predict which of the three would be correct on a given trial. Seventeen conditions were used with ten different Ss serving in each condition. Two types of reinforcement, contingent and noncontingent, were used. Results were discussed as they related to predictions based on a generalization of the meaning of proportionality for two alternative responses.
T. G. R 5

17,046
Pollack, I. IDENTIFICATION OF VISUAL CORRELATIONAL SCATTERPLOTS. J. exp. Psychol., June 1960, 59(6), 351-360. (USAF Operational Applications Lab., AFCRC, Bedford, Mass.).

17,046
The present paper described studies with a visual correlational display which provides a "useful tool for the study of dynamic shape perception and the behavioral testing of statistical hypotheses." Visual correlational scattergrams were presented on an oscilloscope, Ss (16, over eight experimental series) were required to identify one of two correlated distributions as being the reference or a higher correlation. Duration, size and sampling characteristics of the display, and upper cutoff frequency of the noise distribution were investigated. Results were discussed as they related to the S's task as "a tester of alternative statistical hypotheses under conditions of varying reliability of the display information."
T. G. R 4

17,047
Pearson, R.G. & Hauty, G.T. ROLE OF POSTURAL EXPERIENCES IN PROPRIOCEPTIVE PERCEPTION OF VERTICALITY. J. exp. Psychol., June 1960, 59(6), 425-428. (Carnegie Institute of Technology, Pittsburgh, Penn.).

17,047
To determine the effects of adaptation imbalance and of increased delay at tilt on error or perceived verticality, 96 Ss were tested on a lateral tilt chair for error in perception of the vertical. The task consisted of 20 trials in which experimental variables were: 1) alternation or directional sequence of tilt within each of two magnitudes of tilt, 2) two tilt magnitudes, and 3) three conditions of delay at tilt. Results were discussed as they related to the question of relative importance of proprioceptive learning as compared with sensory adaptation.
T. G. R 5

17,048
McConnell, D. & Shelly, M.W. TRACKING PERFORMANCE ON A SEQUENCE OF STEP FUNCTIONS WHICH APPROACHES A CONTINUOUS FUNCTION AS A LIMIT. J. exp. Psychol., May 1960, 59(5), 312-320. (Ohio State University, Columbus, Ohio).

17,048
To determine the relationship between error in tracking a continuous function and error in tracking a discrete function which approaches the continuous function in limit, five Ss performed under 36 conditions of five-second warm-up followed by 60 seconds of scored tracking. Two types of underlying signals, random and triangular, were used. Results discussed the distribution and function of error in relation to type of signals tracked.
T. G. I. R 12

17,049
Indow, T. & Uchizono, T. MULTIDIMENSIONAL MAPPING OF MUNSELL COLORS VARYING IN HUE AND CHROMA. J. exp. Psychol., May 1960, 59(5), 321-329. (Keio University, Tokyo, Japan).

17,049
To investigate the possibility that differences perceived among surface colors are adequately represented by distances in a real Euclidean space, 21 colors (from the Munsell system of notation), varying in hue and saturation with lightness kept constant, were used. Differences perceived between a standard and each of the colors were converted into spatial distance by moving them one by one. The method of multidimensional scaling was applied to the obtained matrix which had as elements ratio scales of the differences between all possible pairs of colors. The data for one trained and three naive subjects were analyzed separately for each experience level and were compared with expected Munsell system locations.
G. I. R 14

17,050
Indow, T. & Kanazawa, K. MULTIDIMENSIONAL MAPPING OF MUNSELL COLORS VARYING IN HUE, CHROMA, AND VALUE. J. exp. Psychol., May 1960, 59(5), 330-336. (Keio University, Tokyo, Japan).

17,050
To investigate the basic postulates of the psychological color solid (Munsell), tridimensional mapping of colors over a considerable range was attempted. The sense distances between all possible pairs of 24 colors, varying in hue, saturation, and lightness, were scaled by the method of multiple-ratio judgment and by procedures of adjusting the differences, if any, in the unit by which subjects converted color distances into spatial distances. Then multidimensional scaling was applied to the matrix. Pooled data from four subjects, two experienced and two naive, were used. The results were compared with expectancy from the Munsell system.
G. I. R 13

17,051
Miller, Caryl-Ann & Engen, T. CONTEXT EFFECTS ON ABSOLUTE JUDGMENTS OF LENGTH. SUPPLEMENTARY REPORT. J. exp. Psychol., April 1960, 59(4), 276-277. (Brown University, Providence, R.I.).

17,051
This brief note reported an extension of a previous study of context effects in which other investigators had used judgments made on pitch (Campbell, T.C., Lewis, N.A. & Hunt, W.A. "Context Effects With Judgmental Language That Is Absolute, Extensive, and Extra-Experimentally Anchored." J. exp. Psychol., 1958, 55, 220-228). To further reduce the arbitrariness of the response system, the present authors investigated absolute judgment of line length. Results were reported for 40 subjects, each of whom made a total of 75 judgments of nine different line lengths. Results were compared with those reported in the previous study.
G. R 3

17,052
Lit, A. THE MAGNITUDE OF THE PULFRICH STEREOPHENOMENON AS A FUNCTION OF TARGET VELOCITY. J. exp. Psychol., March 1960, 59(3), 165-175. (Vision Research Labs., University of Michigan, Ann Arbor, Mich.).

17,052
This paper reported continuing research designed to obtain systematic data on stimulus variables that influence the magnitude of the Pulfrich effect. Measurements of near and far displacements of a black vertical rod were obtained under each of 11 target velocities, using two Ss in a total of 22 experimental sessions each. Results were analyzed in terms of an hypothesized absolute visual latent period, the magnitude of which was assumed to be an inverse function of level of retinal illuminance. Results were discussed as they related to predictions based on the geometrical theory of the Pulfrich effect.
T. G. I. R 10

17,053
Hillix, W.A. VISUAL PATTERN IDENTIFICATION AS A FUNCTION OF FILL AND DISTORTION. J. exp. Psychol., March 1960, 59(3), 192-197. (University of Missouri, Columbia, Mo.).

17,053
The purpose of this study was to identify what characteristics of a stimulus make it difficult to identify. Subjects (six groups of 20 each) were asked to select from alternative stimuli that one most like a standard; "correct" stimuli were produced by some rearrangement of the standard. Stimuli consisted of a ten by ten grid, a proportion of which had been filled in. Variations consisted of changed amount of "fill" and "distortion" produced by altered place of random elements. Results were reported in terms of average proportion of correct response for each level of "fill" and "distortion" and in terms of mean time per response. Effects of "fill," "distortion," and their interactions were discussed as they related to perceptual difficulty.
T. G. I. R 6

17,054
Botwinick, J., Robbin, J.S. & Brinley, J.F. AGE DIFFERENCES IN CARD-SORTING PERFORMANCE IN RELATION TO TASK DIFFICULTY, TASK SET, AND PRACTICE. J. exp. Psychol., Jan. 1960, 59(1), 10-18. (National Institute of Mental Health, Bethesda, Md.).

17,054
Two groups, 65 to 81 years and 19 to 35 years, were studied while each subject performed in a series of three experiments involving card sorting tasks. The experiments involved: 1) levels of card sorting difficulty defined by the number of stimulus cards or slots that were sorted, 2) an analysis of age differences as they affected changes in the task set or card sorting habit, and 3) an analysis of age differences as they related to the complexity of the task. Also investigated were the roles of education and consecutive sorting trials in relation to the task variables.
T. G. R 12

17,055
Kimmel, H.D. THE RELATIONSHIP BETWEEN DIRECTION AND AMOUNT OF STIMULUS CHANGE AND AMOUNT OF PERCEPTUAL DISPARITY RESPONSE. J. exp. Psychol., Jan. 1960, 59(1), 68-72. (University of Florida, Gainesville, Fla.).

17,055

To determine whether the amount of perceptual disparity response (PDR) is a function of the amount and/or direction of the discrepancy between expected and actual stimulation, 96 Ss were assigned randomly to 15 experimental groups. An auditory stimulus (1000 cps tone of four-seconds duration) was used during a conditioning series of 20 trials and was changed for an extinction series. Thirteen different amounts of change in intensity were used, and amount of GSR, correct for effect of stimulus intensity differences, was used to measure the PDR occurring on first trial with changed intensity. Results were discussed as they related to findings from similar studies.
T. G. R 6

17,056

Slamecka, N.J. RETROACTIVE INHIBITION OF CONNECTED DISCOURSE AS A FUNCTION OF PRACTICE LEVEL. J. exp. Psychol., Feb. 1960, 59(2), 104-108. (University of Vermont, Burlington, Vt.).

17,056

This study was designed to test the effect of varying degrees of practice upon the recall of connected discourses. Each of the 36 Ss used served in four 40-minute sessions. Each session followed the retroactive inhibition paradigm which consisted of original learning, interpolated learning, and relearning of the original learning. The materials were eight 20-word sentences. A mixed factorial design was used with three levels of original learning (2, 4, and 8 trials) and three levels of interpolated learning (0, 4, and 8 trials). The relation of the results to serial learning of unconnected material was discussed.
T. R 11

17,057

Namikas, G. & Archer, E.J. MOTOR SKILL TRANSFER AS A FUNCTION OF INTERTASK INTERVAL AND PRETRANSFER TASK DIFFICULTY. J. exp. Psychol., Feb. 1960, 59(2), 109-112. (University of Wisconsin, Madison, Wisc.).

17,057

This study was concerned with the effect of varying the intertask interval upon negative transfer in a pursuit-rotor task. Twelve conditions with ten Ss in each condition were tested with all Ss given 20 training and 20 transfer trials. The Ss trained on either the 40, 60, or 80 rpm speed and had rest intervals of either 2, 4, 8, or 16 minutes. All Ss were then transferred to the 60 rpm speed for 20 trials. The findings were examined in terms of difficulty of the task and as a function of the length of the intertask interval.
T. G. R 3

17,058

Helson, H. & Nash, Myrtle C. ANCHOR, CONTRAST, AND PARADOXICAL EFFECTS. J. exp. Psychol., Feb. 1960, 59(2), 113-121. (University of Texas, Austin, Tex. & Southwestern at Memphis, Memphis, Tenn.).

17,058

This study attempted to deal with the paradoxical distance effect, lightness contrast, and anchor effects by means of a single theoretical model. Seven conditions of judgment of weights were presented to eight groups of five subjects each. The weights were presented to the subjects in ascending and descending order with the weights judged singly and judged following either a 90- or a 900-gram background stimulus. The type of resulting displacements were discussed and a single explanatory model was defended in terms of the results.
T. G. R 9

17,059

Pollack, I. TEMPORAL SAMPLING PARAMETERS OF INTERAURAL NOISE CORRELATIONS. J. acoust. Soc. Amer., July 1960, 32(7), 795-799. (USAF Operational Applications Lab., AFCRC, Bedford, Mass.).

17,059

How well does the auditory system piece together successive packets of information distributed in time? To provide an experimental analysis of this question, the identification of interaural noise correlations, sampled in time, was selected as the task. Two correlations, a reference and a variable, were first established and the listener asked to identify which of the two was presented. Seven listeners were tested over a variety of temporal sampling periods. The data were analyzed in an effort to find optimal temporal distributions for the identification of interaural noise correlations wherein temporal distribution is more effective than a single uninterrupted package of binaural information.
T. G. R 5

17,060

Knight, J.J. & Coles, R.R.A. DETERMINATION OF THE HEARING THRESHOLDS OF NAVAL RECRUITS IN TERMS OF BRITISH AND AMERICAN STANDARDS. J. acoust. Soc. Amer., July 1960, 32(7), 800-804. (Wernher Research Unit on Deafness & Royal Naval Personnel Research Committee, MRC, London, England).

17,060

A group of 111 naval recruits was examined to determine the hearing thresholds of recruits in terms of British and American standards. A commercial audiometer was used to determine pure-tone thresholds over the range of frequencies 0.25 to 8 kc. To test the effects of practice and motivation on the auditory threshold, the hearing level of the group was compared with that of 15 highly motivated and practiced observers. Analysis of the results was reported on 74 members of the group. A discussion of the results and the relation of the work to other hearing surveys and laboratory measurements followed.
T. R 18

17,061

Creelman, C.D. DETECTION OF SIGNALS OF UNCERTAIN FREQUENCY. J. acoust. Soc. Amer., July 1960, 32(7), 805-810. (University of Michigan, Ann Arbor, Mich.).

17,061

Theoretical models for frequency sensitivity in human observers were discussed. One decision procedure for a multiple-filter model was considered in some detail for a general model for decision situations in which each available response is tied to more than one of the possible signal alternatives. Two experiments were conducted in an attempt to choose between a sweeping-filter and a multiple-filter model. Detection in a two-alternative forced-choice experiment in which the signal could be one of two possible signals was measured over a range of frequency separations. Results were compared with predictions derived from the model.
G. R 10

17,062

Kryter, K.D. SPEECH BANDWIDTH COMPRESSION THROUGH SPECTRUM SELECTION. J. acoust. Soc. Amer., May 1960, 32(5), 547-556. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

17,062

The present study was designed to further investigate the question as to how much and what portions of the speech spectrum can be eliminated before speech intelligibility is reduced below an acceptable level. Six Ss were given 40 hours of testing time on phonetically-balanced words before tests conducted with unfiltered speech and with speech filtered by bandpass filters of 1) 100-7000 cps; 2) 100-1600 cps; 3) 500-2000 cps; 4) 1000-2500 cps; and 5) various configurations of one, two, or three bandpass filters, each 500 cps wide. Using constant speech intelligibility as the criterion, results were discussed in terms of total "effective" bandwidth requirements for both multiple pass and continguous pass band systems.
T. G. I. R 12

17,064

Sakai, T. & Inoue, S. NEW INSTRUMENTS AND METHODS FOR SPEECH ANALYSIS. J. acoust. Soc. Amer., April 1960, 32 (4), 441-450. (Kyoto University, Kyoto, Japan).

17,064

The authors described three new instruments for the analysis of speech based on zero-crossing waves. Analysis of speech (Japanese) by these instruments was compared with analysis by a Sonagraph, using natural wave forms. The new instruments included devices to analyze automatically the zero-crossing interval, to display the zero-crossing waves in three-dimensional form, and to make a visible pattern of the zero-crossing waves. Results of analysis of vowels, of some characteristics of groups of consonants, and of the discrimination of nasal consonants were presented.
T. G. I. R 4

17,065

Lieberman, P. SOME ACOUSTIC CORRELATES OF WORD STRESS IN AMERICAN ENGLISH. J. acoust. Soc. Amer., April 1960, 32 (4), 451-454. (Air Force Cambridge Research Center, L. G. Hanscom Field, Bedford, Mass.).

17,065

To investigate the "relevance of changes in the fundamental frequency, envelope amplitude, and duration to mechanical recognition of the stressed syllable in English stress pairs", 25 noun-verb pairs were recorded by 16 speakers. The fundamental frequency, relative amplitude, duration, and integral of the amplitude with respect to time of stressed and unstressed syllables were measured, and a simple binary automatic stress recognition program was devised. Stress judgments made with this program were compared with perceived patterns for agreement.
T. G. I. R 5

17,066

Pollack, I., Rubenstein, H. & Decker, L. ANALYSIS OF INCORRECT RESPONSES TO AN UNKNOWN MESSAGE SET. J. acoust. Soc. Amer., April 1960, 32(4), 454-457. (USAF Operational Applications Lab., AFCRC, Bedford, Mass.).

17,066

The present study supplements a previous study (13, 097) in which correct responses of listeners to eight-word and 144-word messages presented in noise were examined. Incorrect responses given by listeners to the 144-word message set were analyzed here. Incorrect responses were analyzed in terms of the word-frequency distribution and of the proportion of incorrect responses which were nonsense responses. Those measures were then related to speech-to-noise ratio and to stimulus-word frequency.
T. G. R 4

17,067

Miskolczy-Fodor, F. RELATION BETWEEN LOUDNESS AND DURATION OF TONAL PULSES. II. RESPONSE OF NORMAL EARS TO SOUNDS WITH NOISE SENSATION. J. acoust. Soc. Amer., April 1960, 32(4), 482-486. (Research Dept., New York Eye and Ear Infirmary, New York, N.Y.).

17,067

As one of a series of investigations into the relation between loudness and duration of tonal pulses, threshold change was measured as a function of various durations (300 to 3 msec.) of a noise signal and for tonal pulses shorter than the click-pitch (3 to 0.1 msec.) threshold. Further investigations of the critical time limit between "duration range of pure tone" and "duration range of increasing noise sensation" were carried out. The results were analyzed and compared with previous findings pertinent to pure tones with durations between 300 msec. and the click-pitch threshold.
T. G. R 16

17,068

Miskolczy-Fodor, F. RELATION BETWEEN LOUDNESS AND DURATION OF TONAL PULSES. III. RESPONSE IN CASES OF ABNORMAL LOUDNESS FUNCTION. J. acoust. Soc. Amer., April 1960, 32(4), 486-492. (Research Dept., New York Eye and Ear Infirmary, New York, N.Y.).

17,068

The previously determined relation between time-threshold and loudness (see 17,067) was investigated in cases of pathological loudness response. The observer included cases with complete recruitment and some cases of mixed deafness. Both time-threshold measurements and binaural loudness matching measurements were made. The results were compared with previous findings on normal hearing observers. Experimentally induced abnormal loudness responses in normal hearing observers was accomplished and time-threshold measurements were obtained in an additional effort to verify the results. The significance of time-threshold determinations and their limitations of practical applicability for loudness measurements were discussed.
T. G. R 26

17,069

Ward, W.D. RECOVERY FROM HIGH VALUES OF TEMPORARY THRESHOLD SHIFT. J. acoust. Soc. Amer., April 1960, 32(4), 497-500. (Research Center, Los Angeles, Calif.).

17,069

To determine rate of recovery from high values of temporary threshold shift (TTS), 12 normal observers were exposed to noise that produced at least 50 db of TTS measured two minutes after cessation of the noise. The TTS was measured at regular intervals until recovery was complete. The results were shown graphically.
G. R 7

17,070

Jerger, J.F., Tillman, T.W. & Peterson, J.L. MASKING BY OCTAVE BANDS OF NOISE IN NORMAL AND IMPAIRED EARS. J. acoust. Soc. Amer., March 1960, 32(3), 385-390. (Northwestern University, Evanston, Ill.).

17,070

To investigate the contention that the phenomenon of auditory masking could be used to distinguish among different kinds of hearing loss, the pure-tone masking produced at 11 test frequencies by three octave bands of thermal noise at each of two effective levels was studied in six groups of subjects--20 normal hearing, 20 normal hearing but with plugs in external canal, 10 with bilateral otitis media, 10 elderly bilateral sensori-neural losses due to presbycusis, and 20 with sound loss but due to cochlear lesion. Masked threshold sound pressure levels were compared among the six groups for distinguishing characteristics.
T. G. I. R 12

17,071
Ward, W.D., Glorig, A. & Selters, W. TEMPORARY THRESHOLD SHIFT IN A CHANGING NOISE LEVEL. J. acoust. Soc. Amer., Feb. 1960, 32(2), 235-237. (Research Center, Los Angeles, Calif.).

17,071
To test if there is a numerical summation of exposures of high to lower noise levels which would rule out any simple explanation of temporary threshold shift, 13 men were exposed to 1200-2400 cps octave band noise under three schedules: 1) 30 minutes of exposure to 105 db SPL followed by 180 minutes of recovery in silence; 2) 30 minutes of noise at 105 db SPL followed by 180 minutes of exposure to 95 db SPL; 3) 210 minutes of exposure to 95 db SPL. The Ss were divided into three groups with the schedule given in different order with one week between tests. A discussion of the findings and the problems involved in construction an "acoustic dosimeter" followed. G.

17,072
Weinreb, L. & Touger, M.L. VARIATION IN EAR PROTECTOR ATTENUATION AS MEASURED BY DIFFERENT METHODS. J. acoust. Soc. Amer., Feb. 1960, 32(2), 245-249. (Radio Corporation of America, Camden, N.J.).

17,072
This investigation was designed to determine whether there was any significant difference in measurement attenuation using loudness balance and microphone measurements as compared to threshold-shift technique. Four types of ear protective device were studied: 1) HS-33 Headset with MX-41/AR earmuff, 2) H-70B/AIC Headset with MX-2088/J earmuff, 3) RCA "Quiet Ear" protector, and 4) RCA experimental protector. Four Ss were studied under three attenuation methods: 1) real-ear attenuation at threshold using pure tones in a free field, 2) loudness balance with reference level at a 60 db SPL, 3) objective measurement with a small microphone placed at the entrance to the ear canal with 110 db SPL. The relationships between the various headsets and the three attenuation methods are discussed. G. I. R 4

17,073
Legget, R.F. & Northwood, T.D. NOISE SURVEYS OF COCKTAIL PARTIES. J. acoust. Soc. Amer., Jan. 1960, 32(1), 16-18. (Division of Building Research, National Research Council, Ottawa, Canada).

17,073
A discussion of acoustics of cocktail parties was given with an enlargement upon the theoretical concept of MacKlean. Results were reported on seven gatherings of which four were held in the same room with the groups ranging from 120 to 640 guests. The other three gatherings were held in typical hotel reception rooms. Graphs of the data were plotted indicating: 1) the build-up of noise in the formative stages of four parties, and 2) the steady state noise levels vs. number of guests. A lengthy discussion of the results followed with reference to the methodology used and implications of the results including the "cocktail effect" on permanent impairment of hearing.
G. R 6

17,074
Stevens, K.N. TOWARD A MODEL FOR SPEECH RECOGNITION. J. acoust. Soc. Amer., Jan. 1960, 32(1), 47-55. (Massachusetts Institute of Technology, Cambridge, Mass.).

17,074
Some of the acoustical problems involved in mechanical speech recognition and synthesis are examined and a general model is presented that suggests one method of approach to these problems. As a recognizer, the proposed model accepts a speech wave at its input and generates a sequence of phonetic symbols at its output; as a synthesizer it accepts a sequence of symbols at its input and generates a speech wave. Coupling between the acoustical speech signals and the machine is achieved through two peripheral units: air analogy filter set or equivalent and a model of the vocal tract. Similarities between performance of the machine and the behavior of human generators and receivers of speech are discussed. An experimental study based on this general analysis approach is described in an appendix. G. I. R 20

17,075
Ward, W.D. LATENT AND RESIDUAL EFFECTS IN TEMPORARY THRESHOLD SHIFT. J. acoust. Soc. Amer., Jan. 1960, 32(1), 135-137. (Research Center, Los Angeles, Calif.).

17,075
To test the importance of latent effects in temporary threshold shift, three experiments were conducted. In experiment I, three groups of five men were exposed to three different exposure conditions to determine latent effects from pre-exposure. In experiment II, 14 observers were measured for 15-minute recovery of temporary threshold shift at four and three kc induced by three-minute exposure to 108 db of broad band noise provided by 15 minutes of the same noise or by 15 minutes of silence. In experiment III, the influence of sub-temporary threshold shift induced by higher level noise was assessed. The terms "latent" and "residual" effects are discussed as they apply to the interpretation of the results.
G. R 8

17,076
Bradley, J.V. & Wallis, R.A. SPACING OF PUSH BUTTON ON-OFF CONTROLS. Engng. Industr. Psychol., Winter 1959, 1(4), 107-119. (USAF Aero Medical Lab., Wright-Patterson AFB, Ohio & Antioch College, Yellow Springs, Ohio).

17,076
To investigate human factors which limit the degree to which an instrument may profitably be miniaturized, 36 S were tested on panels on which controls varied in diameter (three ways), orientation (two ways), and spacing (six ways). Each S was tested for all 36 possible combinations. Performance was compared in terms of time scores and touching errors as functions of spacing. Results were related to previous studies of degradation of performance as this related to crowding of knobs. Recommendations were made for optimal placement of push buttons
T. G. I. R 14

17,077
Merenda, P.F., Farrington, A.D. & Clarke, W.V. PREDICTION OF PERFORMANCE OF TEXTILE WORKERS. Engng. Industr. Psychol., Winter 1959, 1(4), 120-127.

17,077
This study was an extension of a study conducted to determine the merits of the Activity Vector Analysis (AVA). The AVA is a self concept personality assessment instrument used to predict success of line workers in the textile industry. The 230 Ss were rated by an interviewer and by an analyst of the AVA. The criteria of success was a job proficiency rating and actual job status. Comparisons between predicted and foreman's ratings and between predicted and actual job outcomes were made. The merits of the AVA as compared to personal interviews were ascertained and discussed.
T. R 1

17,078
Seminara, J.L. SPEED AND ACCURACY OF MATCHING TACTUALLY CODED RELATED PAIRS OF ITEMS. Engng. Industr. Psychol., Winter 1959, 1(4), 128-133. (Missile Systems Div., Lockheed Aircraft Corp., Van Nuys, Calif.).

17,078
The use of tactual cues to perform a common simple operation was investigated. The speed and accuracy of matching related pairs of simulated plugs and receptacles on six Ss were determined. The same task was conducted with the aid of visual cues. These two types of performance were compared and evaluated.
T. G. I. R 8

17,079
Buel, W.D. STABILITY OF PREFERENCE INDICES IN FORCED-CHOICE RATING SCALE ITEMS. Engng. Industr. Psychol., Winter 1959, 1(4), 134-137.

17,079
To check the assumption made in forced-choice scale construction that preference indices (PI's) determined from responses to items in checklist form remain stable when those items are matched on similarity of PI and dissimilarity of discrimination index (DI) and are responded to in forced-choice form, 11 Ss evaluated men on 143 items on a five-point scale. For each item PI's and DI's were obtained and a forced-choice scale was constructed. The same Ss rated the same men on the new instrument three months after the initial study. Results were discussed as they provided a test of the assumption stated above.
R 3

17,080
Mukherjee, B.N. LEARNING EFFICIENCY IN A PSYCHOMOTOR TEST AS A FUNCTION OF INITIAL SKILL. Engng. Industr. Psychol., Winter 1959, 1(4), 138-142. (Bureau of Educational & Vocational Guidance, Patna, Bihar State, India).

17,080
To investigate relations between different measures of learning derived from successive performance on a simple psychomotor task and initial level of ability in the task, 16 subjects were divided into four groups on the basis of scores made on trial tests on a two-hand coordination test. Learning curves based on time scores were correlated with initial performance level. Results of this investigation were compared with findings from similar investigations.
T. G. R 8

17,081
Ernsting, J., Green, I.D., Nagle, R.E. & Wagner, P.R. HIGH ALTITUDE PROTECTION FROM PRESSURE-BREATHING MASK WITH TRUNK AND LOWER LIMB COUNTERPRESSURE. Aerospace Medicine, Jan. 1960, 31(1), 40-48. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

17,081
To determine the limit of protection given by an oronasal mask, pressure jerkin, and anti-g suit pressure breathing system, five Ss performed under four conditions: 1) Ss breathed at a pressure of 60 mm mercury using a pressure helmet, jerkin, anti-g suit combination at sea level; 2) same as (1) except that the oronasal mask was used in place of the helmet; 3) Ss were exposed to simulated altitude of 56,000 feet with an absolute intrapulmonary pressure of 126 mm and a breathing pressure of 60 mm while wearing a pressure helmet, jerkin, and anti-g suit; and 4) the conditions in (3) were repeated with the Ss wearing mask, jerkin, and anti-g suit. Physiologic results were discussed with attention to heart rate, arterial blood pressure, and EEG stress from anoxia under the various conditions. T. G. R 4

17,082
Wilson, C.L. & Zinn, M.B. MEDICAL PROBLEMS IN TESTING HIGH ALTITUDE PRESSURE SUIT. Aerospace Medicine, Jan. 1960, 31(1), 49-56. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,082
The medical problems in testing high altitude pressure suits were discussed with a distinction made between routine suit indoctrination (standard items of protection) and experimental suit testing (new and improved suits). Partial and full pressure suits were considered with physiological results observed under: 1) standard chamber test procedure, 2) routine pressure suit indoctrination, and 3) experimental pressure suit tests. Windblast studies to test protection in ejection and use of positive pressure masks in emergency protection were made. Discussion of the development of a battery of physiologic and psychologic tests used in crew selection was included.
T. I.

17,083
Hiss, R.G., Smith, G.B. & Lamb, L.E. PITFALLS IN INTERPRETING ELECTROCARDIOGRAPHIC CHANGES WHILE MONITORING STRESS PROCEDURES. Aerospace Medicine, Jan. 1960, 31(1), 9-18. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,083
Objective data on the influence of orthostasis and respiration were obtained from a population of aviation cadets. In experiment I, 47 Ss were used to test the influence of orthostasis and respiratory maneuvers on the loss of consciousness by recording Ss EEG's while in a recumbent position and while inclined at 70 and 90 degrees. The above procedure was repeated with Ss given 1/50 gram atropine. In experiment II, to evaluate the influence of decreased ambient pressure alone, seven Ss were given routine EEG's at 29,000 feet in a pressure chamber 1) while recumbent, 2) after two minutes of standing, 3) after five minutes, and 4) after hyperventilation. This procedure was repeated at ground level the next day. Physiological data were presented and changes in EEG recordings under simple and complex stress were discussed. I. R 3

17,084
Strickland, B.A., Jr., Estes, H.D., Kossuth, L.C. & Stopher, D.R. AEROMEDICAL SUPPORT OF ADVANCED FIGHTER-INTERCEPTOR WEAPON SYSTEMS. Aerospace Medicine, Jan. 1960, 31(1), 19-30. (Ent Air Force Base, Colorado).

17,084
This article discusses the distinguishing characteristics of the air defense interceptor operation. These are: relatively inexperienced pilot personnel, high altitude supersonic intercepts, all-weather operations, successive short missions, and around-the-clock alert studies. These necessitate emphasis by an areomedical support program in certain special areas such as delayed areo-otitis media, protective pressure suits, spatial disorientation, emergency escape, and disaster controls in dealing with nuclear weapons.
T. I. R 19

17,085
Bartley, S.H. & Nelson, T.M. SOME RELATIONS BETWEEN PULSE-TO-CYCLE FRACTION AND CRITICAL FLICKER FREQUENCY. Percept. Mot. Skills, Feb. 1960, 10, 3-8. (Michigan State University, East Lansing, Mich.).

17,085
This paper attempted to define some relations between pulse-to-cycle fraction (PCF) and critical flicker fusion (CFF). Stimulation was presented by means of an episcotister. The target was subtended 1.5 degrees and was viewed from a distance of 30 inches. Four different intensities were used and seven PCF were used with ten readings on each of the 28 conditions. The results were analyzed and depicted with CFF plotted against PCF.
G. R 6

17,086
Barch, A.M. TOWARD AN IDEAL PERCEPTUAL-MOTOR DEVICE. Percept. Mot. Skills, Feb. 1960, 10, 11-20. (Michigan State University, East Lansing, Mich.).

17,086
A major lack in the investigation of human skills is that of perceptual-motor devices and situations useful to empirical and theoretical analysis. To meet this lack, the Michigan State University (MSU) Serial Reactor was developed. The apparatus involves the integration of a film strip projector and a modifiable response system. The importance of task characteristics was discussed as these set requirements which must be met in the design of display apparatus, and suggestions are made for an "ideal" perceptual-motor device. The MSU Serial Reactor was described in relation to the "ideal" device. Limitations of present skill apparatus were discussed.
I.

17,087
Hochberg, J. & Hardy, D. BRIGHTNESS AND PROXIMITY FACTORS IN GROUPING. Percept. Mot. Skills, Feb. 1960, 10, 22. (Cornell University, Ithaca, N.Y.).

17,087
The purpose of this experiment was to obtain the quantitative relationship of the "Gestalt grouping factor' as a measure of brightness similarity. Four matrices were used to carry out the investigation.
T. G. R 3

17,088
Abbey, D.S. & Humphries, M. PERFORMANCE OF PILOTS AND STUDENTS ON A COMPLEX PERCEPTUAL-MOTOR TASK. Percept. Mot. Skills, Feb. 1960, 10, 27-30. (University of Toronto & Defence Research Medical Labs., Toronto, Ontario, Canada).

17,088
This experiment was designed to study the effect of prior experience upon the expected relations between forward-backward control movements and the up-down movements on the Toronto Complex Coordinator. Three measures of performance were made: matches, horizontal errors, and vertical errors. The performance of nine qualified RCAF pilots was compared with that of ten male undergraduates from the University of Toronto.
G. R 4

17,089
Gardner, R.W. & Long, R.I. ERRORS OF THE STANDARD AND ILLUSION EFFECTS WITH THE INVERTED-T. Percept. Mot. Skills, Feb. 1960, 10, 47-54. (Menninger, Foundation, Topeka, Kan.).

17,089
There is evidence that overestimation of vertical lines is, in part, a function of the oval shape of the visual field. Attention deployment was investigated by the present study as another factor related to the vertical-horizontal illusion. Three groups of Ss (24, 44, and 60) viewed inverted-T figures and were required to adjust figures to both horizontal and vertical standards. Traditional "illusion effect" measures in which the horizontal line always was the standard were compared with "illusion effect" measures when the standard was varied. Implications of differences found between errors of the standard and "illusion effects" were discussed as they related to interpretation of findings reported from studies using only the traditional measure.
T. R 19

17,090
Macek, A.J. EFFECTS OF PROVIDING A SYSTEM FOR NAMING RESPONSES ON PERFORMANCE OF A DISCRIMINATIVE PERCEPTUAL-MOTOR TASK. Percept. Mot. Skills, Feb. 1960, 10, 63-69. (University of Minnesota, Minneapolis, Minn.).

17,090
To discover whether performance of a discriminative perceptual-motor task will be facilitated when Ss are provided with a meaningful system for identifying responses, four groups of Ss (total N = 100) were trained on a star discriminator task. Two groups were trained to use a clock analogue; two performed without it. Two comparisons were then made: 1) between two groups (one trained with the analogue, one without) which learned to associate conceptual cues with the stimuli of the motor task; and 2) between two groups that had experience in seeing the stimuli and learning irrelevant responses to them. Various possible interpretations of findings were discussed. Differences in performance between Ss who had access to and used the device as compared with performance of those who did not were also discussed. R 4

17,091
McNamara, H.J. & Fisch, R.I. PERSONAL SPACE AND LATERALITY IN PERCEPTION. Percept. Mot. Skills, Feb. 1960, 10, 70. (Menninger Foundation, Topeka, Kan.).

17,091
This note reported results of a study to test the hypothesis that "in a depth perception task when all cues (except size) are excluded, the object fixated most frequently will appear larger and be placed at a greater distance from S than the comparison stimulus." Seventeen right-handed and eight left-handed Ss were asked to place objects in relation to a "standard." The relation of findings to the "error of the standard" effect was pointed out.
R 2

17,092
Morant, R.B. & Mistovich, Mildred. TILT AFTER-EFFECTS BETWEEN THE VERTICAL AND HORIZONTAL AXES. Percept. Mot. Skills, April 1960, 10, 75-81. (Brandeis University & Sylvania Electric Co., Waltham, Mass.).

17,092
This study was concerned with the change of orientation of a field of tilted lines. Under investigation were two theories, Gibson's theory of "adaptation" and the "satiation" theory of Kohler and Wallach, offered to explain the tilt after-effects between the vertical and horizontal axes. This study used a luminescent circular field of straight lines which served both as inspection and test figures in a dark room. The two theories were examined in terms of the results obtained in the study.
T. R 8

17,093
Behar, I. & Bevan, W. ANALYSIS OF THE PRIME PSYCHOPHYSICAL JUDGMENT. Percept. Mot. Skills, April 1960, 10, 82. (Veterans Administration Hospital, Durham, N.C. & Kansas State University, Kan.).

17,093
Intermodality differences on the judgments of auditory and visual intervals were studied. Mean judgments were obtained on 135 Ss for the visual stimuli and on 105 Ss for the auditory stimuli by using the method of single stimuli.
R 2

17,094
Morant, R.B. & Mikaelian, H. INTER-FIELD TILT AFTER-EFFECTS. Percept. Mot. Skills, April 1960, 10, 95-98. (Brandeis University, Waltham, Mass.).

17,094

This study was designed to evaluate the assumption made by Gibson and other investigators that visual tilt aftereffects are localized. The experimental design consisted of a single-tilted inspection line presented to one side of the median vertical of the visual field and a single test line to the opposite side. Four conditions were presented to each S four times. The results were discussed in terms of the results previously reported and of the assumptions cited.
T. R 5

17,095

Cappon, D. & Banks, Robin. PRELIMINARY STUDY OF ENDURANCE AND PERCEPTUAL CHANGE IN SLEEP DEPRIVATION. Percept. Mot. Skills, April 1960, 10, 99-104. (University of Toronto, Toronto, Ontario, Canada).

17,095

Presented is a report on a preliminary study conductec on 21 individuals participating in an 88 hour talkathon. Observed were the changes in perception of time, space, and body, and a feeling of unreality during sleep deprivation and the possible predictors of endurance in such a situation. The following tests were administered to the Ss to determine neurotic and nervous tendencies: 1) Cornell Medical Index, 2) The Maudsley Medical Questionnaire, 3) a short form of the Taylor Manifest Anxiety Scale, and 4) the Raven Progressive Matrices Intelligence Scale.
T. G. R 4

17,096

Gardner, R.W. & Long, R.I. ERRORS OF THE STANDARD AND ILLUSION EFFECTS WITH L-SHAPED FIGURES. Percept. Mot. Skills, April 1960, 10, 107-109. (Menninger Foundation, Topeka, Kan.).

17,096

In this experiment, 20 female Ss were tested with two forms of a reversed-L figure to determine whether errors of the standard and illusion effects are distinguishable aspects of response to the inverted-T. In the two forms used, form A had an horizontal line as a standard and in form B the vertical line was constant. The results were offered as a support to Piagets' hypothesis concerning the importance of attention deployment.
R 10

17,097

Webb, W.B. & Wherry, R.J., Jr. VIGILANCE IN PROLONGED AND REPEATED SESSIONS. Percept. Mot. Skills, April 1960, 10, 111-114. (USAF School of Aviation Medicine, Pensacola Air Station, Fla.).

17,097

This experiment was concerned with the inter- and intrasubject response characteristics in prolonged and repeated sessions of monitoring a simple signal. Data on three Ss were presented. The signal for response was a change of 10 and 20 cps either up or down from a continuous base of 200 cps. Two average time intervals were used. The S responded on a telegraph key and the data were collected for errors, missed signals, and latency of response to each signal.
T. R 2

17,099

Parducci, A., Calfee, R.C., Marshall, L.M. & Davidson, L.P. CONTEXT EFFECTS IN JUDGMENT: ADAPTATION LEVEL AS A FUNCTION OF THE MEAN, MIDPOINT, AND MEDIAN OF THE STIMULI. J. exp. Psychol., Aug. 1960, 60(2), 65-77.

17,099

These studies were designed to "further our understanding of context effects by systematic manipulation of the context stimuli for absolute judgments." A previous experiment tested adaptation level theory; the purpose of the four present experiments was to obtain judgments of a much larger array of stimulus distributions than had been obtained before. Approximately 450 junior high school and 900 college students served as subjects. The task consisted of printed pages of numbers which were to be compared for size. Independent variables were the mean, midpoint, and median of the stimulus context; adaptation level was the dependent variable. Adequacy of the theory of adaptation level as an explanatory concept is discussed.
T. G. R 15

17,101

Hovland, C.I. & Hunt, E.B. COMPUTER SIMULATION OF CONCEPT ATTAINMENT. Behav. Sci., July 1960, 5(3), 265-267. (Yale University, New Haven, Conn.).

17,101

The writers describe a series of computer models which they have developed for the simulation of human concept formation. The first model was based on the concept of learning model Hovland in which the subject knows the dimensions which will be used and the number of values of each. The second model had the added feature of simulating selective attention to certain aspects of the stimulus. Current research is directed toward investigating the operation of memory in concept attainment.
I. R 5

17,102

Vandenberg, S.G., Green, B.F., MacKenzie, B. & Wrigley, C. (Eds.). COMPUTER PROGRAM ABSTRACTS. Behav. Sci., July 1960, 5(3), 268-273.

17,102

This group of 16 abstracts is concerned with the use of computer programs in the statistical analysis of data. Some of these abstracts are on: partial item analysis of the IBM 650, regression analysis, nonlinear estimation, an IBM 650 program for Kendall's Tau, curve fitting, nonlinear regression by criterion of least squares, growth curves, curve plotting routine, response surface evaluation, a basic IBM 650 program to find best-fitting orthogonal factors for a given hypothesis, a basic IBM 650 program for paired comparisons from balanced incomplete blocks.

17,103

Drenick, R.F. RANDOM PROCESSES IN CONTROL AND COMMUNICATIONS. Science, Sept. 1960, 132(3431), 865-870. (Bell Telephone Labs., Murray Hill, N.J.).

17,103

Problems which have faced engineers have attracted the interest of physicists, biologists, neurologists, psychologists, linguists, and mathematicians. Theories suggested by researchers in these fields have both answered and raised questions. Problems of the "signal space," the usefulness of Borel Fields, Wiener's Prediction Theory, Shannon's Information Theory, and the problems of transducers are each discussed briefly.
G.

17,104

Dick, J.L., Gaske, M.C. & Kiley, L.A., Jr. EVALUATION OF PERSONNEL EXPOSURE FROM STRATOSPHERIC FISSION FRAGMENT CONTAMINATION ON AIRCRAFT. Aerospace Medicine, May 1960, 31(5), 353-371. (USAF Research Division, Washington, D.C.).

17,104

This paper attempts to evaluate a number of studies concerned with radioactive contamination from aircraft flying above the trapopause. Permissible levels of contamination are discussed and guide lines for acceptable levels of external radiation, and permissible air and water concentrations are presented. Among the topics discussed at length were: 1) external and internal radiation exposure from fission product debris on aircraft, 2) aircraft contamination from residual stratospheric nuclear weapon debris, and 3) contamination control.
T. G. R 11

17,105
Jacobson, S.L. ENGINEERING OF THE SEALED CABIN ATMOSPHERE CONTROL SYSTEM. Aerospace Medicine, May 1960, 31(5), 388-398. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,105

The emphasis on manned space vehicles has initiated concern in the need for increased environmental control of sealed cabins with special emphasis in the following areas: 1) power supplies, 2) temperature control, 3) total pressure control and gas supply composition, 4) structural weight and leakage, 5) fire hazard, 6) carbon dioxide control as well as water production in the sealed cabin and odor control. The special problems arising with the increase in the number of passengers in the cabin is also considered and discussed.
G. R 7

17,106
Hanna, T.D. & Gaito, J. PERFORMANCE AND HABITABILITY ASPECTS OF EXTENDED CONFINEMENT IN SEALED CABINS. Aerospace Medicine, May 1960, 31(5), 399-406. (USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.).

17,106

Six men lived and worked under simulated space flight conditions for seven days in two small chambers at 10,000 feet with an oxygen concentration of 55 percent sea level equivalent. During that time the men performed tasks for ten hours, slept for eight hours, and spent the remainder of the time eating, in recreation, etc. Diaries were maintained by each S and psychological tests were administered to them before and after the confinement period. The psychological and behavioral aspects were analyzed and discussed with consideration of the effects over a longer confinement period.
T. I. R 6

17,107
Bovard, R.M. OXYGEN SOURCES FOR SPACE FLIGHTS. Aerospace Medicine, May 1960, 31(5), 407-412. (MSA Research Corporation, Callery, Penn.).

17,107

Recent tests have revealed that two relatively new oxygen sources, potassium superoxide and sodium chlorate candles, can be used as a means of controlling a closed chamber atmosphere. Potassium superoxide, a demand chemical, has the property of releasing oxygen when reacting with water and carbon dioxide. The potassium superoxide canister is presently employed as a self-breathing apparatus. The sodium chlorate oxygen candle is a solid oxygen source which can be used to start quickly the potassium superoxide canisters. The use of the two sources separately and in conjunction with each other have been demonstrated.
T. I. R 6

17,108
Gray, R.F. FUNCTIONAL RELATIONSHIPS BETWEEN SEMICIRCULAR CANALS AND OTOLITH ORGANS. Aerospace Medicine, May 1960, 31(5), 413-418. (USN Aviation Medical Acceleration Lab., Johnsville, Penn.).

17,108

This article reviews the theory of how the vestibular organs function to maintain balance including the separate functions of the utricles and saccules in linear accelerations and of the semi-circular canals in angular acceleration. This theory has been adequate for explanations for many observations. However, there is some evidence opposed to the hydrodynamic theory which states that the semicircular canals respond only to angular acceleration. A number of studies are cited in this connection as well as a study conducted at Johnsville, Pennsylvania on vestibular experiments on the human centrifuge. The results of this study point out the limitations of the general concepts of the mechanism of vestibular organ function.
I. R 7

17,109
Bryan, C.A. & Leach, W.G. PHYSIOLOGIC EFFECTS OF CABIN PRESSURE FAILURE IN HIGH ALTITUDE PASSENGER AIRCRAFT. Aerospace Medicine, April 1960, 31(4), 267-275. (RCAF Institute of Aviation Medicine, Toronto, Ontario, Canada).

17,109

The physiological hazards of cabin pressure failure of turbine powered aircraft at high altitude were reviewed. Eight subjects were tested under simulated cabin pressure failure conditions from 8,000 to 40,000 feet in 2.5 seconds. Oxygen was supplied to the subject from a continuous flow regulator and by commercial oxygen masks. Performance of the subjects was followed by the ability to cancel rhythmic alternating light signals by two buttons and EEG were taken. The results were reviewed with consideration of the special nature of the subjects used.
G. I. R 7

17,110
Hale, H.B. HUMAN CARDIOACCELERATIVE RESPONSES TO HYPOXIA IN COMBINATION WITH HEAT. Aerospace Medicine, April 1960, 31(4), 276-287. (Dept. of Physiology-Biophysics, USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,110

Because of the lack of literature on human responses to hypoxia in combination with heat, four experiments were conducted to examine the physiological effects of these two factors. The experiments were: 1) 19 Ss were observed during decompression in a heated chamber; 2) hypoxia was imposed slightly later than heat; 3) hypoxia was imposed simultaneously with heat; and 4) hypoxia was imposed simultaneously with heat and continued for 45 minutes. The results were discussed in terms of other studies conducted on decompression and temperature which helped to explain some of the present findings.
T. G. R 7

17,111
Aerospace Medicine. ABSTRACTS OF PAPERS FROM SCIENTIFIC PROGRAM OF 1960 MEETING OF AEROSPACE MEDICAL ASSOCIATION, MIAMI BEACH, MAY 9-11. Aerospace Medicine, April 1960, 31(4), 296-326.

17,111

A group of 120 abstracts is presented along with papers covering the following areas: "Human Tolerance to Ultra High G Forces;" "Passenger Emergency Oxygen Bag;" "Controls and Displays for Orbital Vehicles;" "Automatic Methods for the Analysis of Physiological Data;" "Space Environment Simulation;" "Underwater Research to Save Pilots;" "An Integrated Life Support System for Orbital Flight;" "Tolerance of Pure Oxygen Atmospheres;" "Oxygen Recovery System for Manned Space Flight;" "Cardiology in the Examination of Civil Air Crewmen;" "Human Factors Program in B-52 G Operations;" "Human Factor Causes of Aircraft Accidents;" "Newer Problems of Carrier Aviation;" etc.

17,112
Beckman, E.L., McNutt, D.C. & Rawlins, J.S.P. AN INVESTIGATION INTO THE FEASIBILITY OF USING THE STANDARD MARTIN-BAKER EJECTION SEAT SYSTEMS FOR UNDERWATER ESCAPE FROM DITCHED AIRCRAFT. Aerospace Medicine, Sept. 1960, 31(9), 715-732. (USN Aviation Medical Acceleration Lab., Johnsville, Penn. & USN School of Aviation Medicine, Pensacola Air Station, Fla.).

17,112
This study was conducted to investigate the possibilities of using an ejection seat as a means of underwater escape. Measurement of physical forces, acceleration, and drag pressure were made under simulated conditions using a dummy and ejection seat. Physiological measurements to evaluate human tolerance were made using human subjects towed through water at speeds up to 30 mph, a maximum velocity of 40 feet per second over a distance of 60 feet. Two tests were conducted to evaluate hazards in ejection through the canopy under water. The first test used the Sea Hawk fuselage and the second test used Meteor Mark 9 fuselage section. The use of this method is discussed with reference to a specific incidence of its use.
R 8

17,113
Meehan, J.P. & Jacobs, Edith. VENOUS PLASMA LEVELS OF CATECHOL AMINES IN SEVERAL PHYSICAL STRESSES. Aerospace Medicine, Sept. 1960, 31(9), 733-738. (Dept. of Physiology, School of Medicine, University of Southern California, Los Angeles, Calif.).

17,113
The venous plasma levels of adrenaline and noradrenaline were studied in relation to physiological responses to stress. The four physical stress conditions used were: 1) cold pressor test, 2) Harvard Step test, 3) treadmill exercises, and 4) centrifuge studies of positive acceleration. Blood samples to determine plasma levels were taken from each S after each test period and before each test period as a control. The data were analyzed and discussed in relation to past studies in this area.
T. R 9

17,114
Engel, A. & Mendelson, E.S. LABORATORY APPROXIMATION OF INDIVIDUAL TOLERANCE TO AIRCRAFT CARRIER DECK NOISE. Aerospace Medicine, Sept. 1960, 31(9), 739-744. (USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.).

17,114
A summary of recent scientific evidence on the auditory reflex which has primarily been conducted on animal subjects is given. To establish the appearance of similar effects in the human ear and the relation of these effects to auditory overload, the following exploratory studies were conducted: 1) reflex threshold, 2) relation of reflex mechanisms to dynamic range of stimuli, 3) persistence of reflex contractions with sustained noise or tones, 4) time to fatigue, 5) recovery rates after fatigue, 6) naive applications, and 7) middle ear and eustachian tube. The basic assumption of these studies was that individual differences in auditory excitability may be demonstrable. The method of extratympanic monometry was used and its applicability was discussed as were the results.
T. I. R 9

17,115
Lovell, F.W., McMichael, H. & Townsend, F.M. PATHOLOGY AS AN AID TO RECONSTRUCTION OF AIRCRAFT ACCIDENTS. Aerospace Medicine, Sept. 1960, 31(9), 745-748. (USAF Institute of Pathology, Washington, D.C.).

17,115
This article discusses the need for complete autopsy reports including photographs, toxicology, and x-ray studies on all fatalities of aircraft accidents. The value rendered from these studies in reconstructing the accident and aiding in evaluating the causes or conditions pertinant to the accident is discussed. Examples of particular cases are cited and the applicability of the above methods in determining: 1) carbon monoxide, 2) tissue fragments on aircraft structures, 3) reconstruction of over water accidents, 4) timing of lesions by histological examination, and 5) position of crew members at the time of the accident are also pointed out.
I. R 4

17,116
Sackler, A.M., Weltman, A.S. & Jurtshuk, P., Jr. ENDOCRINE ASPECTS OF AUDITORY STRESS. Aerospace Medicine, Sept. 1960, 31(9), 749-759. (Laboratories for Therapeutic Research, Research Institute of the Brooklyn College of Pharmacy, Long Island University, Brooklyn, N.Y.).

17,116
To determine the effects of auditory stress on the endocrine system, 120 mature male rats were tested under three conditions with equal control groups for each condition. Group I was exposed to an electric buzzer, Group II to an alarm bell, and Group III to a pure sound (1000 cps). Control groups were exposed to equal periods of quiet. At the end of three weeks of stimulation, the rats were sacrificed and autopsied and the testes, liver, spleen, thymus, adrenals, seminal vesicles, thyroid, and pituitary were weighed and adrenal samples were analyzed. The results were examined and discussed in terms of the histological and biochemical finds and a similar study conducted on female rats.
T. R 34

17,117
Berry, C.A. & Hekhuis, G.L. X-RAY SURVEY FOR BONE CHANGES IN LOW-PRESSURE CHAMBER OPERATORS. Aerospace Medicine, Sept. 1960, 31(9), 760-765. (USAF Office of the Surgeon General, Wahington, D.C. & USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,117
Due to some question concerning bone lesions and changes as a result of frequent exposure to low pressure chambers, the following study was conducted. X-rays of the anterior-posterior views of the humerii, radii, ulnae, femurae, tibiae, and fibulae were taken on 579 low pressure chamber operators. Past histories of injuries and serious diseases were obtained via questionnaires. The findings were analyzed and discussed in terms of dystarism and nondystarism groups, age, weight, etc. The need for continued study was stressed.
T. G. R 7

17,118
Smith, J.E. & Wentz, A.E. APPLICATION OF RESEARCH TO CIVIL AVIATION MEDICINE. Aerospace Medicine, Sept. 1960, 31(9), 766-769. (Bureau of Aviation Medicine, Federal Aviation Agency, Washington, D.C.).

17,118
This report discussed the Federal Aviation Agency, it functions, aims, and the role of the Research Requirement: Division in the Bureau of Aviation Medicine. The Division is divided into three main areas: 1) Aeromedical Liaison Branch, 2) Clinical Medical Research Branch, and 3) Civil Aeromedical Research Institute. The problems of medical certification of pilots in relation to aging were extensively considered as were the weaknesses of research and applied medicine. A means of solving the problems has been to organize special areas of study such as: 1) neurological, 2) biophysics, 3) behavioral sciences, etc. An extensive list of specific projects in these areas was cited.

17,119
Tillisch, J.H. INTERNAL MEDICINE: ITS ACCOMPLISHMENTS AND FAILURES IN AVIATION. THE WILLIAM RHINEHART SCHICK LECTURE. Aerospace Medicine, Aug. 1960, 31(8), 621-626. (Section of Medicine, Mayo Clinic & Mayo Foundation, Rochester, Minn.).

17,119
This paper reviews the role of internal medicine as applied to aviation, its contributions, and its laxities. It attempts to present some of the problems that the physician is confronted with such as: 1) criteria to determine which patients may be transported by air, 2) physical criteria for selecting pilots, 3) problems of coronary disease, 4) diseases of gastrointestinal system, and 5) diabetes melitus in pilots. It does not attempt to solve the problems, merely to emphasize their existence.

17,120
Taylor, W.J.R., Johnson, W.H. & Sellers, E.A. CARDIOVASCULAR CHANGES WITH VESTIBULAR STIMULATION. Aerospace Medicine, Aug. 1960, 31(8), 627-638. (Dept. of Pharmacology, University of Toronto, Toronto, Ontario, Canada).

17,120
The purpose of this study was to compare cardiovascular changes which occur after experimental vestibular stimulation to those changes following exercise and during carotid sinus and eyeball pressure. The four conditions tested on 100 aircrew candidates were: 1) master double-two-step test (with ECGs taken before, during, and after exercise); 2) right and left carotid sinus stimulation; 3) bilateral eyeball pressure; and 4) vestibular stimulation with 41 Ss exposed to a swing for five minutes and 59 Ss exposed to a turntable. The results were analyzed with comparisons made on Ss susceptible to induced motion sickness and Ss not susceptible to induced motion sickness.
R 13

17,121
Marchbanks, V.H., Jr. FLYING STRESS AND URINARY 17-HYDROXYCORTICOSTEROID LEVELS DURING TWENTY-HOUR MISSIONS. Aerospace Medicine, Aug. 1960, 31(8), 639-643. (USAF Hospital, Loring AFB, Maine).

17,121
The purpose of this study was to evaluate urinary excretion of 17-hydrocorticosteroids in B-52 crews flying 20-hour missions in relation to stress. Stress evaluations were conducted on 15 crew members with urine samples collected at two 10-hour intervals during the 20-hour mission. Control samples were obtained on a nonduty day. Evaluation of the results was on the basis of crew position and the relation of time of mission to the normal rest periods. The results were discussed in relation to previous studies in this area.

17,122
Phillips, P.B. "IS HE FIT TO FLY?" Aerospace Medicine, Aug. 1960, 31(8), 644-648. (USN Aviation Medical Center, Pensacola Air Station, Fla.).

17,122
Due to the need for a competent and experienced medical evaluation board, the Bureau of Medicine and Surgery of the Naval Department has been established. The purpose of the board and its functions are given as well as the experience and qualifications of the board members. A review of the activities of the board over the first two years of its operation is cited including the categories of patients studied, clinical categories of the patients, and the actions carried out on the patients.

17,123
Stutman, L.J. AN EXPLANATION FOR SUDDEN DEATH IN CERTAIN FLYING PERSONNEL AT HIGH ALTITUDE. Aerospace Medicine, Aug. 1960, 31(8), 659-660. (Dept. of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, New York, N.Y.).

17,123
This paper presents the hypothesis that some sudden deaths in pilots flying at high altitudes may be due to obesity. Autopsies have revealed a patent foramen ovale and fat emboli in the lungs and brain. Studies on dogs have demonstrated that elevation of the serum fatty acids, both at ground level and high altitude, lowered arterial oxygen content. The author discusses the relevance of animal studies to man and the possible role of fatty acids in sudden deaths of pilots.

17,124
Burch, G.E. & Gerathewohl, S.J. OBSERVATIONS ON HEART RATE AND CARDIODYNAMICS DURING WEIGHTLESSNESS. Aerospace Medicine, Aug. 1960, 31(8), 661-669. (Dept. of Medicine, Tullane University of Louisiana School of Medicine, New Orleans, La. & USA Ballistic Missile Agency, Redstone Arsenal, Ala.).

17,124
This is a report on several studies conducted to determine the effects of zero g and acceleration on the activity of the heart. The studies include: 1) an Air Force study conducted on pulse rate and ECG of animals and man during subgravity state, weightlessness studies in the USSR using dogs in hermetically sealed capsules, 3) the von Beckh study on post- and pre-acceleration weightlessness, and 4) the Army-Navy study in which three monkeys were launched in the nose cone of Jupiter Intercontinental Ballistic Missiles. The physiological effects were discussed and the psychological factors such as engine sounds in relation to the physiological effects were also considered.
I. G. R 18

17,125
Strughold, H. & Ritter, O.L. EYE HAZARDS AND PROTECTION IN SPACE. Aerospace Medicine, Aug. 1960, 31(8), 670-673. (Advanced Studies Group, USAF Aerospace Medical Center, Brooks AFB, Tex.).

17,125
This paper discusses the danger of structural damage to the eye as a result of exposure to the sun's rays. Retinal damage such as solar burns and solar lesions of the retina are cited. Critical time exposure to sun and atomic flashes based on some laboratory experiments are mentioned. The need for further optical knowledge is noted. Eye protection in the form of use of light-absorbing glasses and light-scattering ceilings, and orientation of the astronauts to the solar dangers is discussed. Also noted is the application of solar burns for constructive purposes in curative treatment of eye damage.
I. R 14

17,126
Holcomb, G.A. APPLICATION OF BASIC HUMAN ENGINEERING PRINCIPLES TO A COCKPIT DESIGN. Aerospace Medicine, Aug. 1960, 31(8), 674-677. (Human Factors, Stanley Aviation Corp., Denver, Colo.).

17,126

This article points out the need for applying human engineering in the design of cockpits. Outdated specifications and the attempt to pack the maximum number of pieces into the smallest volume has been the governing factor in design. It is recognized now that the cockpit must be treated as a total entity with improved psychological organization, an improved figure-ground relationship between an individual control and its console background, and an increased meaningfulness of switch grouping. An analysis of an operational communications-navigation-identification panel is given with objections presented and possible improvements proposed.
I. R 14

17,127

Gastaut, H. & Gibson, C. ELECTROGRAPHIC STUDY OF SYNCOPAL PREDISPOSITION. Aerospace Medicine, July 1960, 31(7), 531-542. (Laboratory of Neurobiology, Faculty of Medicine, Marseilles, France & University of British Columbia, Vancouver, Canada).

17,127

As an aid in aircrew selection, methods were developed to detect predisposition to syncope of reflex origin. Observations were made on 500 Ss. Respiration, blood pressure, EEG, and an ECG derivation were recorded under the following conditions: 1) ocular compression of both eyes, 2) carotid sinus compression, 3) forced expiration or Valsalva's maneuver, 4) deep hyperventilation, 5) apnea, 6) posthyperventilation apnea, and 7) hypoxia. The merits of the individual tests were discussed and the value of using the ocular compression, carotid sinus compression, and Valsalva test to assess syncopal predisposition of individuals was further discussed.
T. G. R 18

17,128

Schock, G.J.D. AIRBORNE GSR STUDIES A PRELIMINARY REPORT. Aerospace Medicine, July 1960, 31(7), 543-546. (USAF Aeromedical Field Lab., Holloman AFB, N.M.).

17,128

Recordings of the GSR were made during experiments conducted on the effects of weightlessness on three Ss exposed to 30-40 sec. of weightlessness achieved in flying F-94C jet aircrafts in Keplerian trajectories. The instrumentation techniques were presented in great detail. The airborne GSR meter used was a modification of a model 22A dermohmmeter. It consisted of two units, the dermohmmeter and a separate calibration unit. Constant sensitivity was maintained over the operating range. The results included heart rate, GSR, and acceleration experienced by the Ss. The changes in GSR were discussed in terms of the Ss' anxiety and anticipation of events.
G. R 3

17,129

Gastaut, H., Lee, Marilyn C. & Laboureur, P. COMPARATIVE EEG AND PSYCHOMETRIC DATA FOR 825 FRENCH NAVAL PILOTS AND 511 CONTROL SUBJECTS OF THE SAME AGE. Aerospace Medicine, July 1960, 31(7), 547-552. (Laboratory of Neurobiology, Faculty of Medicine, Marseilles, France).

17,129

A review of work conducted over the past ten years on EEG behavioral relations in naval pilots and candidates was given and correlated with recent studies conducted by the authors. Three hypotheses were offered as explanations for slow activity EEG records in pilots. These were that slow EEG rhythms 1) are a result of performance in the profession, 2) exist as one selection factor in men choosing the profession, and 3) are not unique (along with other personality factors) to pilots. The three hypotheses were tested and the study was replicated on 511 male French military recruits as controls. The two sets of investigations were compared and discussed in terms of personality traits and use of EEG as a selection tool.
T. R 15

17,130

Clark, R.T., Clamann, H.G., Balke, B., Tang, P.C. et al. BASIC RESEARCH PROBLEMS IN SPACE MEDICINE: A REVIEW. Aerospace Medicine, July 1960, 31(7), 553-577. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,130

A review of research problems in space medicine in the area of space travel is presented. A wide scope of topics are considered including: studies of the subgravity state during parabolic flight, bio-packs for satellites, disorientation of pilots, photosynthetic gas exchangers and recyclers in closed ecological systems studies, survival of terrestrial organisms under extreme environmental conditions, physiological aspects of training and selection for manned extra-terrestrial flights, and consideration of problems that fall under these categories.

17,131

Schreuder, O.B. MEDICAL CONSIDERATIONS IN CIVIL JET OPERATIONS. Aerospace Medicine, July 1960, 31(7), 578-583. (Overseas Division, Pan American World Airways, Inc., New York, N.Y.).

17,131

Some of the important and current problems in civil jet operations are reviewed. These include: the problem of indoctrination of members of aircrew in physiological aspects of high altitude flight and loss of pressurization with consideration of oxygen supply and necessary equipment; the effects of jet operation in terms of mechanical piloting vs. piston-engined aircraft; the effects of jet flight on flight service personnel, especially stewardesses; the aspects of jet flight found desirable by passengers; the effects of flight on pregnancy; and industrial hazards of ground employees, e.g., high intensity noise of turbo-jet engines.
T. R 10

17,133

Ambler, Rosalie K., Bair, J.T. & Wherry, R.J., Jr. FACTORIAL STRUCTURE AND VALIDITY OF NAVAL AVIATION SELECTOR VARIABLES. Aerospace Medicine, June 1960, 31(6), 456-461. (USN School of Aviation Medicine, Pensacola Air Station, Fla.).

17,133

To assess the effectiveness of the Aviation Score Sheet as an aid in selection, its component parts were investigated. Research objectives were: 1) to obtain the validity between the components of the score sheet and preflight and attrition criteria, 2) to define the factorial structure of component parts of the score sheet and the preflight and attrition criteria, 3) to indicate possible points of departure for future research in selection of flight applicants. Aviation Score Sheets consist of seven component scores and a total score. In analysis of the data, product-moment correlation was made between all variables. Biserials were computed between the variables and two dithotomies: 1) still in program vs. voluntary withdrawal, and 2) still in program vs. flight failure. Several factors were abstracted and discussed. T. R 7

17,134

Taylor, E.R. THE INCIDENCE OF HYPOGLYCEMIA IN FLIGHT. Aerospace Medicine, June 1960, 31(6), 462-467. (Loring AFB, Maine).

17,134
The purpose of this project was to determine the incidence of hypoglycemia in flight as a possible cause of accidents involving pilot error. The Ss used were 190 jet pilots. Blood specimens were obtained before and after each flight with no more than two flights being made per day. Blood specimens were obtained from finger punctures and measured for glucose concentration. A record of each S's dietary intake and time spent in bed over the preceding 24 hours was made and compared to the blood sugar concentration. Special emphasis was put on the role of sugar and carbohydrates as a function of hypoglycemia. A discussion of the findings followed with reference to sleep as another source of consideration in this matter.
T. G. R 8

17,135
Jacobs, H.I. A REVIEW OF AVAILABLE INFORMATION ON THE ACOUSTICAL AND VIBRATIONAL ASPECTS OF MANNED SPACE FLIGHT. Aerospace Medicine, June 1960, 31(6), 468-477.

17,135
This is a review of the problem of noise and vibration with respect to manned space flight. Several areas are discussed including: 1) noise environment connected with space vehicle operations which include the rocket engine jet and the boundary layer turbulence or aerodynamic noise; 2) human tolerance to noise, permanent effects; 3) human tolerance to noise, temporary effects; 4) communications in high noise fields; and 5) vibrational environment in future space vehicles. Each of these topics is extensively covered and discussed.
T. G. R 11

17,136
Jones, G.M. FATIGUE EFFECTS IN RADIO OPERATORS DURING A PROGRAM OF HIGH INTENSITY, LONG DURATION, FLYING. Aerospace Medicine, June 1960, 31(6), 478-484. (Institute of Aviation Medicine, MRC, Farnborough, Hampshire, England).

17,136
This experiment was designed to investigate fatigue effects in radio operators during high intensity, long duration flying. The basic flying unit was a 15-hour operational sortie with four crews each flying four sorties over a period of eight days. The Ss were given a set hourly task, their achievement being scored as its percentage completion in each hour. Analysis of the results was done on three different time scales: 1) from hour to hour throughout a watch, 2) from watch to watch throughout a sortie, and 3) from sortie to sortie throughout the trial. Parallel investigations of pilot performance, physiological reactions to stress, and vigilance were also conducted. A discussion of the results in relation to other studies in the area followed.
T. G. R 11

17,137
Hock, R.J. THE POTENTIAL APPLICATION OF HIBERNATION TO SPACE TRAVEL. Aerospace Medicine, June 1960, 31(6), 485-489. (White Mountain Research Station, University of California, Big Pine, Calif.).

17,137
Space flights of long duration present the problem of aging which may be solved by the application of three possible methods: 1) dilation of time, 2) whole body freezing, and 3) hibernation. The third, hibernation, is discussed more fully in relation to reduction of energy expenditure of which longevity may be a function. The hazards of ventricular fibrilation are discussed as well as other problems encountered in putting man into this condition and maintaining it for long periods of time.
T. G. R 17

17,138
Lederer, L.G., Graybiel, A., Kidera, G., Lamb, L.E., et al. LIMITS OF CARDIOVASCULAR NORMALITY FOR FLYING--A PANEL DISCUSSION. Aerospace Medicine, June 1960, 31(6), 490-501.

17,138
This panel discussion is concerned with the significance of cardiovascular findings in relation to flying. A panel of eight physicians approached the questions from two points of view: 1) selection for flying duties, and 2) maintenance or retention in a flying capacity of trained individuals. The problem of syncope and electrocardiographic findings of slow atrial tachycarda, left bundle branch block, and myocardial infarction are extensively covered by the panel.

17,139
van Laer, J., Galanter, E.H. & Klein, S.J. FACTORS RELEVANT TO THE DEVELOPMENT OF AIRCRAFT WARNING AND CAUTION SIGNAL SYSTEMS. Aerospace Medicine, Jan. 1960, 31(1), 31-39. (Northwestern University, Evanston, Ill. & University of Pennsylvania, Philadelphia, Penn.).

17,139
Considering the problem of priority of information presentation to the pilot, two category systems, warning and caution, were studied. The distinction between these two systems was made with the warning signal acting as an alerting stimulus and the caution signal as a directing stimulus. The input channels of vision, audition, and cutaneous pressure sensitivity were inspected in respect to their applicability to these two systems. The feasibility of using these input channels in relation to reaction time and differentiating of signals was also discussed.
R 24

17,140
Berry, F.B. "WHICH ERRING MEN CALL CHANCE." Aerospace Medicine, Feb. 1960, 31(2), 91-100. (US Office of the Secretary of Defense, Washington, D.C.).

17,140
This lecture reviews some of the problems of public safety and the necessity of an awareness of the dangers of air travel. Among the topics discussed are the difficulties of pilot examinations, accident prevention from the standpoint of human error, the role of the lay press, the need for a set of physical standards with a method of investigation, the role of aging on ability and usefulness of the pilot, and the effects of alcohol and drugs on the pilots and passengers. Emphasis is placed on the need to exercise greater care against human and mechanical error especially with the increasing use of modern aircraft.
R 17

17,141
Brent, H.P., Carey, T.M., Powell, T.J., Scott, J.W., et al. SYNERGISM BETWEEN EFFECTS OF HYPERVENTILATION, HYPOGLYCEMIA AND POSITIVE ACCELERATION. Aerospace Medicine, Feb., 1960, 31(2), 101-115. (RCAF Institute of Aviation Medicine, Toronto, Ontario, Canada).

17,141
To determine the effects of hyperventilation, modest positive acceleration, and physiological hypoglycemia on consciousness, 18 Ss were exposed to combinations of voluntary hyperventilation (3.4 g for five seconds on the centrifuge) and changes in glycemia (one and three hours after glucose feeding). Blood glucose changes were obtained by venous blood samples and EEG and ECG tracings were taken. A discussion of the results included the relation of the EEG to ECG changes.
T. G. I. R 18

17,142
Hall, A.L. & Martin, R.J. PROLONGED EXPOSURE IN THE NAVY FULL PRESSURE SUIT AT "SPACE EQUIVALENT" ALTITUDES. Aerospace Medicine, Feb. 1960, 31(2), 116-122. (USN Missile Center, Point Magu, Calif.).

17,142

A naval aviation flight surgeon was submitted to simulated altitudes between 80,000 and 170,000 feet for 72 hours to determine man's ability to tolerate 100 percent oxygen under such conditions and his ability to function adequately in the Mark III Model II Navy Pressure Suit. The S was given a pre-exposure physical examination and a battery of psychological tests. During exposure, a record was made of food and water intake, oxygen expenditures, and subjective symptoms. Routine urine studies and ECG tracing were also made. Results were discussed with emphasis on the extreme nature of the experimental conditions. The favorability of a two-member crew for extended space flights was discussed.
T. I. R 13

17,143

Bryan, G.L. & Rigney, J.W. EMOTIONAL BEHAVIOR OF AIRLINE PASSENGERS. Aerospace Medicine, Feb. 1960, 31(2), 123-126. (Electronics Personnel Research Group, University of Southern California, Los Angeles, Calif.).

17,143

Stewardesses (156) from three major airlines operating out of Los Angeles were interviewed and completed questionnaires to obtain information on the nature and extent of passenger problems in air travel. The questionnaire consisted of three parts: a biography, an opinion survey, and a description of extreme passenger behavior as witnessed by the stewardess. The problem of passenger emotion was discussed in terms of increases in flight travel and increases in the number of passengers in aircrafts.
T.

17,144

Carbery, W.J., Tolles, W.E. & Freiman, A.H. A SYSTEM FOR MONITORING THE ECG UNDER DYNAMIC CONDITIONS. Aerospace Medicine, Feb. 1960, 31(2), 131-137. (Dept. of Medical and Biological Physics, Airborne Instruments Lab., Deer Park, N.Y. & Sloan-Kettering Institute, New York, N.Y.).

17,144

A monitoring system was developed that allows continuous recording of ECG during body movements and exercise. Skin electrodes, a high-gain oscilloscope, a two-channel paper recorder, and a two-channel magnetic tape recorder were used. The Ss who had ECG's recorded covered a wide range of ages and body builds. The two lead configurations allowed for continuous recording during exercise for long periods of time. An evaluation of the monitoring system was given and its applicability to studies of the heart action of Ss during aircraft and satellite flights was noted.
G. I.

17,145

Michel, E.L., Langevin, R.W. & Gell, C.F. EFFECT OF CONTINUOUS HUMAN EXPOSURE TO OXYGEN TENSION OF 418 MM HG FOR 168 HOURS. Aerospace Medicine, Feb. 1960, 31(2), 138-144. (USN Air Crew Equipment Lab., NADC, Philadelphia, Penn.).

17,145

This study was conducted to define more clearly human limitations to higher than normal oxygen percentages. Six men were confined for a seven-day period in an altitude chamber at 10,000 feet and exposed to a continuous oxygen percentage of 80 percent. Vital capacity and pulse were measured twice daily and respiratory frequency was recorded once a day on each S during a one and three-quarter hour work period. Physical examinations were administered at the end of the study to determine the presence of any lasting effects on the S.
T. I. R 17

17,146

Berry, C.A. & Eastwood, H.K. HELICOPTER PROBLEMS: NOISE, COCKPIT CONTAMINATION AND DISORIENTATION. Aerospace Medicine, March 1960, 31(3), 179-190. (USAF Office of the Surgeon General, Washington, D.C.).

17,146

Because of the wide use of helicopters, some of the frequent problems: noise, cockpit contamination and disorientation were discussed. Four types of helicopters were considered: the H-13, H-19, H-21C, and H-37. The reports considered the relation of noise and vibration levels to discomfort and hearing loss. Cockpit contamination was investigated to determine causes of headaches and nausea with carbon monoxide as a likely source of contamination. Spatial disorientation at night with lighting as a source of trouble was considered. The change from visual to instrument flight regulations was considered in this context. Also, the problem of a photic stimulus coming from the sun's rays through the rotor blades causing convulsions was discussed.
I. G. R 18

17,147

Eastwood, H.K. & Berry, C.A. DISORIENTATION IN HELICOPTER PILOTS. Aerospace Medicine, March 1960, 31(3), 191-199. USAF Office of the Surgeon General, Washington, D.C.).

17,147

Seventeen pilots were interviewed concerning their experiences with disorientation in helicoptors. These disorientation experiences were divided into three types: 1) mild, 2) moderate, and 3) severe. These experiences were reported to have occurred under the following conditions: 1) night flying, 2) under weather conditions, and 3) under the hood (goggle-like devices worn by the pilot). Individual experiences under the above conditions as well as recommendations for prevention of disorientation were given by the pilots.
I. R 9

17,148

Giesecke, A.H., Jr., Hill, J.F. & Halverson, R.C. SPATIAL DISORIENTATION AS A CAUSE OF ACCIDENTS IN ARMY CARGO HELICOPTERS. Aerospace Medicine, March 1960, 31(3), 200-203. (USA Sixth Headquarters, Presidio of San Francisco, Calif.).

17,148

A review of some of the mechanisms of disorientation in helicopters and some of the factors that tend to increase helicopter disorientation are given in this report. These include: 1) the inherent instability of the helicopter, 2) pilot fatigue, 3) inadequacy of the instruments, 4) location of the basic flight instruments which necessitate excessive head movements, and 5) shape and distribution of cockpit glass which cause confusing ground reflections. Several case reports are cited and recommendations are set forth to improve present conditions.
R 8

17,149

Miller, J.W. & Goodson, J.E. MOTION SICKNESS IN A HELICOPTER SIMULATOR. Aerospace Medicine, March 1960, 31(3), 204-212. (Human Factors Section, Hughes Aircraft Company, Fullerton, Calif. & USN School of Aviation Medicine, Pensacola Air Station, Fla.).

17,149

The 2-FH-2 helicopter simulator was designed to investigate problems of visual contact in flight training, evaluate the point source system of visual presentation, and provide training in autorotation and hovering maneuvers. The three principal components of the simulator are: 1) the projection system, 2) cockpit, and 3) the computer. The feasibilaty of using such a device is discussed in terms of the problems encountered such as vertigo and "motion sickness" experienced by the instructors and trainees.
I. R 5

17,150

Hershgold, E.J. ROENTGENOGRAPHIC STUDY OF HUMAN SUBJECTS DURING TRANSVERSE ACCELERATIONS. Aerospace Medicine, March 1960, 31(3), 213-219. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,150

The effects of transverse acceleration on the body were studied using x-ray examinations of the Ss. A human centrifuge was used to simulate accelerations of 6 and 12 g for right and left sideward accelerations and forward accelerations. Chest x-rays of five Ss were taken under the three conditions and studied to observe the effects on the pulmonary circulation and the vulnerability of the mediastinal and abdominal organs to displacement under these conditions.
I. R 4

17,151
Meehan, J.P. & Brandt, W. PARA-AMINO HIPPURATE AND ENDOGENOUS CREATININE CLEARANCES IN POSITIVE ACCELERATION. Aerospace Medicine, March 1960, 31(3), 220-224. (Dept. of Physiology, University of Southern California, School of Medicine, Los Angeles, Calif.).

17,151

To investigate the extent to which the kidneys participate in the centrally-induced pressor responses to maintain circulation under positive acceleration, three Ss were studied. Each S was exposed to a positive acceleration of three g for ten minutes and blood and urine samples of each S were examined. The results were examined in relation to the role of renal circulation under positive acceleration.
T. I. R 9

17,152
Knauf, G.M. THE BIO-EFFECTS OF RADAR ENERGY A RESEARCH PROGRESS REPORT. Aerospace Medicine, March 1960, 31 (3), 225-228. (USAF Missile Test Center, Patrick AFB, Fla.).

17,152

This progress report on biological research investigated the effects of exposure to radar energy on the human body. A maximum safe ambient energy level was established and a maximum safe exposure level investigated Several common sense precautions for personnel have been projected and the questions of sterilization and injury to the eye and to living tissue have been investigated. The results discussed the need for further study with the main emphasis on basic cellular physiology.
R 9

17,153
Reynolds, E.L. IRRADIATION AND HUMAN EVOLUTION. Hum. Biol., Feb. 1960, 32(1), 89-108. (P.O. Box 5199, Honolulu, Hawaii).

17,153

The effects and consequences of irradiation on human evolution are discussed with special consideration given to: 1) past evolution and the possible effects of radiation from natural sources (e.g., cosmic rays, atmosphere, and rocks and soil; 2) effects of man-made radiation (e.g. x-rays and radioactive wastes); and 3) the possible future for man with adaptation as an answer. Possible approaches to the problem are discussed with emphasis placed on the role of education on radiation as a possible solution to the problem.
R many

17,154
Sheehe, P.R. A TEST OF PREDICTIONS BASED ON CAUSAL HYPOTHESES. Hum. Biol., May 1960, 32(2), 162-184. (Rosewell Park Memorial Institute, Buffalo, N.Y.).

17,154

The need for prediction based on a causal hypothesis in the observational studies is discussed. The following four criteria are proposed for a test of a prediction: 1) a fairly large number of varying conditions should be available for analysis; 2) a prediction of variation under varying conditions should be specified; 3) the prediction should account for a significant amount of variation (significant agreement, based on linear models); 4) the residual unpredicted variation should not be significantly large (insignificant disagreement, linear model). This proposed test of a prediction is not meant to prove or disprove causation; it puts the causal hypothesis through a rigorous trial. An illustration of this is made with the findings analyzed and explained in terms of the above criteria. R. 4

17,155
Reitman, W.R. HEURISTIC PROGRAMS, COMPUTER SIMULATION, AND HIGHER MENTAL PROCESSES. Behav. Sci., Oct. 1959, 4(4), 330-335. (Carnegie Institute of Technology, Pittsburgh, Penn.).

17,155

This section includes 1) a note which discusses the methodological basis for research into higher mental processes--the heuristic computer program--and describes some current developments; and 2) an index of statistical programs available in the following areas in the statistical library of the ILLIAC: matrix operation, other algebraic routine, multivariate analysis, and analysis of variance and covariance.
R 15

17,156
Donahoe, J.W. THE EFFECT OF VARIATIONS IN THE FORM OF FEEDBACK ON THE EFFICIENCY OF PROBLEM SOLVING. J. exp. Psychol., Sept. 1960, 60(3), 193-198. (University of Kentucky, Lexington, Ky.).

17,156

To study problem-solving behavior as a function of the manner in which information regarding prior performance is fed back to the S a total of 60 Ss were used in two experiments in which a geometrical game was the task. Two conditions of feedback were employed: one group of Ss received information about a response from a single source, the second group received information from two sources. Results for the two groups were compared in terms of number of steps required to complete the game and rate of responding.
T. G. R 2

17,157
Reiss, R.F. THE DIGITAL SIMULATION OF NEURO-MUSCULAR ORGANISMS. Behav. Sci., Oct. 1960, 5(4), 343-358. (Laboratory for Automata Research, Librascope Div., General Precision, Inc., Binghamton, N.Y.).

17,157

The author cites four specific criticisms of current simulation models, describes a particular simulation model (an asychronous nerve-net model), and comments on general problems connected with simulation studies. The second section of this paper describes technical features of the simulation program designed for the model which provide "important advantages in economy and flexibility.
I. R 26

17,158
McGuigan, F.J., Crockett, Frances & Bolton, Carolyn. THE EFFECT OF KNOWLEDGE OF RESULTS BEFORE AND AFTER A RESPONSE. J. gen. Psychol., July 1960, 63(First Half), 51-55. (Dept. of Psychology, Hollins College, Hollins College, Va.).

17,158
Under investigation was the temporal effect of knowledge of results. The hypothesis tested was that knowledge of results provided just prior to response might be a superior condition to that of providing knowledge of results shortly after the response was made. A line-drawing task performed while blindfolded was administered to four groups of 14 subjects. The four conditions used varied in terms of when knowledge of results was given to the subject.
T. R 10

17,159
Oswald, I. NUMBER-FORMS AND KINDRED VISUAL IMAGES. J. gen. Psychol., July 1960, 63(First Half), 81-88. (Institute of Experimental Psychology, Oxford University, Oxford, England).

17,159
This study examined visual images named "number-forms" (individual numbers occur in constant spatial relationship to one another and to the observer). The author discussed the frequency of the "forms," the conditions under which "forms" are experienced, whether or not the "forms" are mnemonics, their flexibility, and their alleged usefulness. The conclusions of the author were presented.
I. R 14

17,160
Horne, E.P. & Hart, H.C. PERCEPTUAL THRESHOLDS AND SPONTANEOUS CORTICAL RHYTHMS. J. gen. Psychol., April 1960, 62(Second Half), 185-188. (Dept. of Psychology, University of Florida, Gainesville, Fla.).

17,160
The purpose of this experiment was to relate measures of visual perception to specific functions of the human brain. The hypotheses tested were: 1) mean alpha frequency may be related to perceptual thresholds, and 2) mean alpha percent time, as a measure of the prepatory state, may also be related to perceptual threshold. Monopolar recordings of electrical activity of the cortex were obtained and the perceptual threshold for complex materials was measured by using a mirror tachistoscope.
T. R 6

17,161
Ammons, Carol H. TEMPORARY AND PERMANENT INHIBITORY EFFECTS ASSOCIATED WITH ACQUISITION OF A SIMPLE PERCEPTUAL-MOTOR SKILL. J. gen. Psychol., April 1960, 62 (Second Half), 223-245. (Dept. of Psychology, University of Montana, Missoula, Mont.).

17,161
To determine for an easy perceptual-motor task, with a fairly small motor component: 1) the relationship between performance level and duration of intertrial rests, duration of a single rest, duration of trials, and rest-period activity; 2) the relationship between duration of prior continuous practice and amount of reactive inhibition developed; and 3) the relationship between duration of prior continuous practice and the amount of conditioned inhibition, three experiments were conducted with a total of 960 Ss tested. The results were presented and discussed in terms of the hypotheses set forth by Hull and Kimble.
T. G. R 27

17,162
Chiang, C.L. A STOCHASTIC STUDY OF THE LIFE TABLE AND ITS APPLICATIONS: II. SAMPLE VARIANCE OF THE OBSERVED EXPECTATION OF LIFE AND OTHER BIOMETRIC FUNCTIONS. Hum. Biol., Sept. 1960, 32(3), 221-238. (University of California, Berkeley, Calif.).

17,162
Presented in this paper is an application of the theoretical probability distribution of biometric functions in the life table to actual problems of statistical inference. The necessary formulas are presented and explained and cohort life tables are presented. Emphasis is placed on the sample variance of the observed expectation of life.
T. R 16

17,163
Stoudt, H.W., Damon, A. & McFarland, R.A. HEIGHTS AND WEIGHTS OF WHITE AMERICANS. Hum. Biol., Dec. 1960, 32(4), 331-341. (Dept. of Industrial Hygiene & Guggenheim Center for Aviation Health and Safety, Harvard School of Public Health, Boston, Mass.).

17,163
This paper presented "average" heights and weights for white males and females in the United States from birth to old age. The figures were based on published and unpublished data obtained from seven sources. The application and need of such data in the biological field was stressed and the limitations of the present study were noted and discussed.
T. R many

17,164
Bradley, J.V. & Wallis, R.A. SPACING OF TOGGLE SWITCH ON-OFF CONTROLS. Engng. Industr. Psychol., Spring 1960 2(1), 8-19. (USAF Aero Medical Lab., Wright-Patterson AFB, Ohio & Antioch College, Yellow Springs, Ohio).

17,164
This experiment was designed to investigate efficiency in the human operations of toggle switches as a function of the spacing between controls. The efficiency with which a miniaturized toggle switch could be operated as compared with the usual size of toggle switches was also investigated. Thirty-six Ss were used to test these types of switches at three different positions. The limitations of the experimental design were discussed and the application of toggle switches as compared to pushbutton controls was noted.
T. G. R 2

17,165
Pierce, B.F. MANUAL FORCE CAPABILITIES OF A PILOT IN A FULL-PRESSURE SUIT--TECHNIQUES OF MEASUREMENT AND DATA PRESENTATION. Engng. Industr. Psychol., Spring 1960, 2(1), 27-33. (Convair Astronautics, General Dynamics Corporation, Groton, Conn.).

17,165
This investigation was concerned with developing techniques for measuring the force a pilot in an inflated full pressure suit can exert on manual controls of various types in various locations. Also sought was a method of presenting these data in a form amenable to direct application by the design engineer. Six types of measurement were taken; four were concerned with torque and two with forces involved in pulling and pushing.
T. I. R 3

17,166
Holstein, D. EFFECTS OF TARGET WIDTH AND CROSSHAIR WIDTH ON TRACKING PERFORMANCE. J. appl. Psychol., Dec. 1960, 44(6), 365-369. (International Business Machines Corporation, Bethesda, Md.).

17,166
The purpose of this study was to investigate the problem of perceptual discrimination in tracking by studying target width and crosshair width simultaneously. A compensatory tracking task was performed by ten Ss. The target widths ranged from 1/32 to 1 inch and the crosshair widths ranged from 1/64 to 1/2 inch and were projected on a ground glass screen. Each S served under the 36 conditions twice. Error scores, time scores, and the interaction effects obtained were discussed.
T. G. R 6

17,167
Garvey, W.D. A COMPARISON OF THE EFFECTS OF TRAINING AND SECONDARY TASKS ON TRACKING BEHAVIOR. J. appl. Psychol., Dec. 1960, 44(6), 370-375. (USN Research Lab., Washington, D.C.).

17,167
A compensatory tracking task was performed by six Ss. The performance of a man-machine system was analyzed in terms of absolute error and lead or lag error scores to compare the effects of training and secondary tasks on these measures. The secondary tasks which were given to the Ss on separate days were an arithmetic task, a visual task, and a motor task.
G. I. R 3

17,168
Creamer, L.R. & Trumbo, D.A. MULTIFINGER TAPPING PERFORMANCE AS A FUNCTION OF THE DIRECTION OF TAPPING MOVEMENTS. J. appl. Psychol., Dec. 1960, 44(6), 376-380. (Kansas State University, Lawrence, Kan.).

17,168
This investigation was designed to systematically study the relationship between multiple finger tapping performance and the direction of tapping movements. Five nontypists had their performance recorded for 20 consecutive days. Each day constituted a session which included a three-minute trial at each of five keyboard angles ranging from 0 to 88 degrees from the normal horizontal position. The results were discussed and the need for further research with typists and with additional tasks was pointed out.
T. G. R 8

17,169
Rimland, B. MULTIDIMENSIONAL SCATTERPLOTTING: A GRAPHIC APPROACH TO PROFILE ANALYSIS. J. appl. Psychol., Dec. 1960, 44(6), 404-406. (USN Personnel Research Field Activity, San Diego, Calif.).

17,169
Discussed here is a graphic approach to portraying multidimensional relationships. The approach consists of a bivariate scatterplot with coded symbols introduced on it. It appears to be a simple and easy technique to use but does demand multiple sampling. The limitations and possible approaches in strengthening the method are also discussed.
G. R 5

17,170
Wilkie, D.R. MAN AS A SOURCE OF MECHANICAL POWER. Ergonomics, Jan. 1960, 3(1), 1-8. (Dept. of Physiology, University College, London, England).

17,170
Discussed here were the physiological aspects of muscular exercise as a source of mechanical power in man as well as the chemical and mechanical considerations. The results from several types of exercises were collected and a distinction was made between champion athletes and healthy nonathletes. The exercises performed were: 1) running, 2) rowing, 3) pedal-cycling, and 4) pedal-cycling with hand-cranking.
G. R many

17,171
Rasch, P.J. & Pierson, W.R. EVALUATION OF A SUBMAXIMAL TEST FOR ESTIMATING PHYSICAL WORK CAPACITY. Ergonomics, Jan. 1960, 3(1), 9-16. (Research Center, College of Osteopathic Physicians and Surgeons, Los Angeles, Calif.).

17,171
The purpose of this study was to evaluate the reliability and validity of the Bruce Physical Fitness Index (PFI) when used in testing athletes and normal, healthy nonathletes. The Bruce PFI was determined for four groups of Ss: 1) 26 healthy adult college males, 2) 11 volunteers from a high school cross-country team, 3) ten volunteers from a high school and a college football team, and 4) six healthy male college students representing a wide range of body types. Differences in oxygen concentration between inspired and expired air was measured in all tests, and total oxygen consumption and heart rate were recorded.
T. R 6

17,172
Redfearn, J.W.T. THE EOSINOPENIA OF PHYSICAL EXERCISE. Ergonomics, Jan. 1960, 3(1), 17-29. (USA Operational Research Group, West Byfleet, Surrey, England & Clinical Psychiatry Research Group, Graylingwell Hospital, Chichester, England).

17,172
This paper investigated how the degree of eosinopenia is a function of severity and duration of an exercise. Nineteen physically fit soldiers were required to march for certain lengths of time at constant speed on various gradients and carrying different loads. Five experiments were conducted and may be identified accordingly: 1) the eosinopenia effect of a day's march, 2) the effect of varying the duration of the exercise, 3) temporal characteristics of the eosinopenia, 4) marching to exhaustion, and 5) obtaining a mean count for a group of individuals.
T. G. R many

17,173
Fletcher, J.G., Lewis, H.E. & Wilkie, D.R. HUMAN POWER OUTPUT: THE MECHANICS OF POLE VAULTING. Ergonomics, Jan. 1960, 3(1), 30-34. (Div. of Human Physiology, National Institute for Medical Research, Hampstead, London, England & Dept. of Physiology, University College, London, England).

17,173
Slow motion cine-photography was used to study the performance of five pault vaulters. A Kodak Cine Special camera was setup about 100 ft. from the vaulting path and at right angle to it. Movements of the center of gravity of the body were obtained and velocities were measured at various key points during each vault. The kinetic energy was calculated from the velocity after each take-off. The results were discussed and the characteristics of the most successful jump were considered.
G. I. R 3

17,174
Cope, F.W. PROBLEMS IN HUMAN VIBRATION ENGINEERING. Ergonomics, Jan. 1960, 3(1), 35-43. (USN Aviation Medical Acceleration Lab., Johnsville, Penn.).

17,174
This paper discusses the ways in which vibration is transmitted from vehicle to man and the methods of preventing such transmission. The anatomical, physiological, and performance changes which can be caused by the vibration are also discussed. The relationship of experimental work to practical problems are considered and the difficulties involved are emphasized. Approaches to vibration protection are also considered.
G. I. R 19

17,175
Hopkinson, R.G. AN EXPERIMENT ON THE ASSESSMENT OF BRIGHTNESS UNDER 'FREE-CHOICE' AND 'FORCED-CHOICE' CONDITIONS BY A GROUP OF OBSERVERS. Ergonomics, Jan. 1960, 3(1), 44-50. (Dept. of Scientific & Industrial Research, Building Research Station, Garston, Watford, Hertfordshire, England).

17,175
This experiment was conducted to obtain assessments of brightness under controlled conditions. The experiment consisted of the judgment by all of the observers simultaneously of the subjective magnitude of each of a series of ten luminances presented in random order. The Ss were allowed to assign numbers to the luminances provided that the high numbers corresponded to a bright luminance and a low number to a low luminance. Judgments were made under free choice of numbers and forced choice of numbers. The important aspect of the experiment was the relation between the numbers chosen and the corresponding physical luminances.
G. R 2

17,176
Brown, I.D. VISUAL AND TACTUAL JUDGMENTS OF SURFACE ROUGHNESS. Ergonomics, Jan. 1960, 3(1), 51-61. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,176
This paper reported on an initial study of comparative judgments of surface roughness. The experiment was designed to answer the following questions: 1) Which sensory modality is being used most by the skilled operator in making judgments? 2) Can the inspection conditions be improved? and 3) How does the performance of skilled Ss differ from that of unskilled? The method of paired comparisons was used with nine wooden surfaces of different degrees of roughness. Each S made a set of 36 judgments under each of five conditions. The results were discussed, and the performance of the skilled and unskilled Ss was compared.
T. I. R 4

17,177
Seminara, J.L. ACCURACY AND SPEED OF TACTUAL READING: AN EXPLORATORY STUDY. Ergonomics, Jan. 1960, 3(1), 62-67. (Lockheed Aircraft Corp., Sunnyvale, Calif.).

17,177
This study was designed to determine the ability of individuals to tactually read words presented to them. Ninety test words were prepared which ranged from two to seven letters in length. Six subjects, three male and three female, were tested; and the results were examined in terms of speed, accuracy, and the effects of practice.
T. G. R 2

17,178
Pepler, R.D. WARMTH, GLARE AND A BACKGROUND OF QUIET SPEECH: A COMPARISON OF THEIR EFFECTS ON PERFORMANCE. Ergonomics, Jan. 1960, 3(1), 68-73. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,178
Two experiments were conducted to investigate the mechanism responsible for performance changes in an unusually warm environment. The task was a perceptually difficult form of pursuit tracking. In the two experiments, the effects of warmth on performance were compared with the effects of: 1) glare from a naked electric lamp, and 2) a quietly spoken but interesting narrative. The aspects of performance measured were the error alignment and the number of times the pointer reversed its direction of movement. The statistical significance of the results was tested by an analysis of variance technique.
T. G. R 9

17,179
Murrell, K.F.H. & Tucker, W.A. A PILOT JOB STUDY OF AGE-RELATED CAUSES OF DIFFICULTY IN LIGHT ENGINEERING. Ergonomics, Jan. 1960, 3(1), 74-79. (Unit for Research on Employment of Older Workers, University of Bristol, Bristol, England).

17,179
This pilot study was designed to identify some of the factors in the light engineering industry job situation which might be related to age. Fifteen factors were rated and were divided into two sections: 1) environment (light, noise, heat, and atmosphere); and 2) activity (lifting, applying force, body movement, etc.). Each type of machine was rated separately and the age of the man working on it was noted. Of the 15 factors originally rated, six remained following the analysis of the results.
T. R 3

17,180
Cotes, J.E. & Meade, F. THE ENERGY EXPENDITURE AND MECHANICAL ENERGY DEMAND IN WALKING. Ergonomics, April 1960, 3(2), 97-119. (Pneumoconiosis Research Unit of the Medical Research Council, Llandough Hospital, Penarth, Glam, England).

17,180
This study was concerned with deriving some relationships between the variables involved in walking which provide a broader basis from which to predict energy expenditures and which are of theoretical and practical interest. Ten subjects walked on a motor treadmill at various speeds in a flat position and in up and down gradients. The subjects also did stepping exercises. Anthropometric measurements were made of leg length, foot length, and weight; the relationship between these measures and the previous findings were discussed.
T. G. R 25

17,181
Lippold, O.C.J., Redfearn, J.W.T. & Vuco, J. THE ELECTROMYOGRAPHY OF FATIGUE. Ergonomics, April 1960, 3(2), 121-131. (Dept. of Physiology, University College, London, England & Psychiatric Research Group, Graylingwell Hospital, Chichester, England).

17,181
The changes in the electrical activity of muscles during and after voluntary fatigue were discussed. The records were obtained from whole muscles using surface suction electrodes of silver. Tension records were obtained from the calf muscles, triceps muscles, and small hand muscles. Recordings of the mechanical tremors were made with a mechano-electronic transducer. A full discussion of the records obtained followed.
G. I. R 4

17,182
Page, J.K. SOME ERGONOMIC PROBLEMS CONFRONTING THE BUILDING DESIGNER. Ergonomics, April 1960, 3(2), 133-140. (Dept. of Building Science, University of Liverpool, Liverpool, England).

17,182
This paper discusses the need for building designers to recognize the knowledge that the science of ergonomics can offer him in the architectural design and construction of buildings. The problems facing the workman on building sites are discussed as are anthropometric and postural factors, energy expenditure, and environmental factors important to the building user. The need for further research and investigation of the many ergonomic problems facing the designer and contractor is stressed.
R 16

17,183

The optimal form and dimensions of handgrips for handling certain types of concrete building blocks which would serve to reduce the physiological work load were investigated. A series of 29 sets of handgrips were designed on the basis of anthropometric data. The subjects lifted and replaced the models over a fixed height according to a prescribed schedule. Pulse rates and oxygen consumption were measured during the work performed. An optimal form was chosen and the reasons were cited.
T. I. R 4

17,184

Brown, I.D. MANY MESSAGES FROM FEW SOURCES. Ergonomics, April 1960, 3(2), 159-168. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,184

This experiment was designed to investigate the differences between separate sources displays and combined sources displays by studying choice reaction times in these two systems. Displays were compared at three-choice, seven-choice, and fifteen-choice levels with speed and accuracy of response the criterion of efficiency. The results were fully discussed with the differences between displays and the differences between choices noted.
T. G. I. R 10

17,185

Simon, J.R. CHANGES WITH AGE IN THE SPEED OF PERFORMANCE ON A DIAL SETTING TASK. Ergonomics, April 1960, 3(2), 169-174. (State University of Iowa, Iowa City, Iowa).

17,185

This study was concerned with the differential effects of aging on the parts of a simple repetitive motor task. Also investigated were the effects on movement durations of changing the precision requirements of different components of a task as related to age. Two groups of Ss were studied: a young group ranging from 18 to 34 years of age and an older group ranging from 59 to 85 years of age. The results were presented and a discussion concerning the decrement of performance with age followed.
T. I. R 12

17,186

Welford, A.T. THE MEASUREMENT OF SENSORY-MOTOR PERFORMANCE: SURVEY AND REAPPRAISAL OF TWELVE YEARS' PROGRESS. Ergonomics, July 1960, 3(3), 189-230. (Psychological Laboratory, Cambridge, England).

17,186

Presented here is a critical survey of the work and progress made in the area of sensory-motor performance with attention directed to the role of information theory, mathematical approaches, and the contribution of physiology in the study of decision processes. Several sets of experimental results are presented and discussed. The need for further work and the implications of the present approach are also discussed.
T. G. R many

17,187

Murrell, K.F.H. A COMPARISON OF THREE DIAL SHAPES FOR CHECK-READING INSTRUMENT PANELS. Ergonomics, July 1960, 3(3), 231-244. (University of Bristol, Bristol, England).

17,187

Three dial shapes were compared in a watchkeeping task to determine the ease of check reading and ease of qualitative reading. Three simulated panels containing 18 dials were arranged in rows of six. Panel A consisted of circular dials of 8.2 cm in diameter; Panel B consisted of drums 8.2 cm in diameter; and Panel C consisted of scales similar to Panel B but with radii of 4.1 cm. A heterogeneous group of 72 Ss were divided into three groups and each group was tested on a single panel.
T. G. I. R 7

17,188

Poulton, E.C. A NOTE ON PRINTING TO MAKE COMPREHENSION EASIER. Ergonomics, July 1960, 3(3), 245-248. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,188

This paper examines some of the experimental evidence concerning the relation of style of printing to the rate of comprehension of the reader. The limitations of these studies are pointed out, and the difficulties in interpreting the results obtained are considered. The need for further experiments studying style for particular purposes is stressed.
T. R 7

17,189

Coombs, C.H. & Pruitt, D.G. COMPONENTS OF RISK IN DECISION MAKING: PROBABILITY AND VARIANCE PREFERENCES. J. exp. Psychol., Nov. 1960, 60(5), 265-277. (University of Michigan, Ann Arbor, Mich.).

17,189

This study was designed to test the adequacy of a concept of variance preference as opposed to a nonlinear utility for money, to test for the existence of preference for skewness, and to explore the possibility of an interrelation between variance and skewness preference if they exist. Five sets of bets were constructed and used as stimuli. Three sets were used to study variance preference under constant probability treatment, and two sets were used to study skewness preference in constant variance treatment. Inconsistency of preference, stochastic transitivity, and the stability and interactions of preference patterns were measured and analyzed.
T. R 12

17,190

Mednick, S.A. & Freedman, J.L. FACILITATION OF CONCEPT FORMATION THROUGH MEDIATED GENERALIZATION. J. exp. Psychol., Nov. 1960, 60(5), 278-283. (Harvard University, Cambridge, Mass.).

17,190

Thirty subjects were tested with one of two paired association lists and a concept formation list. A technique using the mediated generalization paradigm was used to increase the strength of response dominance and to facilitate concept formation. The results were discussed and an explanation of the process of facilitation was offered and supported by the findings.
T. R 8

17,191

Kaplan, I.T. & Ripps, H. EFFECT ON VISUAL THRESHOLD OF LIGHT OUTSIDE THE TEST AREA. J. exp. Psychol., Nov. 1960, 60(5), 284-289. (Postgraduate Medical School, New York University, New York, N.Y.).

17,191

This experiment was designed to study the influence of luminance, number and location of inducers in the fovea and in the periphery upon the luminance threshold of a test field. The test field was circular and surrounded by several inducers which were equidistant from the test field. The results were presented and discussed.
T. G. I. R 12

17,192

Oyama, T. FIGURE-GROUND DOMINANCE AS A FUNCTION OF SECTOR ANGLE, BRIGHTNESS, HUE, AND ORIENTATION. J. exp. Psychol., Nov. 1960, 60(5), 299-305. (Hokkaido University, Japan).

17,192
This study was concerned with the factors related to the figure-ground phenomenon. The study was designed to obtain some quantitative data concerning the factors which make a given part of a visual field appear more frequently as figure. The chief variables investigated were area or visual angle, brightness, hue, and orientation of the figure.
G. I. R 14

17,193
Myers, J.L. & Sadler, E. EFFECTS OF RANGE OF PAYOFFS AS A VARIABLE IN RISK TAKING. J. exp. Psychol., Nov. 1960, 60(5), 306-309. (University of Massachusetts, Amherst, Mass.).

17,193
Reported was an experiment designed to investigate decisions in risk taking. Subjects were required to choose between a known risk and an unknown risk on each of 100 trials. The unknown outcomes consisted of a range of variables which was the major independent variable in the study.
T. G. R 2

17,194
Meyer, D.R., Sukemune, S. & Myers, R. LOCAL VARIATIONS IN THE MAGNITUDE OF A FIGURAL AFTEREFFECT. J. exp. Psychol., Nov. 1960, 60(5), 314-317.

17,194
This study was designed to test the assumption that the visual cortex is involved in the basic interactions that give rise to the phenomenon of figural aftereffect. The experiment consisted of measuring the magnitude of figural displacement as a function of the positions of the figures in the visual field. Two Ss were tested by using the method of constant stimuli.
G. R 12

17,195
Adams, J.A. & Xhignesse, L.V. SOME DETERMINANTS OF TWO-DIMENSIONAL VISUAL TRACKING BEHAVIOR. J. exp. Psychol., Dec. 1960, 60(6), 391-403. (University of Illinois, Urbana, Ill.).

17,195
This experiment was designed to explore performance on a pursuit tracking task with two visual stimulus sources. Studied were two values of spatial separation, stimulus coherency, and speed of event change in the two-dimensional discrete visual tracking task. The two by two by two factorial design was used to analyze the data.
T. G. R many

17,196
Levy, L.H. WEBER FRACTION ANALOGUES IN SOCIAL PERCEPTION. Percept. Mot. Skills, Dec. 1960, 11(3), 233-242. (Indiana University, Bloomington, Ind.).

17,196
The objectives of this study are to determine whether a basis exists for asserting the existence of Weber Fraction Analogues (WFA) in social perception and to test two hypotheses relating the magnitude of WFA to the meaningfulness of the issue on which groups are divided and whether the individual is in agreement or disagreement with the majority on the issue. A modified method of adjustment is used with Ss having to express how much larger one of two groups of equal size would have to be for them to feel that a real difference between the groups exists. The results are presented and the hypotheses are discussed in terms of the findings.
T. G. R 4

17,197
Arnoult, M.D. & Lewis, J.T.,III. FORM DISCRIMINATION DURING BRIEF EXPOSURES. Percept. Mot. Skills, Dec. 1960, 11(3), 259-260. (Texas Christian University, Fort Worth, Tex. & University of Mississippi, University, Miss.).

17,197
This report partially replicates a previous study (553) which investigated same (S, stimulus paired with itself) and different (D, stimulus paired with one of its own class) discrimination of nonsense forms (80). Subjects (16) observed tachistoscopically ten S and ten D pairs at each exposure time (10, 20, 30, 40, and 50 msec.). No single pair was seen more than once by any S. Data were mean errors in shape discrimination. Results were related to those of Arnoult's prior experiment.
T. R 3

17,198
Arnoult, M.D. PREDICTION OF PERCEPTUAL RESPONSES FROM STRUCTURAL CHARACTERISTICS OF THE STIMULUS. Percept. Mot. Skills, Dec. 1960, 11(3), 261-268. (Texas Christian University, Fort Worth, Tex.).

17,198
This study represented a further investigation into the generality of the multiple correlational approach to form perception. Stimuli (72), which were two-dimensional, closed-contour nonsense forms, were administered to investigate the predictability of judgments of familiarity, meaningfulness, size, and complexity. A separate group of 100 Ss was used to obtain each of the four kinds of judgments. Physical measures of the stimuli were made and correlations between the physical variables of the four kinds of judgments were made.
T. I. R 12

17,200
Jensen, G.D. EFFECT OF PAST EXPERIENCE UPON INDUCED MOVEMENT. Percept. Mot. Skills, Dec. 1960, 11(3), 281-288. (University of New Mexico, Albuquerque, N.M.).

17,200
Two experiments were designed to determine: 1) if induced backward movement is as easy to produce as induced forward movement with stimuli eliciting a forward directional basis, and 2) if induced movement can be produced when the lateral extent of the stimulus field is constant. 1) Fifty-two Ss in a dark room fixated a stationary luminous airplane silhouette while a luminous bar was moved laterally right or left; 2) 28 Ss fixated a stationary luminous ship silhouette while "waves" moved laterally right or left but the lateral extent remained constant. The results were discussed in terms of the Bruell-Albee theory and their significance as new evidence.
I. R 14

17,201
Gollin, E.S. DEVELOPMENTAL STUDIES OF VISUAL RECOGNITION OF INCOMPLETE OBJECTS. Percept. Mot. Skills, Dec. 1960, 11(3), 289-298.

17,201
To determine how complete the representation of a common object must be to be recognized and the extent to which this necessary completeness may be reduced after training, four studies were made: 1) 53 children were given 11 series of five cards each of varying grades of completeness; 2) 22 children in an experimental group were given a recognition test of 20 series, ten naming trials on ten complete pictures, then a recognition test, and seven Ss were control; 3) nine children and 18 adults were tested with the most reduced representations; 4) 40 children were trained on intermediate and complete representations and tested on reduced representations, then children and adults were compared.
T. I. R 3

17,202
Buegel, H.F. & Byers, Laura J. MOVEMENT TIME FROM C TO ALL PIANO KEYS WITHIN FOUR OCTAVES ABOVE THIS C. Percept. Mot. Skills, Dec. 1960, 11(3), 299. (University of North Dakota, Grand Forks, N.D.).

17,202
This paper presented only the final summary data (mean movement time for each S in msec.) and original instructions of a study done about 1941 on the relationship between time of movement and distance. Each of ten Ss struck successively, as rapidly as possible, on individual trials, two keys, the lowest C (which started a Dunlap chronoscope) and each of the white keys (which stopped it) to and including c''', four octaves above. A Virgil silent practice keyboard was used. A brief discussion of the results was given.
T.

17,203
Smith, D.E.P. SERUM CORRELATES OF PERCEPTUAL ERRORS IN PROBLEM READERS. Percept. Mot. Skills, Dec. 1960, 11(3), 300. (University of Michigan, Ann Arbor, Mich.).

17,203
Within one syndrome of reading and behavior disorder there is a subgroup which is especially prone to making substitutions and omissions in reading. To investigate the possibility of sub-clinical hypoparathyroidism, eight males, 14 to 18 years, of normal intelligence, and severely retarded in reading were given serum tests of calcium, pH, albumin, globulin, ratio of protein fractions, total protein, and cholesterol. On the basis of four of the above tests, two groups were found. Results were briefly discussed.
G. R 2

17,204
Wright, B. & Gardner, B. EFFECT OF COLOR ON BLACK AND WHITE PICTURES. Percept. Mot. Skills, Dec. 1960, 11(3), 301-304. (University of Chicago, Chicago, Ill. & Social Research, Inc., Chicago, Ill.).

17,204
This report described the effect of red, blue, and yellow on the meaning of three black and white pictures. An Osgood "semantic differential" of 29 adjective-pairs was used to measure meaning with 930 Ss. Judgments of three colors alone and of four versions of each of three pictures (black and white and one in each color) were obtained. The average ratings of the three colored versions of the three pictures on each adjective-pair were analyzed in 29 three by three analyses variance. Explanations of the results were given.
T. R 12

17,205
Powers, W.R., Clark, R.K. & McFarland, R.L. A GENERAL FEEDBACK THEORY OF HUMAN BEHAVIOR: PART II. Percept. Mot. Skills, Dec. 1960, 11(3), 309-323. (US Veterans Administration Research Hospital, Chicago, Ill. & Northwestern University Medical School, Evanston, Ill.).

17,205
This paper is Part II of a two-part theory of human behavior and outlines applications of the feedback principles to behavior. Six hypothesized levels (Order Systems) of perceptual variables associated with human feedback control systems ranging from spinal reflexes to systems which perceive and maintain orderliness and system concepts are described. Included is a demonstration of each order and a description of an organizing system.

17,206
Costello, C.G. FURTHER OBSERVATIONS ON THE SPIRAL AFTEREFFECT. Percept. Mot. Skills, Dec. 1960, 11(3), 324. (Institute of Psychiatry, Maudsley Hospital, University of London, London, England).

17,206
Two studies were designed to investigate some observations made in preliminary work with the spiral, which had four throws of 180 degrees and was spun at 100 rpm. In Experiment I, 18 Ss were given four trials (expansion aftereffect and contraction aftereffect, the aftereffect being projected onto the spiral itself, and two more with the aftereffect projected on a photograph of the spiral). In Experiment II, six Ss were given expansion aftereffect followed by contraction aftereffect, using a photograph of the spiral, and six were given reversed order. The differences were tested for significance and results compared with other literature.
R 4

17,207
Jacobs, H.L., Levenspiel, O., Rhodes, H.J. & Elwell, R. A HYDROSTATIC OIL BEARING TURNTABLE SYSTEM FOR THE LABORATORY STUDY OF SOME ASPECTS OF WEIGHTLESSNESS. Percept. Mot. Skills, Dec. 1960, 11(3), 333-336. (Bucknell University, Lewisburg, Penn.).

17,207
Described here is the rational and general characteristics of an experimental apparatus which has been used to study human performance under conditions similar to weightlessness without attempting to duplicate all the subjective aspects of the phenomenon. The necessity of not having bearing contact between the outer surface of the individual's body and its surrounds in weightlessness is emphasized. How this is accomplished in the present apparatus is described.
I. R 10

17,208
Simmonds, D.C.V. AN INVESTIGATION OF PILOT SKILL IN AN INSTRUMENT FLYING TASK. Ergonomics, July 1960, 3(3), 249-253. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,208
This experiment was designed to investigate the possibility of using consistency as a measure of skill in relation to an aircraft pilot's performance. Two complex flying maneuvers were performed twice by 17 pilots with varying degrees of skill. Each S's performance was analyzed in terms of deviation from the perfect pattern. Consistency scores were obtained by considering separately for each instrument the two identical maneuvers carried out by each S on his two separate flights. The effects of accuracy were also examined.
T. I. R 2

17,209
McKendry, J.M., Corso, J.F. & Grant, G. THE DESIGN AND EVALUATION OF MAINTAINABLE PACKAGING METHODS FOR ELECTRONIC EQUIPMENT. Ergonomics, July 1960, 3(3), 255-272. (HRB-Singer, Inc., State College, Penn.).

17,209
Presented here are the results of a study designed to develop and evaluate several new methods of packaging electronic equipment. Three techniques were devised: 1) a "component grouping" method, 2) a "circuit grouping" method, and 3) a "logical flow" method. Each was evaluated against the standard packaging method by determining the degree to which the performance of technicians was effected by trouble-shooting each type. Two skill levels of technicians were used: 1) those just completing training, and 2) those with more training and experience. Also, two levels of equipment complexity were used.
T. G. I. R 14

17,210
Spitz, H.H. & Lipman, R.S. RELIABILITY AND INTERCORRELATION OF INDIVIDUAL DIFFERENCES ON VISUAL AND KINESTHETIC FIGURAL AFTEREFFECTS. Percept. Mot. Skills, June 1960, 10(3), 159-166. (Edward R. Johnstone Training and Research Center, Bordentown, N.J.).

17,210

Since some general factor theories of brain processes use aftereffects as an operational index of generalized individual differences in brain function, this experiment was done to see if a high correlation exists between Ss' scores on aftereffects tests. Two average visual aftereffect (VAE) scores and one average kinesthetic aftereffect (KAE) score were obtained for each of 154 Ss divided into two equal groups with the following schedules: 1) VAE, KAE, five-minute rest, KAE, VAE; and 2) KAE, VAE, five-minute rest, VAE, KAE. Judgments were made fairly rapidly on both tasks. Test-retest tetrachoric correlations, eight intercorrelations, recovery rates, and satiation scores were discussed in relation to previous similar studies.
T. R 16

17,211

Hanson, J.A. & Jones, F.P. A "COLOR CLOCK" FOR USE IN CODING STROBOSCOPIC MULTIPLE-IMAGE PHOTOGRAPHS. Percept. Mot. Skills, June 1960, 10(3), 193-194. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.).

17,211

This article describes the method of using a "color clock" for color coding photographs of complex human movements in reaction time studies. The "color clock" records both the sequence of colors and the time interval between the stimulus and the first flash of the strobe. The example given is the movements of getting up from a chair on signal.
I. R 1

17,212

Engen, T. EFFECT OF PRACTICE AND INSTRUCTION ON OLFACTORY THRESHOLDS. Percept. Mot. Skills, June 1960, 10(3), 195-198. (Brown University, Providence, R.I.).

17,212

This is a study of olfactory thresholds as measured by a forced-choice method of limits. To study the effects of practice and variations in instructions on "limits" of sensitivity, Ss first sniffed four test tubes (three contained benzyl benzoate and one a dilution of an odorant) and then indicated which contained the odorant with which he had been familiarized earlier at 100 percent concentration. Odorants used were amyl acetate, phenylethyl alcohol, heptane, heptanal, diacetone alcohol, and vanillin. A random order was used for the position of the tube with the odorant. There was no time limit for judgments after which S was told the correct test tube. When S made two correct choices successively, testing ceased. Results were graphically presented and were discussed.
G. I. R 4

17,213

Platz, A., Uhr, L. & Miller, J.G. A PILOT EXPERIMENT ON THE EFFECTS OF MEPROBAMATE ON STEREOSCOPIC RETINAL RIVALRY OF COMPLEMENTARY COLORS. Percept. Mot. Skills, June 1960, 10(3), 230. (Mental Health Research Institute, University of Michigan, Ann Arbor, Mich.).

17,213

To discover tests that might be sensitive to the effects of the tranquilizer meprobamate, 12 normal Ss, after ingestion of 1) 1200 mg meprobamate and, serving as their own controls, 2) matching placebos (lactose), were given the following seven simple perceptual tasks: 1) binocular accomodation, blur; 2) binocular accomodation, recovery; 3) color form attitude; 4) Sander illusion; 5) Mueller-Lyer illusion; 6) autokinetic effect, latency; and 7) stereoscopic test of color oscillation. A double-blind, counterbalanced design was used. Results of this study were briefly discussed.
R 2

17,214

Berryman, R. A PHYSICAL MODEL FOR THE EXPERIMENT. Percept. Mot. Skills, Aug. 1960, 11(1), 3-12. (Adelphi College, Garden City, N.Y.).

17,214

This paper describes a physical model (a switching circuit with a push button representing the experimental variable, three levers representing three independent variables, and red and green pilot lamps representing two dependent variables) for the controlled experiment. The model, intended for use in instruction, illustrates: the concepts of independent and dependent variables, relations between variables, control, several problems involved in applying Mill's canons of experimental inference to empirical data; and it provides a basis for discussion of research methodology.
T. I. R 9

17,215

Mukherjee, B.N. RELIABILITY ESTIMATES FOR A MODIFIED TWO-HAND COORDINATION TEST. Percept. Mot. Skills, Aug. 1960, 11(1), 13-14. (Bureau of Educational and Vocational Guidance, Bihar, Patna, India).

17,215

To obtain several reliability estimates for a simple psychomotor task, a modified Two-hand Coordination Test on which performance changed from tracing to tracking was used. The subject was to move a pin 0.2 cm in diameter through a tracking path 0.6 cm wide by appropriate turning of two handles. The tracking path, 25 cm long, consisted of three increasingly complex sections. Reliability coefficients estimated by different procedures (odd-even time, odd-even errors, odd-even halves, and test-retest) were presented and compared.
T. I. R 4

17,216

Warburton, F.W. EXAMINATION OF PHILPOTT'S THEORY OF THE WORK CURVE BY ORTHODOX STATISTICAL TECHNIQUES. Percept. Mot. Skills, Aug. 1960, 11(1), 29-30. (Dept. of Education, University of Manchester, Manchester, England).

17,216

The purpose of this paper was to examine the validity, by means of more orthodox statistical techniques, of Philpott's conclusions (obtained by plotting experimental results in terms of output, errors, or fluctuations against short time intervals and in geometric time intervals and examined for signs of periodicity) on fluctuations in mental work: 1) curves contain periodic rhythms, fluctuations geometric rather than arithmetic periodicity; and 2) periodicity is due to the presence of "mechanisms of hairspring fineness." The standard tests of randomness used consisted of: 1) Kendall's tests of the number of turning points and of phase lengths, 2) Kermack and McKendrick's length of run, and 3) Wald and Wolfowitz's runs test.
R 6

17,217

Toch, H.H. CAN EYE DOMINANCE BE TRAINED? Percept. Mot. Skills, Aug. 1960, 11(1), 31-34. (Michigan State University, Ann Arbor, Mich.).

17,217

This study attempted to modify eye dominance through training. A set of ten stereograms, each consisting of two dissimilar pictures one of which was strongly dominant, was used. A pre-test to establish dominance was given to 28 Ss. In the training experiment, 16 Ss viewed ten experimental slides successively for ten minutes, the dominant picture to the left eye. A control group of 18 Ss similarly viewed ten stereograms which yielded "fused" or composite images. The sessions of both groups were preceded and followed by a test for eye dominance. Results were discussed in terms of two alternative explanations.
T. R 3

17,218

Chambers, D.A., Pasternak, Rowena & Mueller, H.F. A CLAMP FOR FINGER-SWEAT PRINTS. Percept. Mot. Skills, Aug. 1960, 11(1), 35-38. (Allan Memorial Institute, McGill University, Montreal, Quebec, Canada).

17,218

A finger clamp for recording finger-sweat prints was described. This clamp, providing constant pressure against the finger, control over the area of finger contact, and requiring minimal cooperation from S, was compared with the postal-scale procedure, requiring S to maintain a steady one-lb. force for three minutes. Sweat prints of the middle finger of each hand were obtained by each test for 40 Ss. All prints were coded and rated by an independent judge against a ten-point density scale. After six months, they were rated twice, a week apart, by a second judge. Inter- and intra-reliability coefficients were determined and results were compared.
T. I. R 5

17,219
Klemmer, E.T. DYNAMIC FACTORS IN FORCE JUDGMENT. Percept. Mot. Skills, Aug. 1960, 11(1), 39-42. (International Business Machines Corporation, Bethesda, Md.).

17,219

Sixteen Ss participated in an experiment with force judgments measuring the phenomenon, "the more rapidly a lifted object ascends, the lighter" it seems. Each S lifted an aluminum lever by flexing his elbow with constant force at his wrist. A paired-comparison method was used: the standard required a ten-lb. force at the wrist to lift the lever; the comparison force for one group varied among 8, 9, 9 1/2, 10, 10 1/2, 11, and 12 lb. and remained constant for the other. Subjects made judgments of "harder, same, and easier." Response measures were: 1) time to acquire force to move lever, 2) initial acceleration, 3) time for half response, 4) time for completion, 5) peak velocity. Predictability of judgments was investigated.
T. G. I. R 2

17,220
Zigler, E. SIZE ESTIMATES OF CIRCLES AS A FUNCTION OF SIZE OF ADJACENT CIRCLES. Percept. Mot. Skills, Aug. 1960, 11(1), 47-53. (Yale University, New Haven, Conn.).

17,220

To discover: 1) percentages of larger or smaller judgments made as a function of ratio of size of center circle to adjacent circles, and 2) transition point at which ratio of size of adjacent circles is such that half of the judgments are smaller and half larger, ten Ss judged ten stimuli by the method of paired comparisons. Nine cards had center circles of 2 cm in diameter, the tenth was a single circle 2 cm in diameter. The diameters of adjacent circles were 1/2, 1, 1 1/2, 2, 3, 4, 8, and 10 cm. Subjects were presented with four series of pairs giving two larger and two smaller judgments for each pair. The results were discussed in terms of past studies.
G. I. R 11

17,221
Petrovich, D.V. THE APPERCEPTIVE STUDY OF PSYCHOLOGICAL ASPECTS OF PAIN. Percept. Mot. Skills, Aug. 1960, 11(1), 57. (US Veterans Administration Hospital, Jefferson Barracks, Mo.).

17,221

Because psychological aspects need to be studied in addition to physical and neurological aspects in order to understand pain, the Pain Apperception Test was developed. The test contains 25 pictures (each of which is responded to on a seven-point, multiple-choice scale for intensity and duration of experience) of a man in familiar painful situations. Reliability coefficients have been made; norms need to be developed.
R 4

17,222
Barthol, R.P. KINESTHETIC FIGURAL AFTEREFFECT UNDER A DROWSY STATE INDUCED BY HYPNOSIS. Percept. Mot. Skills, Aug. 1960, 11(1), 58. (University of California, Los Angeles, Calif.).

17,222

To test the idea that satiation is related to kinesthetic figural aftereffect (KAE), the hypothesis that a reduced KAE would occur if satiation took place while Ss were in a drowsy hypnotic state was tested. Six Ss estimated the width of a one and one-half inch bar while blindfolded. They were hypnotized into a drowsy state, rubbed a three-inch wide bar for two 120-second periods for satiation, and were then awakened and estimated the one and one-half inch bar. Results were compared with those of Ss who were satiated while awake and were discussed.
R 2

17,223
Powers, W.T., Clark, R.K. & McFarland, R.L. A GENERAL FEEDBACK THEORY OF HUMAN BEHAVIOR: PART I. Percept. Mot. Skills, Aug. 1960, 11(1), 71-88. (US Veterans Administration Research Hospital, Chicago, Ill.).

17,223

A conceptual model of human behavior, based on some fundamental considerations of feedback theory and leading to a generalized theory of behavior, is presented. Fundamental definitions are given; and discussions of the basic feedback control system, aggregates of feedback control systems, negentropy system, and basic feedback unit modifications are included.
G. I. R 12

17,224
Meltzer, H. WORKERS' PERCEPTUAL STEREOTYPES OF AGE DIFFERENCES. Percept. Mot. Skills, Aug. 1960, 11(1), 89. (Human Relations Research Foundation, St. Louis, Mo.).

17,224

A study of stereotyping is shown to be more realistic if Ss are asked to rank periods of years both in terms of how they feel about them from their own lives and from the lives of others. Thus stereotyping can be studied in terms of the amount of self read into others. Three hundred workers of both sexes and varied ages under the same management with the same work philosophy and in three regions of the United States ranked the following age spans: up to 20, 20 to 35, 35 to 45, 45 to 60, and 60 up. Investigations of age differences in preferences, concepts, and stereotypes; sex differences in Ss' happiness; and regional differences were studied.

17,225
Uhr, L., Platz, A. & Miller, J.G. A PILOT EXPERIMENT ON THE EFFECTS OF MEPROBAMATE AND OF PROCHLORPERAZINE ON TESTS OF COGNITION AND PERCEPTION. Percept. Mot. Skills, Aug. 1960, 11(1), p.90. (Mental Health Research Institute, University of Michigan, Ann Arbor, Mich.).

17,225

To determine toxic effects of tranquilizers on cognition and perception, Ss were randomly assigned to 1) 800 mg meprobamate (15 Ss), 2) 20 mg prochlorperazine (17 Ss), or 3) matching placebo, lactose (18 Ss). Immediately after and again one hour after taking the pills, all Ss were given two tests: 1) simple addition of two-digit numbers, and 2) simple multiplication of a two-digit number by a one-digit number. Change scores were used to analyze these results. Other tests were: 1) alterrate multiplying and subtracting of a one-digit number from a two-digit number; and 2) the following taken from Guilford's battery measuring orthogonal factors of higher mental processes: a) sentence order, b) picture group naming, c) four word combinations, etc. Associate scores from these tests were used to compare groups. R 1

17,226
Clark, J.A. & King, G.F. PERCEPTUAL AND MOTOR SPEED IN AN EXTENDED AGE GROUP: A FACTOR ANALYSIS. Percept. Mot. Skills, Oct. 1960, 11(2), 99-102. (Michigan State University, East Lansing, Mich.).

17,226

A heterogeneous group of male Ss (199) from 18 to 77 years of age and with education from 3 to 21 years were given three perceptual tests: 1) Spiral Inspection, discriminating between standard and offstandard spirals; 2) Perceptual Scanning, finding in order randomly scattered numbers on a page; and 3) Number Recognition, indicating whether pairs of numbers were the same or different; and three motor tasks: 1) Right-Right Turning, turning pairs of bolts on an upright panel; 2) Two-Plate Tapping, making 100 taps with a stylus on a two-plated tapping board; and 3) Lifting and Turning, using both hands to lift and turn 60 blocks on a formboard. The principal axes method and Guttman's method of estimating communalities were used to determine the results.
T. R 7

17,227

Rhodes, H.J., Jacobs, H.L. & Levenspiel, O. A DUPLEX ROTATOR FOR EXPERIMENTAL CONTROL OF VESTIBULAR STIMULATION. Percept. Mot. Skills, Dec. 1960, 11(3), 337-340. (Bucknell University, Lewisburg, Penn.).

17,227

Described is the rotator used to evaluate the ability of human Ss to perceive absolute rotation in the absence of vestibular stimulation. The new duplex turntable system which allows translatory motion as well as a wide range of rotation speed is described and illustrated.
R 4

17,228

Clemedson, C.-J. SOME BLAST STUDIES WITH APPLICATION TO EXPLOSIVE DECOMPRESSION. J. Brit. interplanetary Soc., May-June 1960, 17(9), 279-285. (Research Institute of National Defence, Sweden).

17,228

Discussed here are the similarities between explosive decompression and blast injury. The physiological changes occuring after exposure to strong shock wave are considered and include respiration and circulation. Cardiac activity and lung injuries are also discussed, and the results of experiments and studies conducted on animal Ss are cited.
G. R 25

17,229

Lansberg, M.P. SOME CONSEQUENCES OF WEIGHTLESSNESS AND ARTIFICIAL WEIGHT. J. Brit. interplanetary Soc., May-June 1960, 17(9), 285-288. (National Aeromedical Centre, Netherlands).

17,229

Weightlessness in spaceflight and the physiological consequences of such a condition is discussed. Considered in this context are air circulation; body perception; motion and locomotion; and the actual sensation of being weightless. The possibility of muscular atrophy as a consequence of weightlessness is considered. The introduction of artificial "weight" by making the satellite rotate around its own axis is also discussed.
I.

17,230

Bjurstedt, H. EFFECTS OF PROLONGED EXPOSURE TO POSITIVE G LOADINGS ON THE PULMONARY GAS EXCHANGE. J. Brit. interplanetary Soc., May-June 1960, 17(9), 288-289. (Lab. of Aviation & Naval Medicine, Stockholm, Sweden).

17,230

The experiments reported were concerned with physiological responses to g which might take several minutes to develop before interfering with psychomotor performance or functions of the central nervous system. Experiments were performed on anaesthetized dogs under positive g loadings lasting up to five minutes. Interest was focused on the possibility of acceleration forces causing derangements on the pulmonary circulation. Continuous recordings of the arterial oxygen saturation and pH were made. The applicability of the findings to humans was discussed.

17,231

Guignard, J.C. THE PHYSIOLOGICAL EFFECTS OF TRANSIENT MECHANICAL FORCES: A REVIEW OF THEIR RELEVANCE TO ASTRONAUTICS. J. Brit. interplanetary Soc., May-June 1960, 17(9), 290-292. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

17,231

Reviewed are the mechanical stresses which may occur in spaceflight and the problems of re-entry are discussed. Also considered are the physiological responses to mechanical force with the parameters of human tolerance to linear acceleration summarized and responses to vibration as a function of frequency indicated.
G. R 4

17,232

Billingham, J. MAN'S THERMAL ENVIRONMENT DURING INTERPLANETARY TRAVEL. J. Brit. interplanetary Soc., May-June 1960, 17(9), 293-297. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

17,232

The problems of heat exchange between man and his immediate surroundings during space flight are considered as are the relevance of these problems to the design of sealed cabins. Calculations of the heat transfer under ten different conditions are made on the basis of certain assumptions. These assumptions include the parameters of clothing, exposed skin, metabolic rate, gravity, humidity, and others. A discussion follows and the problems arising during re-entry are also considered.
T. R 6

17,233

Billingham, J. HEAT EXCHANGE BETWEEN MAN AND HIS ENVIRONMENT ON THE SURFACE OF THE MOON. J. Brit. interplanetary Soc., May-June 1960, 17(9), 297-300. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

17,233

An analysis of heat exchange between man and the spacesuit, and the spacesuit and the surroundings at different times and places on the surface of the moon is made. The assumptions arising from the distinctions made between day and night are considered in detail and are followed by calculations and results. These assumptions include solar radiation, surface temperature, and metabolic rate. The conclusions drawn are cited and discussed.
T. I. R 5

17,234

Jackson, K.F. IMPAIRMENT OF HUMAN PERFORMANCE IN CONTROL. J. Brit. interplanetary Soc., May-June 1960, 17 (9), 301-303. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

17,234

Examined were some of the aspects of human performance in controlling a space vehicle. Two experiments: 1) impairment of performance during intensive flying, and 2) multiple tracking test were reported and the results and applications of the findings were considered. The need to better understand the needs and capabilities of the pilot was expressed.
I. R 2

17,235
Hoover, G.W. THE MAN-MACHINE SYSTEM IN SPACE VEHICLES. J. Brit. Interplanetary Soc., May-June 1960, 17(9), 304-310. (USN Office of Naval Research, Washington, D.C.).

17,235
Presented are several proposals for an integrated approach to the problem of finding out under what conditions a man works most happily and efficiently in a closed vehicle. Considered are matters such as: what we mean by an operational environment, what constitutes a decision-making environment, optimum space man-machine relationship, and the basic limitations of man. Described is a suitable information flow structure created to establish effective direction of the many engineering and scientific personnel involved in such a program. The wide applicability of the program to missiles, ships, submarines, and tanks as well as aircraft is stressed.
I.

17,236
Cunningham, C. THE EFFECTS OF SENSORY IMPOVERISHMENT, CONFINEMENT AND SLEEP DEPRIVATION. J. Brit. Interplanetary Soc., May-June 1960, 17(9), 311-314. (Air Ministry, London, England).

17,236
The purpose of this paper was to discuss the probable effects of sensory impoverishment, confinement, and sleep deprivation in a space vehicle. Considered were factors such as duration of the flight, presence or absence of a task, and the extent to which the pilot is able to control the passage of the vehicle. The experiments conducted by Hebb to study cognitive functioning during perceptual isolation were cited and discussed, and evidence of former prisoners in deprivation conditions was given. Sleep deprivation was also discussed and the conclusions arrived at were presented.
R 15

17,237
Hanson, S.W.F. SOME PROBLEMS OF SPACEFLIGHT FEEDING. J. Brit. Interplanetary Soc., May-June 1960, 17(9), 314-316.

17,237
Considerations concerning feeding in space flight are discussed with distinctions made between the problems arising due to the nature of the flights. The problems differ according to whether the flight is a short orbital flight lasting hours, a lunar excursion lasting days, a planetary trip lasting months, or a long-term extra-terrestial existence. The advantages of dehydrated foods are considered as is the feasibility of a microcosmic biological cycle for the longer trips.

17,238
Pugh, L.G.C.E. HUMAN FACTORS IN A SPACE CABIN, WITH SPECIAL REFERENCE TO WEIGHT AND ECONOMY. J. Brit. Interplanetary Soc., May-June 1960, 17(9), 317-319. (Medical Research Council, London, England).

17,238
The factors of mass and cabin pressure in space flight are considered in the presence of experience and information gained on the ascent of Mt. Everest. The feasibility and advantages of reducing the structural mass of the space capsule by lowering the barometric pressure in the cabin is discussed. Also considered are the advantages of having small and lightweight crew members to save mass.
T.

17,239
Parkes, A.S. & Smith, Audrey U. SPACE TRANSPORT OF LIFE IN THE DRIED OR FROZEN STATE. J. Brit. Interplanetary Soc., May-June 1960, 17(9), 319-320. (Medical Research Council, London, England).

17,239
Discussed is the possibility of transporting life in a dried or frozen state to other planets or to the moon. The chemical and biological considerations are made. The resistance of living organisms to freezing, drying, and lack of oxygen is discussed in terms of some of the conditions that are likely to be encountered in space and on other planets.

17,240
Briggs, M.H. SOME NUTRITIONAL PROBLEMS OF MANNED SPACE-FLIGHT. J. Brit. Interplanetary Soc., May-June 1960, 17(9), 325-327. (Dept. of Chemistry, Victoria University of Wellington, New Zealand).

17,240
The problem under consideration is that of providing nutrition in manned space flight. Discussed are the types of diets and the form of foods that would be suitable under low gravitational conditions. Means of preserving water and recovery materials from excreta are examined and several methods are advanced. Also considered are the use of microorganisms to balance a closed system, and the growth of algae as a supply of nutrients.
T. R 13

17,241
Useller, J.W. & Algranti, J.S. PILOT CONTROL OF SPACE VEHICLE TUMBLING. Soc. exp. Test Pilots Quart. Rev., Summer 1960, IV(4), 26-37. (National Aeronautics & Space Administration, Lewis Research Center, Cleveland, Ohio).

17,241
This investigation was designed to 1) explore the feasibility of a manually operated control system, 2) evaluate the astronaut's performance, and 3) define the physiological limits that might be improved on the pilot during space vehicle tumbling. The S was rotated about each of the pitch and yaw singly at rates up to 30 rpm. Somewhat higher rates were tested in the roll direction. Rotations were induced for both left and right directions of operation. Syndromes of motion sickness and vestibular nystagmus were also investigated.
G. I. R 1

17,243
Eysenck, H.J. & Holland, H. LENGTH OF SPIRAL AFTER-EFFECT AS A FUNCTION OF DRIVE. Percept. Mot. Skills, Oct. 1960, 11(2), 129-130. (Institute of Psychiatry, University of London, London, England).

17,243
To study effects of motivation on perceptual phenomena, the performance of 245 industrial applicant apprentices (high drive) was compared with 80 apprentices, 8 psychologists, and 17 university students (low drive). The data and testing conditions for the high drive group were given in a study by Holland and Eysenck (17,254). Comparisons of the aftereffect in seconds as a function of stimulation time in seconds for the four groups were presented and discussed.
G. R 3

17,244
White, Helen L. & Price, A.C. FIGURE-GROUND CONFUSION ON A TEST FOR COLOR BLINDNESS AS RELATED TO IMPAIRMENT ON PERCEPTUAL TESTS FOR CORTICAL BRAIN DAMAGE. Percept. Mot. Skills, Oct. 1960, 11(2), 131-136. (Florida State University, Tallahassee, Fla. & Veterans Administration Center, Biloxi, Miss.).

17,244

To determine whether persons designated "organic" cortical on tests for deterioration would appear color blind on a pseudo-isochromatic test, Ss were tested 1) on the Spiral Aftereffects Test and Memory-for-Designs Test to determine figure-ground perception, and 2) on the Dvorine Pseudo-Isochromatic Plates, Color-Naming, and Trials Sections to evaluate color blindness. Also, two achromatic plates (light-on-dark, dark-on-light) similar in design to Dvorine's Trials were presented. The Ss were grouped as: 1)young normal (20), 2) old normal (37), and 3) old impaired (34) on the basis of tests (1) above. Group error scores for light and dark colors, failures on specific cards, and on Dvorine Trials were presented.
G. R 8

17,248

Brooks, Virginia & Hochberg, J. A PSYCHOPHYSICAL STUDY OF "CUTENESS." Percept. Mot. Skills, Oct. 1960, 11(2), 205. (Cornell University, Ithaca, N.Y.).

17,248

This is a study of "cuteness" as a function of eye height in a series of quantitative studies on physiognomic qualities. Three groups of Ss (39, 38, and 40) each rated a set of five simple drawings of baby's face on numbered scales ranging from ten, "most cute," to zero, "least cute." For groups A and B, eye heights were varied up and down from those of neutral stimulus faces. For group C, eyes were varied forward and back from the neutral stimulus face. Mean ratings and analysis of variance by ranks were given.
G. I. R 3

17,249

King, G.F. & Campos, L.P. NOTE ON AGE AND INTERTRIAL VARIABILITY FOR PERCEPTUAL AND MOTOR SPEED TESTS. Percept. Mot. Skills, Oct. 1960, 11(2), p.206. (Michigan State University, East Lansing, Mich.).

17,249

To test the hypothesis that performance becomes more constant with increasing age, the performances of three groups of Ss (20 in each): 1) 20-30 years, 2) 40-50 years, and 3) 60 years plus, were compared on the following perceptual and motor tests: Spiral Inspection, Perceptual Scanning, Number Recognition, Right-Right Turning, Two-Plate Tapping, and Lifting and Turning. To measure intertrial variability, mean discrepancy scores between the two trials were used. The results were discussed.
R 4

17,251

Vernon, J.A. & McGill, T.E. UTILIZATION OF VISUAL STIMULATION DURING SENSORY DEPRIVATION. Percept. Mot. Skills, Oct. 1960, 11(2), 214. (Princeton University, Princeton, N.J. & Willians College, Williamstown, Mass.).

17,251

This study used the conditions of sensory deprivation used by Vernon, J.A., McGill, T.E., Gulick, W.L., and Candland, D.K. (13, 118) with an additional condition of a "viewing box," which 15 Ss operated by pushing a button. This illuminated only the interior of the box where one line and two circles, black on white, could be seen. Subjects were free to use it when they wished. In the experimenter's area, unknown to the S, a timing device was engaged when the button was pushed. Data were presented and related to the Ss asking for early release and those remaining the 72 hours of the experiment.
T. R 1

17,254

Holland, H. & Eysenck, H.J. SPIRAL AFTER-EFFECT AS A FUNCTION OF LENGTH OF STIMULATION. Percept. Mot. Skills, Oct. 1960, 11(2), 228. (Institute of Psychiatry, University of London, London, England.).

17,254

To study effects of length of stimulation on perception, 245 applicant industrial apprentices were given four trials at stimulation periods of 15, 45, 90, and 120 sec. with 30 sec. rest periods between trials. Intertrial correlations were determined to obtain reliabilities for the test. Results of these and other correlations were presented.
R 4

17,256

Smedal, H.A., Creer, B.Y. & Wingrove, R.C. ABILITY OF PILOTS TO PERFORM A CONTROL TASK IN VARIOUS SUSTAINED ACCELERATION FIELDS. Aerospace Med., Nov. 1960, 31(11), 901-906. (National Aeronautics & Space Administration, Ames Research Center, Moffett Field, Calif.).

17,256

This study was designed to investigate the ability of a pilot to perform a meaningful task while immersed in moderately high varied fields of accelerations for prolonged periods of time and seated in a forward-facing position. Six Ss were used and were required to perform a relatively complex tracking problem while submitted to various g forces. Electrocardiographic, respiration, pilot efficiency and acceleration patterns were recorded.
T. G. I. R 10

17,257

Steiner, S.H., Mueller, G.C.E. & Taylor, J.L.,Jr. HEMODYNAMIC CHANGES DURING FORWARD ACCELERATION. Aerospace Med., Nov. 1960, 31(11), 907-914. (USAF Acceleration Section, Wright-Patterson AFB, Ohio).

17,257

The purpose of this paper was to better define the cardiovascular parameters encountered during forward accelerations of high magnitude for extended time periods. Eight mongrel dogs under chloralose anesthetic were accelerated on the centrifuge while oriented perpendicular to the acceleration vector. They were submitted to randomized 6, 10, and 14 g acceleration plateaus for either 5 or 10 minutes. Cardiac output was measured by the indicator-dilution technique which was fully described in the report. Heart rate, circulation, blood pressure, respiration rate, and qualitative appearance of arterial blood were also recorded.
G. R 19

17,258

Magid, E.B., Coermann, R.R. & Ziegenruecker, G.H. HUMAN TOLERANCE TO WHOLE BODY SINUSOIDAL VIBRATION. Aerospace Med., Nov. 1960, 31(11), 915-924. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,258

This study was designed to define human subjective tolerance to whole body sinusoidal vibrations between 1 and 20 cps for short time, one-, and three-minute periods. Ten Ss were used in the short time study and 15 in the one- and three-minute studies. Electrocardiographic tracings were taken before, during, and after each run. A tolerance curve based on subjective responses was compiled. Also, 16 sensations or symptoms were recorded and a table describing regional symptomology at low frequency and high amplitude sinusoidal whole body vibrations was presented.
T. G. I. R 2

17,259

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. Aerospace Med., Dec. 1960, 31(12), 973-988.

17,259
This report deals with four different surveys designed to obtain information on the incidence of loss of consciousness of US Air Force personnel engaged in active flying and in future flying personnel. Anonymous questionnaires were administered to four groups of men which included 1578 individuals on flying status and 402 Academy cadets. The results are examined and the implications of the findings are discussed.
T. R 3

17,260
Swearingen, J.J., McFadden, E.B., Garner, J.D. & Blethrow, J.G. HUMAN VOLUNTARY TOLERANCE TO VERTICAL IMPACT. Aerospace Med., Dec. 1960, 31(12), 989-998. (Protection and Survival Branch, Civil Aeromedical Research Institute, Oklahoma City, Okla.).

17,260
This study was concerned with the effects of high vertical impact forces (positive g) with high jolt factors and short time intervals on human Ss. Thirteen Ss were used to establish human tolerances with the jolt and g forces recorded from an electrokinetic accelerometer attached to the experimental platform and from an accelerometer attached to the S's shoulder. Measurements were taken on seated positions, standing with knees locked, standing with knees flexed, squatting, and seated in chair equipped with stafoam.
T. G. I. R 3

17,261
Donnell, A.M., Jr. & Norton, C.P. SUCCESSFUL USE OF THE RECOMPRESSION CHAMBER IN SEVERE DECOMPRESSION SICKNESS WITH NEUOCIRCULATORY COLLAPSE. Aerospace Med., Dec. 1960, 31(12), 1004-1009. (USAF Surgeon's Office, Langley AFB, Va.).

17,261
Presented here is a case report of a military pilot who suffered from severe decompression sickness accompanied by neurocirculatory collapse during an altitude chamber flight. The patient was treated by being placed in a standard Navy double-lock recompression chamber. Of importance is the method of treatment and the fact that there was a five hour delay between the discovery of symptoms and the beginning of recompression. The implications and possible future application of the method of treatment is discussed.
T. R 8

17,262
Gardner, W.J., Licklider, J.C.R. & Weisz, A.Z. SUPPRESSION OF PAIN BY SOUND. Science, July 1960, 132(3418), 32-33. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

17,262
Reported is the procedure which employs sound to suppress pain. Described is the method of using intense accoustic stimulation as an "audio analgesic" during dental operations. Music is supplied to the patient via headphones which he controls along with the noise stimulus which he can increase or decrease. The noise stimulus is random noise with a spectrum shaped by lowpass filters to provide a compromise between analgesic effectiveness and pleasantness of quality. Also presented, is a hypothesis that may account for the suppression of pain in physiological terms.
R 7

17,264
Coles, R.R.A. & Knight, J.J. AUDITORY HAZARDS IN A DIESEL ENGINE TEST HOUSE. Ann. Occup. Hygiene, Nov. 1960, 2(4), 267-273. (Royal Navy & Medical Research Council's Wernher Research Unit on Deafness, King's College Hospital Medical School, London, England).

17,264
The auditory hazard suffered by workers employed in a diesal engine test house was discussed. Otological histories and clinical and audiometric examinations were obtained. The findings were presented as were forms of hearing protections. Recommendations were cited.
T. G. I. R 7

17,265
Brown, R.H. WEBER RATIO FOR VISUAL DISCRIMINATION OF VELOCITY. Science, June 1960, 131(3416), 1809-1810. (USN Research Lab., Washington, D.C.).

17,265
This report attempts to demonstrate the potential utility which may result from appropriate experimental analysis of the Weber ratio for visual discriminations of velocity. An approximation of the Weber ratio for visual discrimination of velocity, based on various experiments reported in the literature, is presented.
G. R 9

17,266
Brown, J.L. INDUCTION OF FECHNER COLORS IN BLACK AND WHITE PHOTOGRAPHS. Science, Jan. 1960, 131(3394), p.155. (Department of Physiology, School of Medicine, University of Pennsylvania, Philadelphia, Penn.).

17,266
The color phenomenon which occurs when two black and white photographs of a scene which have been taken with long-wavelength and a short-wavelength light are viewed in an alternating sequence is described. The method is compared to that used by Land but the important variable here is the temporal sequence. The importance of these observations to the understanding of the physiological bases of color perception is indicated.
R 3

17,268
Connor, J.A., Jr. AEROSPACE NUCLEAR SAFETY. Aerospace Med., Oct. 1960, 31(10), 797-806. (Aerospace Nuclear Safety Board, US Atomic Energy Commission, Germantown, Md.).

17,268
Discussed is the aerospace nuclear power program and the need to examine problems in aerospace nuclear safety. The biomedical aspects and the research programs associated with the development, testing and operation of the manned nuclear aircraft, satellite auxilliary power, nuclear ramjet, and the nuclear rocket are considered and reviewed. The risks involved in such programs and progress are also reviewed.
R 20

17,269
Donaldson, R.T., Carter, E.T., Billings, C.E., Jr. & Hitchcock, F.A. ACUTE HYPOXIA DURING RAPID DECOMPRESSION AND EMERGENCY DESCENT IN A COMMERCIAL JET AIRCRAFT. Aerospace Med., Oct. 1960, 31(10), 842-851. (Departments of Physiology and Preventive Medicine, Ohio State University, Columbus, Ohio).

17,269
Studied were the effects of rapid decompression with emphasis upon the arterial oxygen saturations and "times of useful consciousness," primary characteristics of acute hypoxia. The experimental Ss were exposed to a simulated decompression and immediate emergency descent relevant to an aircraft in commercial use at the present time. A decompression chamber equipped with an air lock and a dump valve between the air lock and main chamber was used. Time of useful consciousness during exposure was measured by the S writing numbers when counting backward from 100. The results from the ten Ss were presented and discussed.
G. R 8

17,270
Kraus, R.N. EVALUATION OF A SIMPLE CORIOLIS TEST FOR VESTIBULAR SENSITIVITY. Aerospace Med., Oct. 1960, 31(10), 852-855. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,270
This study was designed to investigate whether or not exposure to repetitive angular acceleration would cause a consistent decrement in subjective response. Also investigated was whether or not the response of individuals who had previously been exposed differed from those who had not. Simple Coriolis acceleration was used as a stimulus on a group of qualified pilots and a control group. Each S received five trials perday on five successive days. The responses were examined and the role of prolonged and intensive training was considered.
G. R 9

17,271
Hickish, D.E. SENSATIONS OF WARMTH AND FRESHNESS OF WORKERS IN LIGHT INDUSTRY IN SUMMER. Ann. Occup. Hygiene, April 1960, 1(4), 271-279. (Slough Industrial Health Service, Farnham Road, Slough, Bucks, England).

17,271
This study was designed to investigate thermal sensation of workers doing light tasks during the summer. A field survey was conducted during summer months in six factories in Southern England. A total of 2033 subjective sensations of warmth and freshness were obtained. The sensation of warmth in relation to ventilation, and of freshness in relation to the physical factors of the environment were derived. The correlation of freshness sensation with warmth sensation was also obtained and presented.
T. G. R 6

17,272
Lenger, V.J. & Kudrna, J. THE INFLUENCE OF A CHANGE IN PRODUCTION TECHNOLOGY ON THE INCIDENCE OF RADIATION HAZARDS. Ann. Occup. Hygiene, April 1960, 1(4), 291-298. (Health Physics Division, Institute of Industrial Hygiene and Occupational Diseases, Prague, Czechoslovakia).

17,272
This paper indicates the importance of considering the morale, the skill, and the mentality of workers handling radioactive materials. The importance of instructing workers about the dangers as well as how to minimize or prevent the dangers is also stressed. Described is the program engaged in examining all workshops dealing with radioactive materials.
T. G. I. R 5

17,274
Ledley, R.S. & Lusted, L.B. COMPUTERS IN MEDICAL DATA PROCESSING. Operat. Res., May-June 1960, 8(3), 299-310. (School of Engineering, George Washington University, Washington, D.C. & School of Medicine, University of Rochester, Rochester, N.Y.).

17,274
In considering the use of digital electronic computers in medical data processing, both the limitations and the advantages of computer aids are indicated and illustrated. The concepts associated with: 1) applying sequential decision theory to the analysis of medical diagnosis and 2) accumulating and recalling individual medical records are then discussed. Finally, the feasibility of a national health computer network is considered.
G. I. R 4

17,275
Kaufmann, R.A. & Kaufmann, M.I. PREDICTING HUMAN FACTORS ERRORS. Engng. Industr. Psychol., Summer 1960, 2(2), 47-56. (Aerospace Division, Boeing Aircraft Company, Seattle, Wash.).

17,275
This study was concerned with the ability of being able to predict the frequency of human factor errors associated with a given piece of equipment. Also, the rationale behind this ability for prediction was cited and its functional utility was presented. Two forms of the predictor equation, mechanical and electronic packages, were considered in this study. Twelve subsystems of a ground-to-air guided missile were studied with the cost, weight, and volume of each subsystem obtained. The human factors errors that were charged to these subsystems were totaled. The correlation between the two was determined.
T. G.

17,276
Johnson, E.A. THE LONG-RANGE FUTURE OF OPERATIONAL RESEARCH. Operat. Res., Jan.-Feb. 1960, 8(1), 1-23. (Operations Research Office, Johns Hopkins University, Bethesda, Md.).

17,276
After briefly reviewing the early years of operational research, the author indicates its trends today, which are mainly in the form of contributions to industry, the military, and politics. Also he discusses the need for improved quality in this research (through experience and education in its specific techniques) and for increased fiscal support. He then presents the three new frontiers for the future expansion of operational research: regional and world development, medicine, and charity. As a final requirement for a successful and long-range future, he calls for a higher level of the basic and theoretical in its approach.
T. G. I. R 15

17,277
Flehinger, Betty J. SYSTEM RELIABILITY AS A FUNCTION OF SYSTEM AGE; EFFECTS OF INTERMITTENT COMPONENT USAGE AND PERIODIC MAINTENANCE. Operat. Res., Jan.-Feb. 1960, 8(1), 30-44. (IBM Watson Laboratory, Columbia University, New York, N.Y.).

17,277
The reliability of complex systems was analyzed with respect to component survival probability as a function of age (the components being used intermittently and maintained by replacement) assuming that both independent component and complete system failures can occur. Two math models were postulated to predict this reliability, each differing only in their maintenance policies: replacement of components which have caused system failure or fixed interval system checks to replace any faulty component. The reliability functions were derived for a given time interval and the special case of exponential failure was developed.
T. G. R 2

17,278
Hosford, J.E. MEASURES OF DEPENDABILITY. Operat. Res., Jan.-Feb. 1960, 8(1), 53-64. (Philco Western Development Laboratories, Palo Alto, Calif.).

17,278
A procedure to forecast the inventory needs of a textile manufacturer was developed. It was based on the 'line-ratio' concept which was described previously. The basic criterion for such an inventory (seasonal product) was a function of the estimated unit profit during the regular season and the estimated unit loss at the end of the season, each weighted by its probability. A method for determining these probabilities was provided in detail.
G. R 3

17,279
Barlow, R. & Hunter, L. OPTIMUM PREVENTIVE MAINTENANCE POLICIES. Operat. Res., Jan.-Feb. 1960, 8(1), 90-100. (Sylvania Electronic Defense Laboratory, Mountain View, Calif.).

17,279
Two preventive maintenance policies--one suitable for simple equipment and the other more appropriate for complex systems--are considered. Each is defined and mathematical evaluative criteria are established. The optimum parameters for each policy are presented together with a policy comparison and an example of each. All mathematical derivations are included.
G. R 3

17,280
Gazis, D., Herman, R. & Maradudin, A. THE PROBLEM OF THE AMBER SIGNAL LIGHT IN TRAFFIC FLOW. Operat. Res., Jan.-Feb. 1960, 8(1), 112-132. (Research Laboratories, General Motors Corporation, Warren, Mich.).

17,280
This paper considers the problem of the improperly timed amber signal light which locates the motorist in the "dilemma zone," i.e., too close to the intersection to stop safely or too far to pass through before the red signal. Some simple relations between car speed, driver decision and reaction time, the parameters of the road and the intersection, and the duration of the amber signal light are derived and discussed. Observations of the behavior of motorists are obtained and from these data the above parameters are analyzed empirically. Finally, some criteria are presented for more appropriate design of the amber light phase.
T. G. I. R 4

17,281
Hitch, C. UNCERTAINTIES IN OPERATIONS RESEARCH. Operat. Res., July-Aug. 1960, 8(4), 437-445. (Rand Corporation, Santa Monica, Calif.).

17,281
This address deals with that aspect of decision-making known as uncertainty, in particular, the kind of uncertainty "tinged with 'game' elements." The problems which make for this unpredictable characteristic--insurable risk, genuine uncertainty, and intelligent opposition--are enumerated. The reasons for lack of satisfaction in decision-making under these conditions are discussed. Finally some techniques for more adequately handling this kind of problem are presented.

17,282
Firstman, S.I. & Gluss, B. OPTIMUM SEARCH ROUTINES FOR AUTOMATIC FAULT LOCATION. Operat. Res., July-Aug. 1960, 8(4), 512-523. (Armour Research Foundation of Illinois Institute of Technology, Chicago, Ill. & Rand Corporation, Santa Monica, Calif.).

17,282
This paper presents strategies for minimizing the time in locating a fault in a complex system of equipment. The search routine is founded on probabilistic concepts and is employed in conjunction with the engineering logic method which delineates both constrained and convenient test groupings. The search problem model developed here is directed toward an automatically sequenced testing machine that uses a semifixed program. Its assumptions are indicated and the estimation of probabilities performed.
R 12

17,283
Hill, A.V. PRODUCTION AND ABSORPTION OF WORK BY MUSCLE. Science, March 1960, 131(3404), 897-903. (University College, London, England).

17,283
Discussed was the relation of production and absorption of work by muscle between heat, under various conditions of shortening, lengthening, and tension. The reversal of a chemical process under the above conditions is considered as is the mechanism by which it occurs. The application of the results concerning reversibility is examined and discussed.
T. G. R 9

17,285
Geschwind, N. & Segal, J.R. COLORS OF ALL HUES FROM BINOCULAR MIXING OF TWO COLORS. Science, Feb. 1960, 131(3400), p.608. (Department of Neurology, US Veterans Administration Hospital, Boston, Mass.).

17,285
Studied was the effect when two color separation images were presented simultaneously but separately to the two eyes. The experimental procedure was described. The possible explanations such as colormixing were presented.
R 7

17,289
Wishart, D.M.G. QUEUING SYSTEMS IN WHICH THE DISCIPLINE IS 'LAST-COME, FIRST-SERVED,' Operat. Res., Sept.-Oct. 1960, 8(5), 591-599. (Department of Pure Mathematics, University of Birmingham, Birmingham, England).

17,289
The effect of the queue discipline--'last-come, first-served'--on the distribution of waiting times of customers in two queuing systems is discussed. These systems are: 1) single-server with Poisson input and general independent service time and 2) general independent input and negative exponential distribution of service time. Consideration is given to busy periods, unexpended service time, steady state, marginal distributions, and congestion probabilities.
T. R 13

17,290
Ornea, J.C. & Stillson, P. THE OPTIMUM SOLUTION IN OPERATIONS RESEARCH. Operat. Res., Sept.-Oct. 1960, 8(5), 616-629. (Shell Development Company, Emeryville, Calif.).

17,290
The three types of operations research activity: operational, technological, and investment are examined and distinguished with respect to group make-up, emphais on specific techniques and methodology, and general approach to problem formulation. A problem in the petroleum industry is solved in accordance with each of these approaches.
G. R 4

17,291
Heathcote, C.R. A SIMPLE QUEUE WITH SEVERAL PREEMPTIVE PRIORITY CLASSES. Operat. Res., Sept.-Oct. 1960, 8(5), 630-638. (Australian National University, Canberra, Australia).

17,291
The distribution of queue length is a preemptive queuing model with several priority classes is discussed. Difference equations for the steady state probabilities are solved and compared to those for Laplace transforms of the temporal probabilities. Some inverse transformations are also carried out. An explicit solution is completed only for equal service rates.
R 3

17,292
Strauss, W.J. THE NATURE AND VALIDITY OF OPERATIONS-RESEARCH STUDIES, WITH EMPHASIS ON FORCE COMPOSITION. Operat. Res., Sept.-Oct. 1960, 8(5), 675-693. (Institute for Air Weapons Research, University of Chicago, Chicago, Ill.).

17,292

This paper examines the foundations of operations research by attempting to delineate and interrelate some of the factors that often confuse analysts and users of such research. The phases of the operations research process are defined and discussed: problem, assumptions and initial conditions, model, pay-off functions, and recommendations. Also the epistemology here is compared with that of mathematics and physics. Finally, the quality of such a study is considered in terms of the information it provides the decision-maker relative to the nature of the problem, its research ability.
R 7

17,293

Geldard, F.A. SOME NEGLECTED POSSIBILITIES OF COMMUNICATION. Science, May 1960, 131(3413), 1583-1588. (University of Virginia, Charlottesville, Va.).

17,293

Discussed is the use of the skin as a possible mode of communication. The need for adequate devices and procedures is noted and the dimensions of mechanical vibration as the stimulus is discussed. Some of the important things that must be considered and that should be further investigated are attended to and include locus, intensity, duration, and frequency. Also, it is noted that vibration is not necessarily the only candidate and that electrical stimulation should also be considered.
R 13

17,294

Sperling, G. NEGATIVE AFTERIMAGE WITHOUT PRIOR POSITIVE IMAGE. Science, May 1960, 131(3413), 1613-1614. (Bell Telephone Laboratories, Murray Hill, N.J.).

17,294

Presented was a procedure which causes an observer to see a negative afterimage of a visual field without seeing the field itself. It was essentially a tachistoscope which permits the independent illumination of two optically superimposed fields. A quantitative study was conducted and discussed.
G. R 1

17,297

Hitt, W.D. & Ray, H.W. A LABORATORY EVALUATION OF THE EFFECTS OF ELECTRONIC COUNTERMEASURES ON SYSTEM PERFORMANCE. Hum. Factors, Aug. 1960, 2(3), 128-135. (Battelle Memorial Institute, Columbus, Ohio).

17,297

Presented is a description of the simulation of a relatively complex man-machine system by laboratory and analytic techniques. A study conducted to evaluate electronic countermeasures (ECM) effectiveness is described. The simulated system and its subsystem components and the radar simulation are presented. An illustrative experiment consists of two types of ECM and one type of electronic counter-countermeasure (ECCM) which are evaluated. Fifteen experimental conditions were used and the data are presented and discussed.
T. G. R 1

17,313

Baker, C.A., Morris, D.F. & Steedman, W.C. TARGET RECOGNITION OF COMPLEX DISPLAYS. Hum. Factors, May 1960, 2(2), 51-61. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,313

To investigate factors affecting radar target recognition, a study was conducted to determine the speed and accuracy of form recognition. Eight Ss had the task of locating on a problem display a specific target shown to them on a briefing display. The independent variables manipulated were: 1) amount of distortion between the reference form and target form; 2) the number of irrelevant forms in the target display; 3) the position of the target on the display; and 4) stimulus properties of the target; e.g., target "difficulty." Implications of the results for operational situations were discussed.
T. G. I. R 4

17,314

Carter, C.W. INTERNATIONAL LIST OF HUMAN FACTORS FILMS. Hum. Factors, May 1960, 2(2), 62-69. (Convair, General Dynamics Corporation, San Diego, Calif.).

17,314

This article presents an annotated bibliography of films dealing with human factors problems. Sources of the films are also given.

17,315

Sidorsky, R.C. & Newton, J.M. AN INVESTIGATION OF THE ONE-SURFACE CONTACT ANALOG DISPLAY FOR USE IN SUBMARINE DEPTH CONTROL. Hum. Factors, May 1960, 2(2), 70-75. (Electric Boat Division, General Dynamics Corporation, Groton, Conn.).

17,315

Seven operators were tested on their ability to perform on two types of submarine control tasks, depth seeking and depth keeping. The operator controlled a simulator which incorporated a single joystick control and a one-surface control analog which displayed the information necessary for depth changing maneuvers, namely apparent forward motion, apparent depth, and apparent pitch angle. Results are presented in graphical form and their implications are discussed.
T. G. I. R 5

17,316

Enoch, J.M. ENVIRONMENTAL STRESS AS RELATED TO THE VISUAL MECHANISM. Hum. Factors, May 1960, 2(2), 76-83. (Department of Ophthalmology, Washington University Medical School, St. Louis, Mo.).

17,316

Stressful conditions associated with high-speed flight, high altitude flight, and exposure to intense radiation as they effect the performance of visual tasks are discussed. The important aspects of each problem are discussed only briefly, but the article presents information as to where the reader can go to get further information.
R 43

17,317

Swearingen, J.J. & McFadden, E.B. STUDIES OF AIR LOADS ON MAN. Hum. Factors, May 1960, 2(2), 84-91. (Civil Aeromedical Research Institute, Federal Aviation Agency, Oklahoma City, Okla.).

17,317

Studies on the effect of air loads (wind forces) on man are summarized, discussed, and compared. Such things are investigated as the simulated failure of a window or door in a pressurized aircraft, the magnitude of short duration air loads that would cause an individual in various positions to be physically displaced, the effects of clothing on drag force, and the effects of long exposures to air blast.
T. G. I. R 2

17,318

Tilton, J.R. & Jensen, B.T. FACILITATING SELF-EVALUATION IN TASK-ORIENTED GROUP LEARNING. Hum. Factors, May 1960, 2(2), 92-96. (System Development Corporation, Santa Monica, Calif.).

17,318

A study was discussed in which four Air Force radar crews performed a simulated air defense mission lasting two hours. One crew received information about their performance (feedback) and held a discussion period afterwards; another crew was given no formal feedback but held a discussion after the task; a third crew was given feedback but no discussion period afterwards; and the fourth crew received neither treatment. Qualitative comparisons of the crews' performances were made and the results of the experimental treatments on the individuals and crews were discussed.
R 7

17,325
Robinson, D.W. VARIABILITY IN THE REALIZATION OF THE AUDIOMETRIC ZERO. Ann. Occup. Hygiene, July 1960, 2(2), 107-126. (National Physical Laboratory, Teddington, Middlesex, England).

17,325
The purpose of this paper is to evaluate the limits of precision of pure-tone audiometry, based on the prevailing system of standardization and calibration, and to indicate the point at which the quest for higher accuracy becomes illusory. A comparison of different methods of subjective calibrations used is described. The errors incurred at the various stages of calibration are also examined. Suggestions and conclusions are made.
T. G. R 19

17,326
Hickish, D.E. & Challen, P.J.R. A STUDY OF NOISE IN A CIRCULAR-SAW SHOP AND ITS EFFECT ON HEARING. Ann. Occup. Hygiene, July 1960, 2(2), 133-140. (Occupational Hygiene Service, Slough Industrial Health Service, Farnham Road, Slough, Bucks, England).

17,326
The noise produced from a circular saw was recorded at two different distances and tentative risk criterion was determined. A preliminary experiment involved one S being subjected to the noise for three hours with audiometry conducted on him before and after exposure. Four workers were then exposed to the noise under actual working conditions and examined. The findings were discussed as well as methods of reducing exposure to noise during sawing operations.
R 3

17,327
Powell, M. & Lomax, M.A. TOXIC EFFECTS OF HANDLING AND FIRING EXPLOSIVES IN COAL MINES. Ann. Occup. Hygiene, July 1960, 2(2), 141-151. (Medical Service, National Coal Board, London, England).

17,327
Reported were the findings from a pilot field study concerned with the effects of handling and firing explosives in coal mines. The data were collected during routine visits to coal faces and were obtained by casual inquiry of the personnel involved. The information collected included the types of explosives used, their carriage and preparation, and reports of symptoms associated with their use. The toxic factors in colliery explosives were examined as were the methods of storing and using the explosives. The results were reported and recommendations were made.
T. R 11

17,328
Pastore, N. COLOR PHENOMENA. Science, Nov. 1960, 132 (3437), 1396-1397. (Department of Psychology, Queens College, Flushing, N.Y.).

17,328
Reported is the color phenomenon that occurs upon viewing two properly spaced circles drawn in India ink on a white card placed in a steroscope. The circles are presented to a red-filtered eye and to a nonfiltered eye. The critical variable for the appearance of the color phenomenon is the relative imbalance of the amount of light to the two sides of the card. The reports of 35 Ss are given and discussed.
R 2

17,331
Bedford, T. REQUIREMENTS FOR SATISFACTORY HEATING AND VENTILATION. Ann. Occup. Hygiene, Sept. 1960, 2(3), 167-177.

17,331
Considered here are the requirements for the maintenance of a suitable level of warmth and of an adequate supply of ventilation in the working environment. Discussed are fresh air requirements, temperature, humidity and speed of movement of the air, and the radiation from the surroundings. Comfort zones, what constitutes a pleasant environment, the need for warm walls and floors are also included in the discussion.
R 18

17,332
Lind, A.R. THE EFFECT OF HEAT ON THE INDUSTRIAL WORKER. Ann. Occup. Hygiene, Sept. 1960, 2(3), 190-207. (N.C.R. Physiological Research Section, Department of Human Anatomy, Oxford University, Oxford, England).

17,332
This paper attempts to outline the principles governing heat exchanges between the body and its environment. The theoretical calculations of bodily heat exchanges are presented and the three best known scales for measuring total heat stress are considered. Also, the determination of "limiting conditions of heat" for different types of work is discussed, and an example of the use of present information in answering specific heat problems in industry is given.
T. R many

17,333
Billingham, J. CABIN AIR-CONDITIONING IN MILITARY AIRCRAFT. I. PHYSIOLOGICAL ASPECTS. Ann. Occup. Hygiene, Sept. 1960, 2(3), 208-214. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

17,333
This paper considers the thermal environment of the pilot or navigator of a military aircraft and presents an analysis of some of the differences between such an environment and that of a clerk in an office. The aim of cabin conditioning is discussed and "comfort" is defined. The environment of the aircraft cockpit is described and analyzed as are the causes of departure from the comfort state. The possibility of directly cooling or heating the pilot is considered and methods of doing so are elaborated upon.
G.

17,334
Miles, S. NEW PROBLEMS IN SUBMARINE HABITABILITY. Ann. Occup. Hygiene, Sept. 1960, 2(3), 224-227. (Royal Naval Physiological Lab., MRC, Alverstoke, Hants, England).

17,334
Considered are the problems encountered in long periods of duty aboard submarines. Such problems as the need to maintain high levels of health and morale, the danger of an atoxic agent accumulating, methods of supplying adequate amounts of oxygen, supplying adequate amounts of food, and radiation protection are discussed.

17,335
Malcolm, D.G. BIBLIOGRAPHY ON THE USE OF SIMULATION IN MANAGEMENT ANALYSIS. Operat. Res., March-April 1960, 8(2), 169-177. (System Development Corporation, Santa Monica, Calif.).

17,335
"This bibliography represents a fair sampling of simulation literature to date. For the convenience of the user, industrial and military applications have been kept separate. Finally, a number of titles on simulation training games and exercises have been included."
R 150 (approx.)

17,336
Clark, C.E. THE UTILITY OF STATISTICS OF RANDOM NUMBERS. Operat. Res., March-April 1960, 8(2), 185-195. (System Development Corporation, Santa Monica, Calif.).

17,336
The efficiency of stratified sampling in Monte Carlo for operations analyses is suggested and discussed. This technique is demonstrated as profitable when the tables of random numbers present statistics of the numbers. In addition to the numerical examples, computer Monte Carlo is discussed.
T. R 5

17,339
Glanville, W.H. SAFETY IN TRANSPORT I. SAFETY ON THE ROAD. J. Royal Soc. Arts, May 1954, CII(4926), 496-519. (Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

17,339
This paper treats the road safety problem with particular reference to Great Britain. The magnitude of the problem of road accidents at present and possible future trends in both traffic and accidents are discussed. The broad issue of road safety is then discussed as 1) the equipment used (the road and the vehicle), 2) the human element (the pedestrian and the driver), and 3) properly devised and applied sanctions for both 1) and 2).
T. G.

17,340
Brown, V. SAFETY IN TRANSPORT II. SAFETY IN THE AIR. J. Royal Soc. Arts, May 1954, CII(4926), 520-533. (Ministry of Civil Aviation, London, England).

17,340
Factors in achieving air safety are treated in the following order: airworthiness; crashworthiness; airline operation, maintenance, and inspection; accident investigation; the passing of information among government departments, designers, manufacturers, and operators; statistics; and publicity. A final comment is given on what the government of the United Kingdom is doing to overcome the hazards of flying.
G. I. R 6

17,341
Wilson, G.R.S. SAFETY IN TRANSPORT III. SAFETY ON THE RAILWAYS. J. Royal Soc. Arts, May 1954, CII(4926), 534-549. (Ministry of Transport and Civil Aviation, London, England).

17,341
The working principles and methods which underlie the high standard of safety characteristic of railway travel are discussed with particular reference to Great Britain. Major topics treated are as follows: government regulation; railway safety in 1874; railway signalling (block system--double and single lines, signals and interlocking, modern signalling controls, track circuits, continuous track circuiting and multi-aspect signals); railway brakes (nonautomatic, automatic, modern improvements, vacuum, and air brake systems); observance of signals (automatic train control, warning control, and stop control on urban electric railways); and derailments (breakages and failures, examinations). Future developments are discussed.

18,000
Richardson, R.E., Stacey, J.M., Kohler, H.M. & Naka, F.R. RADAR RETURNS FROM BIRDS, AND THEIR ELIMINATION FROM RADAR OUTPUTS. Contract AF 19(604) 5200, Group Rep. 45 42, Dec. 1959, 24pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

18,000
An investigation was made of overwater, short-range, low-altitude targets observed on ground-based control radars. A study of target characteristics, diurnal and seasonal variations over a period of one year, and possible identifications led to a further investigation of birds and their habits. Upon the basis of calculations and experimentation, it was determined that practically all the observed short-range targets at L-band were due to radar return from birds. A sensitivity time control (STC) waveform generator was developed that eliminates the bird returns and allows radar to operate against aircraft on normal days. Design details of the unit were included along with some instructions for effective operation.
G. I. R 4

18,001
Matheny, W.G. CONSIDERATION OF HUMAN FACTORS IN HELICOPTER DESIGN. Rep. 238, Presented at: Joint Meeting of the Flight Test Panel & Aeromedical Panel, Athens, Greece, 11-15 May 1959, 13pp. Advisory Group for Aeronautical Research & Development, NATO, Paris, France. (Human Factors Group, Bell Helicopter Corporation, Fort Worth, Tex.).

18,001
The human factor problems in helicopter design are discussed with primary emphasis on those factors affecting operation and control. There are two main parts of the report, one dealing with the stability of the vehicle and the other with the display of information to the pilot for instrument conditions operation. The latter is part of the research being carried out under the Army-Navy Instrument Program.
G. I. R 1

18,002
Montana, D.M. RADAR EVALUATION BY MEANS OF AERIAL PHOTOGRAPHY. Proj. 5540, Task 426L, RADC TR 58 124, Nov. 1958, 21pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

18,002
A method for evaluating the accuracy with which the space position of a target can be determined through the use of ground radar is described. The principles discussed include vertical aerial photogrammetry and the Church Direction Cosine Method of tilt analysis. It is recommended that personnel responsible for the evaluation of ground radar equipments consider this report a practical tool to serve their needs.
I. R 2

18,003
Riecken, H.W. A PROGRAM FOR RESEARCH ON EXPERIMENTS IN SOCIAL PSYCHOLOGY. Contract AF 49(638) 33, AFOSR TN 58 1115, 1959, 23pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Minnesota University, Minneapolis, Minn.).

18,003
Sources of unintended variance in data collection in experimental social psychology are identified and discussed. The particular task undertaken is the examination of the particular features of the social situation in which data are collected and the processes of negotiation between investigator and subject through which they come to understand how to behave in the situation. Some problems for research in this area are proposed.

18,005
Rudner, R.S. & Wolfson, R.J. NOTES ON A CONSTRUCTIONAL FRAMEWORK FOR A THEORY OF ORGANIZATIONAL DECISION MAKING. Contract AF 49(638) 33, AFOSR TN 58 1116, Presented at: Interdisciplinary Behavioral Sciences Research Conference, University of New Mexico, Albuquerque, N.M., June-August 1958, 72pp. Michigan State University, East Lansing, Mich.

18,005
This is a preliminary treatment of the first phase in a three-phase study: a definitional framework of concepts held to be pivotal in any adequate theory of organizational decision-making. The explicit development of such a theory and its empirical testing are future projects. The definitional framework comprises some 91 definitions. These are grouped into four related categories, with a section devoted to each category as follows: a pool of preliminary concepts, decision behavior, conflict and cooperation, and decision-making in organizations.
R 20

18,006
Rogers, T.F. THE RELATIVE EFFICIENCY OF PRESENT VHF IONOSPHERIC "BURSTS" AND "CONTINUOUS SCATTER" LONG-DISTANCE COMMUNICATION TECHNIQUES. AFCRC TR 58 156, June 1958, 27pp. USAF Communication Sciences Lab., AFCRC, Bedford, Mass.

18,006
The transmission efficiencies of the "burst" and "continuous" very high frequency long-distance communication techniques are compared using available data from the literature. For the same effective radiated power, an estimate is made of the teletype capacity which is available for 99 percent of a year's hours at an average character error rate of 1:1000. It is concluded that, at the present time, the continuous technique yields a high reliability-capacity product in the lower vhf region.
G. R 27

18,007
Norman, R.D. ORGANIZATION OF AND REACTIONS TO THE INTERDISCIPLINARY PROGRAM IN THE BEHAVIORAL SCIENCES SUPPORTED BY THE AFOSR AT THE UNIVERSITY OF NEW MEXICO. Contract AF 49(638) 33, AFOSR TN 58 1099, 1958, 66pp. University of New Mexico, Albuquerque, N.M.

18,007
An organized or systematic approach to interdisciplinary research in the behavioral sciences is discussed. The Interdisciplinary Program in the Behavioral Sciences consisted of two eight-week programs held at the University of New Mexico during the summer of 1957 and 1958. The present report is organized into three major sections: 1) a general description of the program--its purpose and organization, selection of participants, etc.; 2) reactions to some general aspects of interdisciplinary programs; and 3) observations on the functioning of the New Mexico effort specifically. A list of 43 research studies developed during the two conferences is appended.
T.

18,008
Lichte, W.H., Miller, J.G. & Borresen, C.R. THE INFLUENCE OF CHART SCALE AND AMOUNT OF INFORMATION ON AIMING-POINT IDENTIFICATION BY EXPERIENCED SUBJECTS. Contract AF 18(600) 1209, Proj. 7738, Task 27014, AFPTRC TN 58 2, Jan. 1958, 24pp. USAF Operator Lab., Randolph AFB, Tex. (University of Missouri, Columbia, Mo.).

18,008
As a first step in determining what kinds of charts are most helpful to the navigator in preparing for and carrying out his scope-reading and bombing tasks, an experimental study was made of the influence of chart scale and amount of information on aiming-point identification. A series of charts varying in chart scale and amount of information was constructed for experimental use with six groups of Ss; a seventh group used a conventional chart. The Ss were B-47 navigators. After a period of chart study, the Ss indicated target locations on 0-15 scope photographs. Errors were analyzed for effect of the chart variables.
T. R 1

18,010
Trinkl, F.H. & Carr, C.R. A STOCHASTIC FORCE SURVIVAL MODEL. Contract AF 49(368) 700, RM 2474, Jan. 1960, 23pp. The Rand Corporation, Santa Monica, Calif.

18,010
A stochastic model of possible Inter-Continental Ballistic Missile attacks provides a means of measuring the effectiveness of the methods that might be used in protecting a defender's retaliatory capability. Such a model is presented here. The model, which assumes that the attacker's strike consists of two or three reasonably heavy volleys followed by a sequence of much lighter volleys, is first presented for the no-warning case, then for the case with assured warning, and finally, for random warning. Although the model is presented in terms of protective measures for alert aircraft, it is flexible and may be used to evaluate other sets of protective measures and other possible components of the defender's force.
T.

18,011
Bittini, Marcella. A METHOD FOR INCREASING THE EFFECTIVENESS OF BRIEF SIGNALS BRIGHTER THAN THE BACKGROUND. Atti della Fondazione Giorgio Ronchi, Nov.-Dec. 1959, XIV(6), 611-618. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

18,011
The threshold illumination from a stimulus target subtending 12 minutes visual angle and lasting 60 msec. was measured when the stimulus was presented either in the dark or against an illuminated background. Each stimulus (blue or green) was seen against a background of the same color and was brighter than this background. Comparisons were made between threshold data obtained with rectangular and triangular targets having equal energy and duration and different time distribution luminance. Two observers made many observations. Implications of the findings for radar displays were discussed.
G. I. R 12

18,012
Vogelman, J.H. AIR FORCE COMMUNICATIONS EQUIPMENT: A LOOK INTO THE FUTURE. Proj. 4519, RADC TN 58 96, March 1958, 11pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

18,012
In an attempt to stimulate new ideas in the development of communications equipment for the United States Air Force, this report looks into the future, proposes some new components, and applies them to the problem of automatic switching equipment specializing in antennas and transmission lines and new transmitter techniques. It attempts to extrapolate technical advances, now in their research stage, to equipment in the future.
I.

18,013
Young, M.P. & Wall, G.F. MAN-MACHINE FACTORS IN THE NRL NUCLEAR REACTOR CONTROL SYSTEM. Proj. NR 401 000, Task NR 401 001, NRL Prob. Y02 03, NRL Rep. 5270, March 1959, 20pp. USN Research Lab., Washington, D.C.

18,013
One important problem in the design of a research reactor is the allocation of control responsibility among men and automatic equipment so as to achieve the maximum in safety, flexibility, and continuous operation. This report presents the man-machine considerations which led to the defining of the operator's task in the control system of the nuclear reactor at the U.S. Naval Research Laboratory and how these considerations were implemented in the original design. It is felt that the basic operating procedures described here may be modified to meet requirements of future reactor research programs.
T. I. R 1

18,014
Zajonc, R.B. & Smoke, W.H. REDUNDANCY IN TASK ASSIGNMENTS AND GROUP PERFORMANCE. Psychometrika, Dec. 1959, 24(4), 361-369. (University of Michigan, Ann Arbor, Mich.).

18,014
The problem of combining abilities of group members to maximize the performance of the group as a whole is examined in terms of redundancy in task assignments. In particular, ways of distributing a given number of items of information among a given number of individuals to obtain the maximum probability of each item being recalled by at least one individual are studied. It is shown that there exists an optimal distribution scheme which is independent of the amount of material originally given, the size of the group, and individual differences in ability. The model presented is not restricted to recall and may, with slight modifications, be applied to other behavior such as learning, problem solving, or decision-making.
G. R 10

18,015
Wang, R.I.H. & Kereiakes, J.G. PROTECTION FROM RADIATION INDUCED LETHALITY BY CHEMICAL MIXTURE AND PARTIAL-BODY SHIELDING. USAMRL Proj. 6X64 14 001, Task 04, Rep. 459, Dec. 1960, 10pp. USA Medical Research Lab., Fort Knox, Ky.

18,015
To determine the degree of protection afforded by the combined use of chemicals and gridshielding in mice exposed to X-irradiation at supra-lethal dose levels, a series of studies were conducted. Groups of mice were exposed to irradiations ranging from 1400 to 2300 roentgens; control groups were given no protection while experimental groups received protection in the form of gridshielding, chemicals (serotonin plus B-aminoethylisothuronium), or a combination of shielding and chemical protection. The mortality of mice following exposure was recorded every 24 hours for 30 days.
T. G. I. R 5

18,016
Yudkofsky, P.L. GROSS AND MICROCIRCULATORY EFFECTS OF TILTING AND ACCELERATION ON THE GOLDEN HAMSTER. Proj. 7222, Task 71746, WADD TR 60 373, Sept. 1960, 73pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,016
During a wide range of gravitational stress (from one to sixty positive g), the heart rate, respiratory rate, blood pressure, electrocardiogram, organ displacements, and microcirculation of the golden hamster were recorded and correlated. The effects of various anesthetics and hemorrhage on the observed responses were determined. The cardiovascular responses of the hamster to occlusion of the carotid arteries were interpreted and necropsy examinations performed to aid in interpreting the physiologic data. Test animals were also subjected to tilt from the horizontal to head-up position and physiologic responses observed. The cause of death at various magnitudes of acceleration was discussed.
T. G. I. R 110

18,017
Zechman, F.W., Cherniack, N.S. & Hyde, A.S. VENTILATORY RESPONSE TO FORWARD ACCELERATION. J. appl. Physiol., Sept. 1960, 15(5), 907-910. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

18,017
Two series of experiments dealing with the effect of forward acceleration on respiration in man were performed. In both series of studies the trunk was inclined 12 degrees in the direction of acceleration and a rate of onset of one g per second was used. In the first series, the effect of 5, 8, and 12 g on respiratory frequency, tidal volume, minute volume, and nitrogen elimination was determined. In the second series oxygen consumptions were measured before, during, and after accelerations of 5, 8, 10, and 12 g. The findings were discussed together with the need for further investigations of the mechanics of breathing before a full understanding can be had.
T. G. I. R 15

18,018
Brierly, W.B. ENVIRONMENTAL CRITERIA FOR EQUIPMENT DESIGN. Presented at: Fourth Annual USA Human Factors Engineering Conference, Army Chemical Center, Md., 9,10, 11 Sept. 1958, 40-41. USA Research Office, Office of the Chief of Staff, Washington, D.C.

18,018
The Department of the Army policy that relates to the attainment of the capability to conduct military operations in any world area is discussed with specific reference to equipment design and testing. The point is made that with increasing complexity of equipment and the great variety of tactical, strategic, and operational environments possible, the present philosophy of testing needs to be examined critically. Present activities in such a review are discussed.

18,019
Goldberg, B. INFRARED BINOCULARS AND HUMAN ENGINEERING. Presented at: Fourth Annual USA Human Factors Engineering Conference, Army Chemical Center, Md., 9,10,11 Sept. 1958, 51-60. USA Research Office, Office of the Chief of Staff, Washington, D.C.

18,019
A background of basic information about active infrared radiation and image convertor systems is presented and followed by a consideration of infrared binoculars, their use, and the human engineering problems that are still associated with them. Uses include locomotive driving and repair, missile erection and launching, construction operations, vehicle repair and bridge building, and helicopter landing in darkness. Some of the problems discussed are bulk, weight and balance, discomfort due to unequal magnification, limited field-of-view, and limited depth focus.
G. I.

18,020
Bittini, Marcella. ELECTRORETINOGRAPHIC RECORDS IN RESPONSE TO LOW-INTENSITY AND SHORT DURATION STIMULI. Atti della Fondazione Giorgio Ronchi, May-June 1960, XV(3), 260-263. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

18,020
To investigate the electroretinographic response to low-intensity, short-duration stimuli, a number of intensity curves were recorded for one S for durations varying from 2 to 44 msec. The color of the stimulus light was either green or blue. The height of the scotopic b-wave was plotted against luminance and the resultant curves were analyzed for the effect of duration. The results were discussed in terms of retinal interactions.
G. R 5

18,021
Hughes Aircraft Company. UHF AIR/GROUND SCATTER COMMUNICATION SYSTEM STUDY. Contract AF 19(604) 2160, Rep. 2160 F, Oct. 1957, 114pp. Communication Systems Lab. & Systems Development Labs., Hughes Aircraft Company,, Culver City, Calif.

18,021
This air/ground scatter communication study was undertaken to assess the significance of research findings on scatter propagation in terms of their application to military ultra-high frequency air/ground voice communications. The results stem from contact with qualified people in propagation research, systems engineering, and communications operations as well as from a careful review of the literature. Six background studies (UHF tropospheric scatter propagation, other propagation possibilities, airborne and ground antennas, modulation, equipment and operational considerations) are presented and a specific UHF Transhorizon Communication System is proposed and described.
T. G. I. R 80 (approx.)

18,022
Hurwitz, H.M.B. THE CHANGING ROLE AND STATUS OF THE SCIENTIST AND ACADEMIC IN AMERICAN SOCIETY INTERIM REPORT. Contract AF 49(638) 33, AFOSR TN 58 1107, 1957, 38pp. Birkbeck College, University of London, London, England.

18,022
This report is concerned with the broad issue of the changing role and status of the scientist and academic in American society. It involves a longitudinal study of their professions. There are three sections: 1) A discussion is presented of the "sciconad", a neologism which serves to designate a newly emerging socio-economic occupational class. The sciconad is an individual with professional, specialized training in one of the sciences, yet one who functions within an organizational setting. 2) Several suggestions are presented for further study of the problem. 3) A series of appendices reveal the extent to which relevant information has been obtained to date on the problem under study.
R 70

18,023
Sauer, B.P. 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.).

18,023
This report presents approaches to various areas embraced by the theory of systems. Section I is an expository discussion of digital processes containing a brief historical account of routine computational procedures in classical mathematics, the Post-Turing theory of algorithms, and the abstract idea of digital analysis. Sections II "Discrete Linear Mechanisms" and III "Continuous Mechanisms" present a treatment of the basic theory of pulsed and continuous servomechanisms. Section IV contains an extensive development of weighting functions from the point of view of functional analysis. In Section V, a class of mechanisms known as finite automata is analyzed
G. I. R 18

18,024
Alvord, R.W. & O'Clair, F.R. INVESTIGATION OF THE RELIABILITY OF RECOMMENDATIONS RESULTING FROM A FLIGHT TEST EVALUATION. AFFTC TN 58 21, May 1958, 38pp. USAF Flight Test Center, Edwards AFB, Calif.

18,024
To investigate the reliability of USAF Flight Test Center (AFTC) test recommendations in detecting and eliminating operational problems, an opinion survey of 45 pilots and 106 maintenance personnel was accomplished. The pilots completed a survey form requiring evaluation of 126 cockpit features. These features were largely based on recommendations which had been made by the AFTC at a previous time. Acceptability levels of items where modification had been accomplished, partially accomplished, and not accomplished were analyzed. Maintenance personnel were asked to evaluate specific training inadequacies and assign rank order maintainability ratings to aircraft in each of several areas. Responses were analyzed in relation to test predictions.
R 4

18,025
Ashby, W.R. & Riguet, J. THE AVOIDANCE OF OVER-WRITING IN SELF-ORGANISING SYSTEMS. Contract N62558 2404, Proj. NR 049 147, Tech. Rep. 1, Oct. 1960, 8pp. Burden Neurological Institute, Bristol, England.

18,025
When a whole computation or adaptation must be achieved by stages so that earlier results are preserved for use in later stages, the intervening processes must not be allowed to over-write (alter and destroy) the results found earlier. The problem dealt with here is how over-writing can be avoided in self-organizing computer systems. Two methods are considered: 1) information in the necessary quantity must be processed and utilized, and 2) the general parameters of design must be so chosen as to reduce the chance level to a satisfactory degree along with processing an appropriate quantity of information.
R 3

18,026
Conover, D.W. STUDY OF THE HUMAN ELEMENT IN FUTURE ANTI-BALLISTIC MISSILE SYSTEMS. Contract NONR 2953(00), ARPA Order 5 58, Task 9, Part I, Final Summary Rep. ZG 017, Dec. 1960, 94pp. Convair Division, General Dynamics Corporation, San Diego, Calif.

18,026
A summary of the human role in current and proposed future anti-ballistic missile (ABM) systems is treated in a general way without reference to specific system configurations. A preliminary model of a hypothetical ABM system is presented as a frame of reference within which subsequent efforts will be undertaken in the development of system element requirements along behavioral dimensions common to both men and machines. Specific attention is focused upon the role of man in the command and control of ABM systems, the human function in system maintenance and in the management of system development programs.
I. R 17

18,027
Bittini, Marcella, Ercoles, Anna Maria, Fiorentini, Adriana, Ronchi, Lucia, et al. ENHANCED CONTRAST OF AN INDEFINITELY CONTOURED OBJECT BY MOVEMENT OR INTERMITTENT ILLUMINATION. Atti della Fondazione Giorgio Ronchi, Jan.-Feb. 1960, XV(1), 62-84. (Istituto Nazionale di Ottica, Arcetri, Firenze, Italy).

18,027
Two conditions under which the contrast of an indefinitely contoured object may be enhanced were investigated: movement and intermittent illumination. 1) The visibility of both a dark and bright Mach band (perceived at regions of the visual field where the first derivative of luminance with respect to a spatial abscissa has a sharp variation) was measured during an oscillatory movement of the test field. The results were discussed in terms of retinal inhibitory mechanisms. 2) The perception of contrast, in extrafoveal vision, at mesopic and scotopic levels of steady illumination was compared to that under pulsating illumination. The findings were discussed in terms of retinal duality; an electrical parallel is suggested.
G. I. R 30

18,028
Horrocks, J.E., Krug, R.E. & Heermann, E. TEAM TRAINING II: INDIVIDUAL LEARNING AND TEAM PERFORMANCE. Contract N61339 198, NAVTRADEVCEN TR 198 2, Aug. 1960, 56pp. USN Training Device Center, Port Washington, N.Y. (Ohio State University Research Foundation, Columbus, Ohio).

18,028
To evaluate the effectiveness of team performance under varied conditions, two laboratory team tasks (information handling through the decoding of jumbled sentences and judgment making in regard to target positions) were designed and tested under various conditions. Among the variables investigated were various degrees of specificity in knowledge of results, separate vs. combined practice by team members, and pre-training. Implications for applied training procedures to Navy teams are discussed.
R 121

18,029
Shambaugh, G.F. & Pratt, J.J., Jr. DEVELOPMENT OF INSECT REPELLENTS FOR PERSONAL USE. I. DIETHYLTOLUAMIDE. Proj. 7 65 01 002, Pesticides Section Rep. 1, May 1959, 15pp. USA Chemicals & Plastics Div., QM Research & Engineering Command, Natick, Mass.

18,029
This summary of the research and development on diethyltoluamide was assembled from several published and unpublished sources. It is intended for use by the Continental Army Command in evaluating this repellant as an acceptable troop use item. A report was made on laboratory and field tests on skin and clothing, stability with packaging, effect on textiles and plastics, cosmetic acceptability, toxicology, commercial availability, and cost.
T. R 13

18,030
Slote, L. THE ENGINEERING BIOTECHNOLOGY OF HANDLING WASTES RESULTING FROM A CLOSED ECOLOGICAL SYSTEM THERMAL ENERGY EXCHANGE WITH SPECIFIC APPLICATION TO WASTE HANDLING IN A CLOSED ECOLOGICAL SYSTEM PROGRESS REPORT. Contract AF 18(603) 71, AFOSR TR 58 268, July 1957, 7pp. College of Engineering, New York University, New York, N.Y.

18,030
The variation in the total surface temperature of a perfect heat conducting or spinning biosattelite for a given orbit and for various conditions of irradiation is analyzed. The results of the analysis are applied to the problem of using thermal energy sources in connection with processes for cracking of human waste and for the purification of urine by freezing in a closed ecological system.
T. R 5

18,031
Smith, H., Wuerffel, H.L. & Hartshorne, F.A. PHILOSOPHY AND GUIDELINES FOR RELIABILITY PREDICTION OF GROUND ELECTRONIC EQUIPMENTS (AN INTERIM ENGINEERING REPORT). Contract AF 30(602) 1623, Proj. 4526, Task 45155, RADC TN 58 20, Oct. 1957, 85pp. USAF Reliability Techniques Section, RADC, Griffiss AFB, N.Y. (Government Service Dept., Radio Corporation of America, Camden, N.J.).

18,031
The basic concepts of reliability prediction of ground electronics equipments are stated and the methods which have yielded accurate predictions as evidenced by field experience are described. Detailed engineering data developed for the techniques are included along with descriptions of other important aspects of reliability improvement and prediction which require further exploration and development.
T. G.

18,033
Stevens, M.E. A SURVEY OF AUTOMATIC READING TECHNIQUES. NBS Proj. 1205 20 5712, NBS Rep. 5643 & RADC TN 58 21, Aug. 1957, 88pp. US Data Processing Systems Div., National Bureau of Standards, Washington, D.C.

18,033
This report presents the results of a survey and evaluation of current developments in automatic reading techniques. In addition to a study of available literature, inspections of devices in operation or under development and detailed discussions with personnel engaged in studies of character recognition techniques were made. The results are discussed under the following headings: 1) areas of applicability of automatic reading techniques, 2) critical factors in automatic reading problems, 3) controlled solutions to reading problems, 4) automatic reading techniques, and 5) further prospects for development.
T. I. R 56

18,034
Giles, C.G. THE SKIDDING RESISTANCE OF ROADS AND THE REQUIREMENTS OF MODERN TRAFFIC. Road Paper 52, Presented at: Road Engineering Division Meeting, London, England, 23 Oct. 1956, 33pp. Institution of Civil Engineers, Westminster, London, England. (Road Research Lab., Dept. of Scientific & Industrial Research, London, England). (Proc. Instn. Civ. Engrs., Feb. 1957, 6, 216-249).

18,034
The problems to be considered in insuring that in wet weather the skidding resistance of roads is adequate for the demands of modern traffic are examined. Standards for meeting the full performance of vehicles in braking, cornering, and accelerating, and the extent to which requirements are modified by the manner of driving are discussed. Methods of measuring skidding resistances of surfaces are reviewed with an interpretation of test results. Investigations on the relation between skidding resistance and risk of skidding accidents are considered. As a guide to meeting requirements, a table of suggested sideway-force coefficients is presented.
T. G. I. R 14

18,035
Wever, E.G. THE COCHLEAR POTENTIALS AND THEIR RELATION TO HEARING. Ann. Oto-, Rhino-, Laryngology, Dec. 1959, 68(4), 975-989.

18,035
The view that cochlear potentials constitute one of the essential links in the chain of events from the entrance of sounds into the ear to the arousal of auditory sensations is defended in this paper. A comparison of the threshold acuity of animals as determined by behavioral methods with the pattern of cochlear potentials recorded from the same animals is made, using available data from the literature. A number of features that bring out certain systematic relations between the cochlear potentials and auditory acuity are presented and discussed.
G. R 23

18,036
Fried, C. STUDIES ON THE KINETIC DEPTH EFFECT AS A MEANS FOR PRESENTING THREE-DIMENSIONAL INFORMATION: II. EFFECTS OF VARYING ANGLE AND LENGTH OF A TWO-DIMENSIONAL FORM. OCO Proj. TB1 1000, Tech. Memo. 18 60, Dec. 1960, 35pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,036
An attempt was made to correlate the amount of length and angle changes of shadow projections of rotating wire rods with the ease with which the depth impression of the Kinetic Depth Effect (KDE) is elicited. This attempt was based on the findings of a previous study that the stimuli for KDE are length and angle changes of line making up a moving form. On the basis of the findings of this study suggestions are offered for further search for stimuli determining this illusion.
T. G. I. R 4

18,037
Grime, G. THE PERFORMANCE OF HEAD-LAMP MEETING BEAMS. Proc. Instn mech. Engrs, Automobile Division, 1954-5, (3), 108-16. (Road Research Laboratory, Department of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

18,037
This paper is largely concerned with work done at the Traffic and Safety Division of the Road Research Laboratory, Great Britain, on the question of improvement of vehicle headlighting, and thus visibility, on the road. The work falls into three parts: 1) surveys to determine the magnitude of the dazzle (glare) problem and the state of aim and maintenance of headlights in use, 2) the development of methods of testing headlamps and forecasting their performance from curves of light distribution, and 3) consideration of methods of improving visibility and reducing dazzle.
T. G. I. R 7

18,038
Grime, G. & Giles, C.G. THE SKID-RESISTING PROPERTIES OF ROADS AND TYRES. 1954, 19pp. Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England. (Reprinted from: Proc. Instn. mech. Engrs., Automobile Div., 1954-5, (1), 19-30).

18,038
This paper is concerned almost entirely with skidding on wet roads. The main facts are given concerning the importance of wet-weather skidding in relation to accidents, and then methods of measuring the slipperiness of road surfaces are considered. Typical results for British roads are given and considered in relation to such factors as types of surfacing and surface texture. It is then shown that the non-skid properties of tires depend for their effectiveness upon the type of road surface as well as on the tread pattern. The results of experiments with a number of different patterns are discussed.
T. G. I. R 11

18,039
Spiegel, F.S. CHANGING CONCEPTS IN PHYSICAL STANDARDS FOR FLYING. Aerospace Medicine, Nov. 1960, 31, 941-948. (USAF Office of the Command Surgeon, San Francisco, Calif.).

18,039
It is noted that physical standards for aviation pilots have not changed significantly over the years but that there have been refinements in examination techniques and improvements in evaluation of essential organ systems. Several examples of each of these avenues of advancement are given. It is anticipated that in the forseeable future further application of the results of laboratory tests and mass surveys will help the flight surgeon in even better selection of candidates for the job at hand.
R 26

18,040
Smeed, R.J. ACCIDENT RATES. ca. 1953, 11pp. Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England. (Reprinted from: Internatl. Road Safety & Traffic Rev.).

18,040
A large amount of vehicular accident information from different countries has been brought together and analyzed in an effort to arrive at an understanding of the way accident frequency varies with the quantities to which it can be related. The variables discussed are: 1) number of vehicles, 2) type of accident injury, 3) number of vehicles involved, 4) accidents at junctions, 5) rural vs. city areas, 6) traffic flow, and 7) distance traveled.
T. G. R 13

18,041
Smeed, R.J. SOME STATISTICAL ASPECTS OF ROAD SAFETY RESEARCH. J. Royal statist. Soc., 1949, CXII(1), 1-23. (Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

18,041
This paper surveys some aspects of road accident statistics and draws attention to some of the matters into which investigation is required. Accident rates in different countries are compared and the trend of accident rates in Great Britain are considered along with the economic cost of road accidents. Some of the available evidence of the success of various accident prevention methods are then discussed.
T. G. I. R 18

18,042
Glanville, W.H. SPEED ON THE ROAD AND RELATED EFFECTS. Proc. Roy. Instn., 1956, 36(163), 1-17. (Road Research Lab., Department of Scientific & Industrial Research, Harmondsworth, Middlesex, England).

18,042

This paper deals with problems of safety as related to driving speeds. In general, consideration is given to what happens up to speeds of 100 mph. The human operator as a road user and driver, how he reacts to speed, and how accurately he judges speed are considered first. The efficiency of brakes, distances required to stop and how it varies with speed are considered. These considerations are then linked to the question of the tire/road combination. The energy stored up in the moving car, the forces required to stop the car, and protective devices for crash injury are discussed.
T. G. I.

18,043

Charlesworth, G. & Coburn, T.M. THE INFLUENCE OF ROAD LAYOUT ON SPEEDS AND ACCIDENTS IN RURAL AREAS. Presented at: Public Works and Municipal Services Congress, Harmondsworth, Middlesex, England, Nov. 1956, 21pp. Road Research Lab., Dept. of Scientific & Industrial Research, Harmondsworth, Middlesex, England.

18,043

This paper presents information on the effect of certain items of road layout on speed and accidents on rural roads. The estimates of the effect of road curvature, gradients, carriageway width, and amount of traffic on mean speeds are presented for use in assessment of the value of road improvements. Formulae relating the speed exceeded by the fastest 15 percent of cars and the fastest five percent of cars to mean speed are derived for use in selecting the speed value to be used for design purposes. A comparison of accident rates per vehicle mile on different roads is made to show benefits obtained from various types of road improvement.
T. G. I. R 14

18,045

Davis, J.M., McCourt, W.F. & Solomon, P. THE EFFECT OF VISUAL STIMULATION ON HALLUCINATIONS AND OTHER MENTAL EXPERIENCES DURING SENSORY DEPRIVATION. Amer. J. Psychiat., April 1960, 116(10), 889-892.

18,045

To test the hypothesis that it is the absence of meaningful stimulation rather than the absence of sensory stimulation itself that produces hallucinations and other abnormal mental states, ten persons served as Ss. Each S was placed in a tank-type respirator with the vents open, in a semi-darkened room, wearing cardboard cuffs over arms and legs. A constant repetitive auditory stimulus from the motors of the respirator and air-conditioner was present along with random light flashes and flashed projections of colored Rorschach cards, also at random intervals. Subjects were kept in the respirator ten and one half hours or released upon request. Records of heart rate, Ss' verbalization, and subsequent psychological tests were analyzed and compared with results from a previous experiment with no visual stimulation. T. R 7

18,046

White, B.W. RECOGNITION OF DISTORTED MELODIES. Amer. J. Psychol., March 1960, LXXIII, 100-107. (Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.).

18,046

To measure the effects of various transformations on the recognizability of familiar melodic patterns, Ss were asked to identify short passages from ten well-known songs. Transformations were effected by performing various operations (some linear and some non-linear) on the intervals between adjacent notes in each melodic pattern and by temporal reversal. The results were discussed in terms of possible factors in pattern recognition.
T. R 3

18,050

Collins, L.R. & Leonard, J.L. NAVAL TACTICAL DATA SYSTEM (NTDS) SERVICE TEST LOGIC SYMBOLOGY. Contract SS 19006, Task 5643 (NEL R1 7), NEL Res. Rep. 1004, Oct. 1960, 44pp. USN Electronics Lab., San Diego, Calif.

18,050

This report presents a description and analysis of the Naval Tactical Data System Service Test logic symbology and proposes a uniform or standard logic symbology which includes all information required for maintenance, such as logic function, electrical operation, input-output connections, and hardware location. The proposal is based upon study of the service test system logic symbology and analysis and comparison of the systems used by Remington Rand Univac, Collins Radio Company, and Hughes Aircraft Company—the three principal contractors.
I. R 33

18,051

McGrath, J.J. HUMAN FACTOR PROBLEMS IN ANTI-SUBMARINE WARFARE. THE EFFECT OF IRRELEVANT ENVIRONMENTAL STIMULATION ON VIGILANCE PERFORMANCE. Contract NONR 2649(00), Proj. NR 153 199, Tech. Rep. 6, Nov. 1960, 79pp. Human Factors Research, Incorporated, Los Angeles, Calif.

18,051

Two experiments were conducted to test hypotheses from two theories of vigilance: 1) the "filter" theory (the observer during a vigil increasingly selects irrelevant environmental stimuli); and 2) the "arousal" theory (competing stimuli will increase arousal). Experiment I tested the effects of extraneous auditory stimulation on visual vigilance performance. Twenty-eight Ss detected brightness increments of an intermittent light; on four sessions white noise was presented, on another four auditory stimulation was presented. Experiment II tested the effects of extraneous visual stimulation on auditory vigilance performance. Eighteen Ss detected loudness increments of an intermittent pure tone; on two sessions Ss scanned photo albums, on another two they did not. Recommendations for further research are made. T. G. I. R 33

18,052

McGrath, J.J. HUMAN FACTOR PROBLEMS IN ANTI-SUBMARINE WARFARE. SUBJECTIVE REACTIONS OF VIGILANCE PERFORMERS. A SUPPLEMENTARY NOTE TO A STUDY OF INDIVIDUAL DIFFERENCES IN VIGILANCE PERFORMANCE. Contract NONR 2649(00), Proj. NR 153 199, Supp. Note to Tech. Reps. 2 & 4, May 1960, 10pp. Human Factors Research, Incorporated, Los Angeles, Calif.

18,052

Fifty-four Ss who participated in a study of individual differences in vigilance performance were interviewed in order to: 1) obtain introspective reports of attitudes toward the study, 2) obtain information concerning changes in motivational state from week to week and during each hour's watch, and 3) obtain an idea of intellectual approaches to the task. A non-directive approach was used to interview each S privately about ten days after the last experimental session. The theoretical implications of the Ss' introspective reports were discussed.
R 3

18,053

Briggs, P. MEASUREMENT OF HUMAN OPERATOR ALERTNESS IN CONTINUOUS CONTROL SYSTEMS. Contract AF 19(604) 4548, Rep. 8055 2, ERD TN 60 794, April 1960, 30pp. Dynamic Analysis and Control Lab., Massachusetts Institute of Technology, Cambridge, Mass.

18,053
A technique is proposed and evaluated for measuring the alertness of the human operator who is assigned a continuous visual tracking task demanding a high degree of precision during a prolonged period of time. The technique is this: while the operator is tracking a continuously varying reference input, a relatively high frequency, low amplitude disturbance is intermittently introduced at a point between the operator and the process he is controlling; it is thus necessary to cancel the disturbance by appropriate manipulation of the controls. His amplitude-phase response to the disturbance input is taken as an alertness measure. Laboratory tests were performed using a simulated vehicular control task for one hour periods.
T. G. I.

18,054
Brunner, L.K., Clevenger, L.J. & Dodson, G.W. A METHOD OF IDENTIFYING, QUANTIFYING AND SPECIFYING THE OBJECTIVE PREDICTORS OF MAINTAINABILITY. June 1960, 79pp. USAF School of Logistics, Wright-Patterson AFB, Ohio.

18,054
This study was conducted to develop a method of identifying, qualifying, and specifying the objective predictors of maintainability. A sampling technique was presented which makes possible a maintainance evaluation of the entire weapon system. Reliability and maintainability were discussed both separately and together as they affect availability.
T.

18,055
Barr, N.L., Hussman, T.A., Jr. & Parker, J.F., Jr. THE VISIBILITY OF AIRPORT RUNWAYS. Proj. NM 001 056.07.03, BUAER Proj. TED PTR AC223, Nov. 1954, 46pp. USN Medical Research Institute, Bethesda, Md.

18,055
This report was designed to provide a theoretical demonstration of the influence of the brightness difference between runway and surrounding terrain on runway visibility and to provide airport engineers with means of determining the precise influence of any given runway surface material or terrain cover on the visibility of the runway. Photometric measurements of reflectivity and inherent contrast of runway and surrounding terrain surfaces of 30 airports, along with tables and graphs relating brightness differences between runways and surrounding terrain to runway visibility, were presented.
T. G. I. R 8

18,057
Belleville, R.E., Rohles, F.H., Jr., Grunzke, M.E. & Clark, F.C. COMPLEX AVOIDANCE BEHAVIOR IN THE CHIMPANZEE AND ITS APPLICABILITY TO THE STUDY OF SPACE ENVIRONMENTS. Proj. 6893, Tasks 68930 & 68931, AFMDC TR 60 27, Sept. 1960, 20pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

18,057
The concurrent development of two types of avoidance behavior in the chimpanzee is described. A discrete avoidance task was superimposed on a schedule requiring continuous avoidance behavior. The rationale for using these tasks for measuring the behavioral effects of space flight is presented.
G. I. R 10

18,058
Braunstein, M. & Anderson, N.S. A COMPARISON OF READING DIGITS ALOUD AND KEYPUNCHING. Rep. RC 185, Nov. 1959, 13pp. IBM Research Center, Yorktown Heights, N.Y. (University of Michigan, Ann Arbor, Mich. & University of Maryland, College Park, Md.).

18,058
To compare talking to keypunching for relatively untrained operators, five experimental Ss with no prior training in keypunching were studied. After a few practice sessions on the keypunch, the Ss were required to read digits for five minutes into a tape recorder and then to key digits for five minutes on a summary punch. Three series were performed. A preference survey was made by asking the S to either read or keypunch three sheets of 25 digit numbers as they preferred. Errors, reading, and punch rates (calculated from errors and time) were analyzed for relative speed and accuracy of the two methods.
T. G.

18,059
Blair, W.C. & Plath, D.W. SHIP CONTROL XI. STEERING AND DIVING WITH THE COMBINED INSTRUMENT PANEL AND A CONTACT ANALOG-ROADWAY DISPLAY. Contract NONR 2512(00), Tech. Rep. SPD 60 078, P60 128, Sept. 1960, 28pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

18,059
Investigated was the effectiveness of the contact analog display with a roadway type device which would yield more precise interpretation of the ship's motive and command information and a standard of comparative performance based upon the existing operational display. Three different displays were evaluated by testing three groups of five subjects each. The task of the subject was to seek and keep course and depth simultaneously on one of three ship control displays: a combined instrument panel, a contact analog-roadway display with order information, and a contact analog-roadway display with error information.
T. G. I. R 9

18,060
Bliss, W. & Diamantides, N.D. OBSTACLE IDENTIFICATION AND DISPLAY: PERCEPTUAL-MOTOR STUDIES FOR THE BELL HELICOPTER CORPORATION. THIRD INTERIM REPORT. Contract NONR 1670(00) FW 2601, GER 9949, Oct. 1960, 30pp. Goodyear Aircraft Corporation, Akron, Ohio.

18,060
Presented is a theoretical analysis of adaptive control system models with particular reference to human adaptive analogies that appear feasible. The description of the experimental apparatus to be used in psychophysical experimentation in human adaptive perceptual-motor characteristics, and the statement of the experimental problem and design are included in the report.
T. I. R 14

18,061
Boynton, R.M., Elworth, C.L., Onley, Judith W. & Klingberg, C.L. FORM DISCRIMINATION AS PREDICTED BY OVERLAP AND AREA. Contract AF 30(602) 1973, Proj. 8501, Task 85001, RADC TR 60 158, Sept. 1960, 59pp. USAF Rome Air Development Center, Griffiss AFB, N.Y. (University of Rochester, Rochester, N.Y.).

18,061

To determine the value of overlap as a predictor of form discriminability, nine subjects viewed 105 different form pairs in eight relative rotary orientations. Six experimental conditions were tested with the response tendencies controlled by using monetary reward. An instrument for making the overlap measurements was developed Thus, the relationships between the physical measure of overlap and the psychophysical measure of form discriminability could be obtained.
T. G. I.

18,062

Baker, Alma S. BIBLIOGRAPHY OF INFORMATION THEORY. SUPPLEMENT. July 1954, 32pp. Engineering Library, Documents and Research Information Section, Raytheon Manufacturing Company, Waltham, Mass.

18,062

This bibliography covers material on general information theory, exclusive of speech and television information theory. The period covered is mainly from January 1953 to July 1954. The bibliography is arranged alphabetically by author. A total of 221 items is included and 60 periodicals are represented.
R many

18,063

Bellman, R. & Kalaba, R. ON COMMUNICATION PROCESSES INVOLVING LEARNING AND RANDOM DURATION. Reprinted from: "1958 IRE National Convention Record, Part 4," 1958, 16-21. The Institute of Radio Engineers, Inc., New York, N.Y. (The Rand Corporation, Santa Monica, Calif.).

18,063

A brief resume is given of previous papers showing that certain aspects of the fundamental problem of determining the utility of a communication channel in conveying information may be viewed as problems within the framework of multi-stage decision processes of the stochastic type, and as such may be treated by the theory of dynamic programming. In this paper, the treatment of communication problems involving the use of a channel whose statistical properties are not completely known is shown. Also those channels involving processes of random duration are discussed. Both are special cases of still more general problems in prediction.
G. R 15

18,064

Black, J.W. PREDICTING THE INTELLIGIBILITY OF WORDS. Folia phoniat., 1960, 12(4), 260-272. (Ohio State University, Columbus, Ohio).

18,064

To find whether or not the intelligibility of a word might be predicted from phonetic recognition values, the relative intelligibility values of approximately 1200 common English words were determined on the basis of correct identifications by 200 listeners. Each word was pronounced by from 12 to 20 speakers. The listeners, wearing headsets, were in a high-level noise field. Responses, both correct and incorrect, provided material from which relative scores of the recognition of the different vowels and consonants of the stimulus words were determined.
T. G.

18,065

Beckman, E.L., McNutt, D.C. & Rawlins, J.S.P. ESCAPE FROM DITCHED AIRCRAFT. III. AN INVESTIGATION INTO THE FEASIBILITY OF USING THE STANDARD MARTIN-BAKER EJECTION SEAT SYSTEMS FOR UNDER WATER ESCAPE FROM DITCHED AIRCRAFT FPRC 1093, July 1959, 21pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

18,065

The feasibility of using the ejection seat as a method of escape from ditched aircraft at sea was investigated. The physical forces which would act upon the pilot when using the ejection seat in water were measured in a test tank. Subsequent to the above measurements an evaluation of the human tolerance to these forces was undertaken in a lake approximately 30ft. deep. Finally, the hazards involved in ejecting through the canopy underwater were evaluated. Functioning of the auxiliary systems of the ejection seat were also undertaken. Recommendations were made for modifying the present ejection seat systems to improve their performance under water.
T. G. I. R 8

18,066

Billingham, J. & Hughes, T.L. PROTECTION OF AIRCREW AGAINST THE HIGH CABIN TEMPERATURES WHICH MAY OCCUR IN PROLONGED SUPERSONIC FLIGHT AFTER FAILURE OF THE CABIN COOLING SYSTEM. FPRC 1109, Mech. Eng. Tech. Note 302, Feb. 1960, 26pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England & Royal Aircraft Establishment, Farnborough, Hants, England).

18,066

The variations of temperature and flow of air ventilated suits ventilating air needed to achieve reasonable comfort with cabin environments of increasing severity were investigated. Tests were made in a simulated aircraft cockpit under conditions representing high speed flight at low altitude. An S wearing a specific clothing assembly was cooled by means of an air ventilated suit (AVS); his microclimate temperature (next to skin) was accurately measured by an electrical resistance thermometer. There was no supply of cooling air in the cabin. The AVS man/flow temperature combinations necessary to keep the microclimate temperature at 32.5 degrees C were established for aircraft skin temperatures of 125, 142, 165, and 183 degrees C. Practical implications of the results were discussed. T. G. I. R 10

18,067

Billingham, J. & Kerslake, D. McK. SPECIFICATION FOR THERMAL COMFORT IN AIRCRAFT CABINS. FPRC Memo. 133, June 1960, 25pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farborough, Hants, England).

18,067

A proposed specification of requirements for thermal comfort in aircraft cabins is presented and recommended for use in place of existing requirements. A detailed analysis of the differences between existing and proposed specifications and the reasons for change are given in an appendix. The proposed specification is based on a theoretical analysis which has received some experimental support and is put forward at this time for use in high performance aircraft. These topics are covered in the specification: heat exchange at the skin, clothing insulation, insulation of the air, globe temperature, solar radiation, humidity, departure from comfort state, principles in use of the specification, examples, and use of globe thermometer.
G. R 7

18,068

Billingham, J. & Kerslake, D. McK. AN ANALYSIS OF ENVIRONMENTS COMPATIBLE WITH THERMAL COMFORT IN MAN. FPRC Memo. 134, June 1960, 18pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

18,068

A theoretical analysis is given of ways in which the various environmental parameters may be combined to produce the state of thermal comfort. Combinations of these parameters are considered: activity level of man; clothing worn; temperature and flow of ventilating air, if any; wattage dissipation and location of electrical heating elements in suit, if any; radiant temperature of environment; air temperature and movement; atmospheric pressure; solar radiation falling on man. Equations connecting the variables are unwieldy so four intermediary quantities are used: H=total heat flow through the clothing; I_c=insulation of clothing; I_a=insulation of boundary air layer above clothing or exposed skin; and Tg=globe thermometer temperature. The information is given graphically as to the calculated comfort conditions. G. R 6

18,069

Bowen, H.M., Kelley, C.R. & Ely, J.H. TRACKING TRAINING IV: DESIGN AND UTILIZATION OF THE GENERAL VEHICULAR TRAINER. Contract NONR 1908(00), NAVTRADEVCEN TR 1908 00 4, Aug. 1960, 50pp. USN Training Device Center, Port Washington, N.Y. (Dunlap and Associates, Inc., Stamford, Conn.).

18,069

The design of a General Vehicular Trainer is described in detail. The trainer is designed to accomplish preliminary training in vehicular control for early stages in the training courses for pilots, submarine helmsmen/planesmen, surface ship helmsmen, land vehicle drivers, etc. Recommendations concerning utilization practice and the design of a field evaluation test are given. An experiment is reported that compared nine methods of scoring. Major recommendations arising from the series of studies, of which this is the fourth, are presented. T. G. I. R 5

18,070

Blackwell, H.R. & Bixel, G.A. THE VISIBILITY OF NON-UNIFORM TARGET-BACKGROUND COMPLEXES: I. PRELIMINARY EXPERIMENTS. Contract AF 30(602) 1974, Tech. Rep. 890 1 & RADC TR 60 99, April 1960, 56pp. Ohio State University Research Foundation, Columbus, Ohio.

18,070

A study was made of the extent to which it is meaningful to assign a value of "effective contrast" to represent the visibility of a target in a target-background complex where the target and background may be of non-uniform luminance. The threshold value of relative contrast for several sizes and shapes of targets at various luminance levels were established by a method of adjustment to threshold. The probability of detection was also experimentally established as a function of values of relative contrast, using a method of constant stimuli with a temporal force-choice discriminatory-criterion. The relations of threshold value of physical contrast to background luminance and detection probability to physical contrast were also established for unifrom target-background displays. T. G. I. R. 16

18,071

Aero Service Corporation. SMALL SCALE AERIAL PHOTOGRAPHY. Contract AF 30(602) 1840, RADC TR 60 152 & Rep. 8156 07, Sept. 1960, 62pp. Aero Service Corporation, Philadelphia, Penn.

18,071

This manual is written to introduce the experienced photo interpreter to the subject of interpreting small scale (defined here as 1:50,000 and smaller) aerial photographs; to point out how many of his usual techniques can be applied; to indicate some precautions that must be taken in so doing; and to introduce some new equipment, methods, and techniques for deriving the maximum information from small scale photography. The manual is organized into five sections: 1) introduction and purpose, 2) factors affecting interpretability, 3) materials and equipment for viewing, 4) an approach to interpretation, and 5) interpretation of selected subjects. A selected list of references is included.
G. I. R 17

18,072

Adams, G.L. PERFORMANCE EVALUATION OF APPRENTICE WEAPON CONTROL SYSTEMS MECHANICS. GRADUATES OF ATC COURSE NO. ABR32231F. Proj. 998HL27, APGC TR 60 56, Oct. 1960, 24pp. USAF Air Proving Ground Center, Eglin AFB, Fla.

18,072

The ability of apprentices graduating from the Air Training Command Resident Course (Weapon Control Systems Mechanic) to perform the duties of their specialty was compared to that of apprentices receiving only fundamental training in the resident course and special equipment training in the Field Training Detachment. Six apprentices, representing an academic cross section of each course, were to do the normal duties of an apprentice weapon control mechanic at Tyndall Air Force Base. For a period of three months each apprentice was under the supervision of an experienced worker who kept records of work accomplished, nature of assistance needed, and made ratings on performance ability and work time. Improvements in the training course were recommended on the basis of findings.

18,073

Anderson, Nancy S., Braunstein, M. & Novick, Lee. AN EVALUATION OF HUMAN READABILITY AND RECOGNITION OF A SPECIALIZED FONT. Rep. RC 219, Feb. 1960, 20pp. IBM Research Center, Yorktown Heights, N.Y.

18,073

Two experiments were conducted to evaluate human readability and recognition of the new banking system font of numbers, known as E13B, compared to a standard Banker's Gothic font. The first was an adding machine transcription study in which two groups of three Ss worked on both fonts for an average of seven hours over a period of 18 days. A second experiment also used two groups of 18 Ss who crossed out numerical characters in the two fonts for a three hour period in one day. Mean scores from both situations were compared for the two fonts in terms of accuracy and speed.
T.

18,074

Allen, R.G., Brown, F.A., Logie, L.C., Rovner, D.R., et al ACUTE EFFECTS OF GAMMA RADIATION IN PRIMATES. Radiation Res., May 1960, 12(5), 532-539. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

18,074

A study was made of the survival of small primates after whole-body exposure to a source of pure gamma radiation to examine the clinical and pathological syndrome produced particularly in the mid- and high-dose regions. Doses of 400 to 40,000 r were given to 107 small primates exposed in 16 groups. Statistical evaluation of survival times, determination of the $LD_{50}(30)$ dose, clinical observations for a 30-day irradiation period, and immediate postmortem examinations were performed. Each method was used to categorize the groups of animals; the groups were compared for correspondence and then classified as to central nervous system, gastrointestinal, and hematopoietic types of radiation death.
T. G. I. R 8

18,075

Altman, I. & Terauds, Anita. MAJOR VARIABLES OF THE SMALL GROUP FIELD. Contract AF 49(638) 256, Suppl. Agreement 2(59 634), AFOSR TN 60 1207, Rep. HSR RR 60/6 GN, Nov. 1960, 730pp. Human Sciences Research, Inc., Arlington, Va.

18,075

This report is one of a series in a program to intergrate small group research knowledge. The facet of this work presented here is a systematic review of major variables appearing in the small group studies analyzed in the course of the program. Each variable is described in terms of operational varieties, major and minor variables related to, and the extent of, association with other variables. In addition, a special review of individual and group performance effectiveness variables is presented. It is intended as a source book for social scientists and operational personnel.
T. G. R 250

18,076
Hartline, H.K. RECEPTOR MECHANISMS AND THE INTEGRATION OF SENSORY INFORMATION IN THE EYE. Rev. mod. Physics, April 1959, 31(2), 515-523. (The Rockefeller Institute, New York, N.Y.).

18,076

This paper deals with an analysis of the first steps of the visual process. The inherent properties of the receptor are discussed in terms of the type of processing of information from the outside world. The next step in the processing of sensory information concerns the distribution of light over the entire population of visual receptors where neural integration begins. Inhibitory interaction is described and its function ascribed to enhancement of contrast effefts. Thus, patterns of afferent nervous activity are greatly modified to accentuate significant features of information about the environment.
G. I. R 29

18,077
Hartline, H.K. THE MODIFICATION OF SENSORY INFORMATION BY NEURAL INTERACTION IN THE EYE, AND ITS RELATION TO VISION. IRE Trans., June 1959, ME 6, 84-85. (The Rockefeller Institute, New York, N.Y.).

18,077

The spatial and temporal modifications of sensory information produced by "integrative" neural processes in the retina of the eye are discussed briefly. The modifications produced by neural integration in the eye appear to be distortions, but are more properly to be considered the accentuation of significant features of the stimulus pattern to which the organism must respond appropriately if it is to survive and flourish.
R 9

18,078
Hawrylewicz, E.J. EFFECT OF CHRONIC WHOLE-BODY RADIATION ON BLOOD ENZYMES. DEVELOPMENT OF A SIMPLE LABORATORY PROCEDURE TO DETECT EARLY RADIATION DAMAGE. Contract AF 33(616)-6491, Proj. 7165, Task 71838, WADD TR 60 662, Nov. 1960, 37pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio. (Armour Research Foundation, Chicago, Ill.).

18,078

To determine the effect of radiation exposure on the activity of plasma enzymes and coenzymes, young, adult, male rats were exposed to four levels of cobalt-60 gamma radiation ranging from 0.3 to 300 roentgens per week for 26 weeks. During this time the rats were bled by heart puncture six times and their blood analyzed for enzyme activities. The mean activity of each enzyme from at least five rats at each level was statistically compared to the mean activity of a similarly treated, nonirradiated control group and the change noted. Red and white blood cell counts and hemoglobin determinations were also made.
T. G. I. R 17

18,079
Harter, H.L. EXPECTED VALUES OF NORMAL ORDER STATISTICS. Proj. 7071, Task 70429, ARL TR 60 292, June 1960, 32pp. USAF Aeronautical Research Labs., Wright-Patterson AFB, Ohio.

18,079

A brief history is given of the development of the theory of order statistics and of past efforts to tabulate their expected values for samples from a normal population. The major portion of the paper presents the method of computation of a five-decimal-place table of the expected values of all order statistics for samples of size n from a normal population. A table is included for n=2(1)100 and for values of n, none of whose prime factors exceeds seven, up through n=400. Also included is a discussion of an approximation proposed by Blom, and a table of values of the constant a required for the approximation for selected values of n. Actual and potential uses of the tables are discussed.
T. R 18

18,080
Harris, J.D. & Pikler, A.G. THE STABILITY OF A STANDARD OF LOUDNESS AS MEASURED BY COMPENSATORY TRACKING. Amer. J. Psychol., Dec. 1960, 73(4), 573-580. (USN Medical Research Lab., New London Submarine Base, Conn.).

18,080

To explore the stability of a standard of loudness, five Ss listened to tape recorded programs which presented variations in intensity (0.3 to 1.0 db/sec. within a 20 db range) of a 1000 cps tone at 40 phons which had been first heard. The Ss attempted to maintain the loudness-constant by rotating a dual attenuator (compensatory tracking) which controlled loudness of tone, and in addition allowed tracking responses to appear on the paper tape of a voltage-recorder. Tracking-errors and time-lag of responses were analyzed. Suggestions were given for use of the method of auditory tracking in audiometry and engineering.
T. G. R 4

18,081
Harris, W.P. EXTENDING THE SUCCESSIVE INTERVALS MODEL TO THE MULTIDIMENSIONAL CASE. Contract AF 19(604) 7400, Rep 58G 0015, Oct. 1960, 12pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

18,081

Thurstone's Successive Intervals method is shown to be capable of extension to multidimensional data when the S responds to several attributes of a stimulus on each trial. A diagram of the model is presented and the method explained. The nature of the computations and "model-fitting" implied by the method are discussed along with types of problems to which it is applicable.
I. R 2

18,082
Hammel, H.T. THERMAL AND METABOLIC RESPONSES OF THE ALACALUF INDIANS TO MODERATE COLD EXPOSURE. Contract AF 33(616) 6306, Proj. 7163, Task 71820, WADD TR 60 633, Dec. 1960, 47pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio. (Department of Physiology, University of Pennsylvania, Philadelphia, Penn.).

18,082

To find out if the Alacaluf Indian, a primitive tribe inhabiting a cold region in South America, respond to cold by any metabolic or thermal means which would distinguish them from other ethnic groups that have been studied, a field study was undertaken. The oxygen consumption and body temperature of nine adult male Indians were measured while exposed to moderate cold for eight hours during the night. Six Indians were measured a second time when provided with adequate insulation to maintain thermal comfort throughout the night. The results were compared with those from other ethnic groups.
T. G. I. R 14

18,083
Hall, J.F., Jr. & Polte, J.W. THERMAL INSULATION OF AIR FORCE CLOTHING. A CATALOG AND PART 5 OF A SERIES. Proj. 7164, Task 71830, WADD TR 60 597, Sept. 1960, 75pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,083
Results of the fifth of a series of thermal insulation studies performed with electrically heated hand, foot, head, and entire body models are presented. The data include results obtained with light, medium, and heavy clothing types, as well as with thermal protective items of a specialized nature. A revised catalog is included listing the insulation, in clo units, of many recently developed clothing items. The methods by which the values were obtained (separate measurement or difference method) are discribed and their advantages and limitations discussed. Graphs show relationship between measured and calculated thermal insulation of clothing assemblies and correction factors. Laundering effects on clothing insulation are discussed.
T. R 6

18,084
Greek, D.C. CHECKLIST OF HUMAN ENGINEERING DESIGN PRINCIPLES. Rep. MD 58 334, Jan. 1959, 86pp. Missile Div., North American Aviation, Inc., Columbus, Ohio.

18,084
This checklist presents, in a single, easily referenced document, design principles compatible with human engineering ideals and appropriate to missile systems. The data are, however, applicable to any man-machine system design with information for both the design engineer (recommendations on hardware) and the human engineer (a guide and memory aid to use in evaluating compliance with basic human engineering principles). There are seven major sections: visual displays, controls, aural equipment, panel layout, workspace characteristics, maintainability, and safety. A subject index is included.

18,085
Goodson, J.E. & Jones, M.B. IN-FLIGHT SUGGESTIBILITY. Proj. MR005.13 5001, Subtask 16, Rep. 2, Nov. 1960, 8pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,085
To explore one aspect of the nature and strength of in-flight suggestion, 22 former naval aviation cadets were each tested for suggestibility. The first test was given in the cabin of an aircraft and consisted of a series of standard tests of suggestibility. Then the S was placed at the controls of the aircraft for a cockpit session, and finally the standard tests were repeated after the flight when S was on the ground. The critical test consisted of instructions to fly the plane on a straight-and-level course. After a short delay, the experimenter suggested to the S that perhaps he was losing altitude or gaining, or in some way was off the straight-and-level. The responses of all three tests were correlated and the results interpreted in terms of certain in-flight phenomena. T. R 3

18,086
Goldbeck, R.A. & Kay, E. SOME PROBLEMS IN PREDICTING TRAINING REQUIREMENTS FOR FUTURE WEAPON SYSTEMS. Subcontract 1 002, Res. Rep. 6, Nov. 1960, 30pp. Human Resources Research Office, George Washington University, Washington, D.C. (American Institute for Research, Pittsburgh, Penn.).

18,086
The problems associated with predicting the training requirements to be generated by future weapon systems were analyzed. Several studies concerned with the forecasting of job and training requirements were first reviewed and summarized. Problem areas were delineated where solutions must be found if a complete and systematic procedure for predictions is to be developed. Another approach was made to the same problem by attempting to develop information about training requirements for the Hawk missile system just prior to the development of a complete prototype Hawk system. Sources of information most relevant to the task were identified and necessary administrative procedures were outlined.
R 36

18,087
Fuchs, A.H. THE PROGRESSION-REGRESSION HYPOTHESES IN PERCEPTUAL-MOTOR SKILL LEARNING. Contract AF 30(602) 2107, ARPA 73 59, Rep. 1000 2, July 1960, 36pp. Antenna Lab., Department of Electrical Engineering, Ohio State University Research Foundation, Columbus, Ohio.

18,087
Tested were two hypotheses regarding the development of perceptual-motor skills. The hypotheses were the progression hypothesis and the regression hypothesis. The technique used to test the hypotheses was a system in which a human analog, consisting of analog computers and servo-mechanisms, was used to attempt to match the performance of a human operator; the gain adjustments for the position, velocity, and acceleration characteristics were provided automatically by a servo-mechanism.
T. G. I. R 11

18,088
Freedman, S.J. SENSORY DEPRIVATION AND PERCEPTUAL LAG. Contract AF 33(616) 5663. Proj. 7220, Task 71741, WADD TR 60 745, Dec. 1960, 7pp. USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio. (Massachusetts Mental Health Center, Boston, Mass.).

18,088
Investigated was the effect of sensory deprivation upon perceived visual speed. Subjects were isolated with auditory white noise and wearing gloves and cuffs. They were tested for "perceptual lag" at the beginning and every 30 minutes over a period of three hours. The Ss viewed a rapidly changing visual field produced by a set of spatially separated lights of different intensities flashing on and off in a random sequence and duration. The results were analyzed and discussed.
G. 1. R 9

18,089
Fourt, L. SPACER SYSTEMS FOR COOLING BY NATURAL CONVECTION INSIDE CLOTHING. Contract DA 19 129 QM 1328, Proj. 7 79 10 001A, Rep. 4, Clothing Branch Rep. 17, June 1960, 30pp. USA Textile, Clothing & Footwear Div., QM Research & Engineering Center, Natick, Mass. (Harris Research Laboratories, Inc., Washington, D.C.).

18,089
This is a summarizing review of work accomplished on an investigation of the principles of spacers suitable for use in hot weather clothing. The first section deals with physical factors in cooling by natural convection: air movement-density differences, air movement-chimney effect, friction effects, and type of flow. The experimental methods used are described briefly and the findings summarized around the following: effects of temperature difference and of vapor pressure difference; relative amount of cooling by evaporation and other means; effects of chimney height, of spacer gap, of obstruction, and of motion inside the spacer.
T. G. I. R 10

18,090
Flaherty, B.E., Flinn, D.E., Hauty, G.T. & Steinkamp, G.R. PSYCHIATRY AND SPACE FLIGHT. Rep. 60 80, Sept. 1960, 9pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

18,090
The psychological stresses related to the threatening environmental stresses encountered in space flight were considered and discussed. Experiments involving simulated orbital flights of 36 hours duration were conducted and the psychiatric evaluations of the four subjects were given and discussed. The distinction between sensory deprivation and isolation was also made and their effects on the astronaut were discussed.
R 23

18,091
Rao, M.M. SOME ASYMPTOTIC RESULTS ON TRANSFORMATIONS IN THE ANALYSIS OF VARIANCE. Contract AF 33(616) 3878, Proj. 7071, Task 70429, ARL TN 60 126, Aug. 1960, 20pp. USAF Aeronautical Research Labs., Wright-Patterson AFB, Ohio. (Carnegie Institute of Technology, Pittsburgh, Penn.).

18,091
The square root and the logarithmic transformations used in analysis of variance are considered when the mean is large in each case. In the former, the variance is assumed known; and in the latter, the corresponding assumption is that the coefficient of variation is small but the variance is unknown. In these cases, it is shown that the usual normal theory is applicable to test the hypotheses on means of the untransformed variables. Sufficient conditions for the applicability of the normal theory are presented for a class of distributions depending on a finite set of parameters with one parameter large, while others, if any, are relatively small or are confined to a fixed bounded set in parameter space.
R 13

18,092
Raifsnider, M.H. RADAR AIR TRAFFIC CONTROL DEMONSTRATION FOR AIR TRAINING COMMAND. WADC TN 55 605, Oct. 1955, 10pp. USAF Directorate of Flight and All-Weather Testing, Wright-Patterson AFB, Ohio.

18,092
A demonstration of the previously developed Radar Controlled Formation Break-Up and Descent Procedure was attempted on 22 July 1955, using F-86D and B-47 aircraft of the Air Training Command. Eight planes of each type participated in the demonstration. Initial radio contact with the two flights was made over Indianapolis, Indiana, and the aircraft were monitored by Flight Test Radar while enroute to Madison, West Virginia. The attempt was made to land the high performance aircraft at the rate of one every 30 sec. Actual landing rates were reported and discussed in terms of ways to improve performance.
I.

18,093
Plath, D.W. & Blair, W.C. SHIP CONTROL XII. AN EMPIRICAL EVALUATION OF QUICKENING IN A CONTACT ANALOG DISPLAY. Contract NONR 2512(00), Tech. Rep. SPD 60 131, Oct. 1960, 13pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

18,093
This study was concerned with the effects of adding quickened information to the Contact Analog (CA) display in relation to ship control functions. The study, conducted aboard the Electric Boat Submarine Simulator, involved two groups of subjects. One group used a quickened indication only and the other used the same quickened indication superimposed on a two-surface CA display which included a "roadway" director and an artificial horizon. A comparison of the performance of the two groups was made and the results were discussed.
T. G. I. R 9

18,094
Pickett, J.M. & Rubenstein, H. PERCEPTION OF CONSONANT VOICING IN NOISE. Language and Speech, July-Sept. 1960, 3(3), 155-163. (USAF Operational Applications Office, Applications Research Branch, AFCCDD, Bedford, Mass.).

18,094
The perception of the voicing of the consonants / p, b, t, d, f, v, s, z / was measured in two noise spectra: white noise and low-frequency noise. The listener's task was to report whether the consonant spoken was of the voiced class / b, d, v, z / or of the unvoiced class / p, t, f, s /. Factors investigated (other than noise levels) were 1) position of the consonant in test utterances: initial, intervocalic, or final; 2) the place of articulation: alveolar or labial; and 3) the degree of occlusion: stop or fricative. The results were interpreted in terms of low-frequency cues to voicing which were independent of place of articulation and high-frequency cues with place of articulation.
R 17.

18,095
Peryam, D.R. FOOD ATTITUDES IN AN UNUSUAL ENVIRONMENT. INTERIM REPORT. Rep. 32 60, Oct. 1960, 24pp. USA Quartermaster Food & Container Institute for the Armed Forces, Chicago, Ill.

18,095
An exploratory interview study of food-related attitudes was conducted among a sample of enlisted men stationed at Camp Fistclench, Greenland, during the summer of 1959. It was assumed that under the conditions of stress, such as were provided by this outlying station, attitudes towards food would change from an assumed norm. The interview technique was used, not only to obtain attitudes toward food but also to explore areas where evidence of psychological stress might be revealed. The findings were discussed with possible interpretations advanced.
T. I. R 2

18,097
Page, C.M., Jr., Huston, R.H. & Pierce, L.H., Jr. MAINTENANCE CONCEPTS AND STRUCTURE FOR OPTIMUM SUPPORT OF MISSILE WEAPON SYSTEMS. June 1960, 62pp. USAF Institute of Technology, Wright-Patterson AFB, Ohio.

18,097
The problem considered was that of the maintenance concepts and structure necessary to provide optimum support of missile weapon systems during the mixed forces era of the present. Logistics were discussed and the following missile weapon systems were studied: Bomarc (IM-99), Atlas (SM-65), Titan (SM-68), and Minuteman (SM-80). Four criteria which maintainance concepts and structures must meet were developed, and the distinction between missiles and manned aircraft was made.
R 15

18,098
University of Oregon. STATISTICAL INFERENCE FOR MARKOV CHAINS AND PROCESSES BIBLIOGRAPHY. Grant DA ORD 25, Tech. Rep. 1, Aug. 1960, 7pp. Department of Mathematics, University of Oregon, Eugene, Oregon.

18,098
This 66 item bibliography lists references dealing with statistical inference for Markov chains and processes. The items cover a period from 1948 to 1960, and are arranged in alphabetical order by author.
R 66

18,100
Fisher, R.B. & Sunkes, J.A. PRELIMINARY STUDY OF PILOT OPERATIONAL CAPABILITIES IN THE USE OF THE CAA PICTORIAL POSITION INDICATOR AND THE AVION PICTORIAL NAVIGATIONAL DISPLAY IN THE TERMINAL AREA. INTERIM REPORT. Task D 2 5213, Feb. 1960, 89pp. US National Aviation Facilities Experimental Center, Federal Aviation Agency, Atlantic City, N.J.

18,100
Presented was a preliminary study and analysis on the ability of pilots to use a pictorial display of VOR/DME information to fly selected or predetermined routes in a terminal area and to determine associated effects on communication workload. Two portable lap model displays were used with two different pilots assigned to fly each device. Five courses were flown at least ten times by each pilot and each flight path was recorded by several methods.
T. G. I.

18,101
Fine, B.J., Cohen, A. & Crist, B. THE EFFECT OF EXPOSURE TO HIGH HUMIDITY AT HIGH AND MODERATE AMBIENT TEMPERATURES ON ANAGRAM SOLUTION AND AUDITORY DISCRIMINATION. Proj. 7X83 01 009, Tech. Rep. EP 138, Oct. 1960, 28pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,101
Ten Ss were exposed for six and one-half hour periods on four successive days to ambient dry/wet bulb temperatures of 70/53 degrees F, 70/60 degrees F, 95/70.5 degrees F, and 95/92 degrees F with minimal wind. Each condition was replicated four times during four successive weeks. The Ss performed an anagram and an auditory discrimination task immediately after entering and just prior to leaving the experimental situation. The performance of the Ss was analyzed to determine the presence of decrement or increment due to either temperature or humidity.
T. I. R 17

18,102
Feder, H.C. CIRCULAR TRACK-CHAMBER. A PROPOSED FACILITY FOR TESTING MAN-MACHINE SYSTEMS UNDER CONDITIONS OF SPACE FLIGHT AND LUNAR HABITATION. Proj. 6892, AFMDC TN 60 14, Oct. 1960, 30pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

18,102
The design of a proposed circular-track for simulated flight conditions to test man-machine systems was presented. The design philosophy of the proposed circular-track was explained and the design components, accomodation of pay load, acceleration profile, and the test arrangement were described.
G. I. R 4

18,103
Erlick, D.E. JUDGMENTS OF THE RELATIVE FREQUENCY OF TWO RANDOM SEQUENTIAL EVENTS: EFFECTS OF DURATION OF OBSERVATION. Contract AF 33(616) 6095, Proj. 6190, Task 71556, WADD TR 60 673, Sept. 1960, 7pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,103
Investigated was the effect that the length of observation period has on one's ability to tell which of two random sequential events has occurred more frequently. Two series of experiments were conducted: 1) random order of observation times in which Ss received all observation times in an unpredictable sequence during a session, and 2) non-random observation times in which Ss received the same observation time throughout a session. Two distinct events with different frequencies of occurrence were used.
T. G. R 1

18,104
Ely, J.H., Hall, N.B. & Van Albert, C.E. CODING ELECTRONIC EQUIPMENT TO FACILITATE MAINTENANCE. IRE Trans., Sept. 1960, HFE 1(2), 66-69. (Dunlap and Associates, Inc., Stamford, Conn.).

18,104
Reported was a study designed to improve maintenance of electronic equipment by determining what information to place on the equipment and developing techniques for its display. A survey of maintenance procedures and problems at five airways and air communication service sites was conducted. Questionnaires to determine discrepancies between actual test point readings and those called for in the manuals were administered. The findings and recommendations of the study were presented and the results of an experiment conducted to test the usefulness of the recommendations were also given.
T. G. R 3

18,106
Dantzig, G.B., DeHaven, J.C., Cooper, I., Johnson, S.M., et al. A MATHEMATICAL MODEL OF THE HUMAN EXTERNAL RESPIRATORY SYSTEM. Contract AF 49(638) 700, Proj. RAND, Res. Memo. 2519, Sept. 1959, 100pp. The Rand Corporation, Santa Monica, Calif.

18,106
The thesis that a part of the human physiological system can be simulated by a suitably constructed mathematical model was examined. As a test case, the external respiratory function was chosen. Based on the known physiological and chemical aspects of this system, a mathematical model was constructed. The model used derives from a class of mathematical programming methods that were originally developed for representing complex military and industrial activities. The value of some 30 different molecular species as determined by the model were compared with observed values.
T. I. R 21

18,107
Davis, C.G., Kerle, R.H., Silvestro, A.W. & Wallace, W.H. THE AIR TRAFFIC CONTROL TRAINING PROGRAM AS VIEWED BY TRAINING SUPERVISORS. Contract FAA/BRD 40, Proj. O, Rep. 33, March 1960, 36pp. Courtney and Company, Philadelphia, Penn.

18,107
Federal Aviation Agency (FAA) planners and policy makers were concerned with bridging the gap between the number of available air traffic controllers and the increasing demand for them. This report was based on intensive interviews with the training supervisors of 24 towers and 12 centers. Detailed accounts of the current training programs, their problems, and the ways the programs could be improved were obtained from these supervisors. Major recommendations were made to FAA in order to provide specific feedback of information from the field situation.
T. R 3

18,108
Dickson, G.G. LOW ALTITUDE CREW ESCAPE SYSTEM TESTS. Proj. 1362, Task 13972, WADC TN 59 224, May 1960, 15pp. USAF Aircraft Lab., Wright-Patterson AFB, Ohio.

18,108
A series of tests was summarized which were conducted to determine low altitude ejection capabilities and to study the effects of personnel recovery when ejecting from a moving aircraft on a runway. The test vehicle was an F-94C airplane that was modified and instrumented specifically for the tests. F-86 aircraft ejection seats, determined to be the most suitable for the tests, were modified and fitted to the vehicle. Both types M3 and M5 catapults were used with various configurations of parachute assemblies. Tests were made at indicated airspeeds ranging from 120 to 150 knots, the speed range deemed most critical for aircraft on the runway. Recommendations were included.
T. G. I.

18,109
Dunning, G.M. BIOLOGICAL EFFECTS OF A NUCLEAR ATTACK. Rep. TID 5563, Sept. 1959, 28pp. US Radiation Effects of Weapons Branch, Division of Biology and Medicine, Atomic Energy Commission, Washington, D.C.

18,109
The biological effects of an assumed nuclear attack of 1453 megatons (total yield) on the United States, 2500 megatons on the Northern Hemisphere outside the continental United States (one-half being fission and one-half fusion and all surface bursts) are considered in this paper. Principal factors discussed are 1) shorter-term hazard (excluding immediate blast, thermal and radiation effects) of external gamma radiations and internal radiation by ingestion of contaminated food and water; and 2) long-term hazards such as lukemia and bone tumor, life shortening, and genetic effects.
R 23

18,110
Dunham, C.L. RADIOACTIVE FALLOUT--A TWO-YEAR SUMMARY REPORT. Rep. TID 5550, May 1959, 110pp. US Technical Information Service, Atomic Energy Commission, Washington, D.C.

18,110
This summary report on radioactive fallout presents information gathered through a two-year period, 1957-1959, as a continuation of the congressional hearings of 1957. It covers such topics as 1) public information program; 2) present state of knowledge on biological effects; 3) Atomic Energy Commission's research program on fallout; and 4) a report on progress made on "unresolved questions" from the 1957 hearings on "clean" nuclear weapons, distribution of fallout, "safe" levels of radiation, and the like. Standards for radiation protection are also discussed. There are seven special papers appended which spell out some of these topics in detail.
T.

18,111
Diehl, M. Joan & Seibel, R. THE RELATIVE IMPORTANCE OF VISUAL AND AUDITORY FEEDBACK IN SPEED TYPEWRITING. Rep. RC 278, July 1960, 14pp. IBM Research Center, Yorktown Heights, N.Y. (Columbia University, New York, N.Y.).

18,111
To study the effects of auditory and visual feedback on the speed and accuracy of typing, 16 skilled operators of electric typewriters took standard speed-typing tests. Four different conditions were tested: 1) normal speed test conditions, 2) normal conditions except that operators could not see what they had typed, 3) normal conditions except that earphones were worn through which came noise that masked the sound of the typewriter, and 4) a combination of (2) and (3). The average number of gross words per minute and of net words per minute were compared for these conditions.
T. G. I. R 2

18,112
Dellinger, J.H. (Chm.). PAPERS PRESENTED AT THE FALL 1955 RTCA ASSEMBLY MEETING, SEPTEMBER 29-30, HOTEL STATLER, WASHINGTON, D.C. Paper 180 55/AS 173, Oct. 1955, 131pp. Radio Technical Commission for Aeronautics Washington, D.C.

18,112
Papers presented at an assembly of the members of the Radio Technical Commission for Aeronautics are given here along with summary reports of discussions. Two technical and two symposia were held; the latter dealing with the "decision gate" factors in automatic instrument approaches and the validity of the SC31 communication philosophies; the former with factors limiting the accuracy and utility of pictorial displays and a variety of specific problems in navigation systems, altitude measurement, the ATC Radar Beacon system and TACAN. The problems of a "common system" for various types of carriers underlay many of the papers.
G. I.

18,113
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.).

18,113
A mathematical derivation of a model for presenting dark adaptation as a function of age and time was presented. The dark adaptation data were obtained by a previous study from an age sample ranging from 16 through 89 years. It was found that the model could be generalized. In addition, it was concluded that the threshold of dark adaptation as a function of time was lawfully related to chronological age. Rate of adaptation was determined and the shape of the function was found. These findings were discussed in relation to the hypothesis that threshold and rate of dark adaptation depend upon basic physiological processes that change with age.
T. G. R 2

18,115
Connelly, M.E. COMPUTERS FOR AIRCRAFT SIMULATION. Contracts N5ORI 07895 & N61339 45, Rep. 7591 R 2, Dec. 1959, 112pp. Electronic Systems Lab., Massachusetts Institute of Technology, Cambridge, Mass.

18,115
This report is the concluding work of a one-year study of the equations of motion and the computing techniques used in the aerodynamics computer section of Operational Flight Trainers (OFT). A review of the characteristics of basic 60 cps, 400 cps, and DC analog computing techniques is presented with emphasis on the relative applicability of these techniques to the unique requirements of the OFT problem. Recommendations for the most acceptable technique are based on cost, size, maintenance, and power consumed in addition to performance acceptability. Several suggestions are made concerning OFT acceptance procedures, the matching of OFT to the actual aircraft, and standardization.
T. G. I. R 124

18,116
Constantine, T.T. DESIGN AND DEVELOPMENT OF PROTECTIVE FACE MASK. FINAL REPORT. DECEMBER 31, 1958 - AUGUST 1, 1960. Contract DA 19 129 QM 1359, Case C59740, 15pp. Fabric Research Labs., Inc., Dedham, Mass.

18,116
This report describes the development of an automatically deployed protective face mask useful for the purpose of protecting the normally exposed face and neck areas of military personnel in the field where exposure to nuclear blast radiation has become imminent. A description of the mask as thus far developed is given. Work performed on each component of the assembly is set forth. Remaining problems are discussed.
T. G. I.

18,117
Churchill, A.V. TACTUAL AND VISUAL INTERPOLATION: A CROSS-MODAL COMPARISON. Canad. J. Psychol., 1960, 14 (3), 183-190. (Defence Research Medical Labs., Toronto, Ontario, Canada).

18,117
To study the directional bias of errors when making cross-modal judgments of size and to establish consistency of results obtained for both tactual and visual judgments in an earlier experiment, seven Ss were required to judge the position of each of nine rods (varying in diameter by a constant increment) between two reference rods that were designated as "zero" and "ten." The intermediate rods were judged visually or tactually while the S sensed the reference rods tactually or visually. Judgments were obtained for four combinations of these conditions. Errors of interpolation were classified as over- or underestimations and analyzed for differences due to modality or cross-modality. Constant errors (magnitude) were also studied.
T. G. R 9

18,118
Cohen, S.I., Silverman, A.J. & Shmavonian, B.M. PSYCHOPHYSIOLOGICAL MECHANISMS OF STRESS RESPONSIVITY. SEMI-ANNUAL REPORT, APRIL 1960 - OCTOBER 1960, ON AIR FORCE OFFICE OF SCIENTIFIC RESEARCH CONTRACT AF 49(638) 354. 28pp. Division of Psychophysiological Research, Department of Psychiatry, Duke University, Durham, N.C.

18,118
Progress of work accomplished in an investigation attempting to delineate personality variables which might be associated with a differential impact of sensory deprivation upon individual Ss was reported. The primary concern was with the perceptual dimension of body and field orientation. Thus far, 29 Ss have been studied in an experimental situation having elements of uncertainty, social isolation, low sensory input, and restraint from active movement. The results of various physiological and psychological tests were compared for the two categories of orientation into which the Ss had been grouped.
T.

18,119
Cafaro, J.A., Voegtlen, H.D., Merlock, N., Retterer, B.L., et al. MAINTAINABILITY MEASUREMENT AND PREDICTION METHODS FOR AIR FORCE GROUND ELECTRONIC EQUIPMENT. PHASE II PROGRESS REPORT. Contract AF 30(602) 2057, Proj. 5519, Task 45210, RADC TN 60 221, Sept. 1960, 277pp. Radio Corporation of America, Camden, N.J.

18,119
Progress on a study of maintainability techniques for Air Force Ground Electronic Equipment is reported. A concept of maintainability has been developed and a research plan adopted through which maintainability measurement and prediction are being formulated. The experimental procedures being used are detailed and some of the preliminary findings to date are discussed.
T. G. I. R 7

18,120
Kenneway, A.J., Sears, R.T., Murdock, R. & Cutting, Hazel E. DEVELOPMENT OF AN EMERGENCY PRESSURE SUIT COVERALL, HIGH ALTITUDE, VENTILATION-EXPOSURE TYPE CSU-5/P. Contract AF 33(600) 36627, Proj. 6336, Task 63619, WADD TR 60 809, Nov. 1960, 9pp. USAF Operational Support Engineering Div., Wright-Patterson AFB, Ohio. (David Clark Company Incorporated, Worcester, Mass.).

18,120
The various features that were evaluated during the development of Coveralls, Flying, High Altitude, Ventilation-Exposure, Type CSU-5/P, are described. Each progressively improved prototype garment is described and results are reported. The development of this coverall presents an opportunity to consolidate the anti-exposure and altitude coveralls with a minimum penalty for weight, when used on a mission that requires protection at altitude and exposure on land and water in cold climates.
I.

18,121
Crain, K. & Siegel, A.I. AIRCRAFT DETECTABILITY AND VISIBILITY: II. TACHISTOSCOPIC THRESHOLDS FOR FLUORESCENT AND ORDINARY PAINTS. Contract N156 38581, Proj. TED NAM AE 42222, Part 3, Rep. NAMC ACEL 444, Nov. 1960, 19pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn. (Applied Psychological Services, Wayne, Penn.).

18,121
To provide information about the relative visual effectiveness of fluorescent and ordinary paints, visual thresholds were investigated under each of two field luminance conditions. The stimuli were fluorescent red-orange, yellow-orange, blue, and for "matched" ordinary paints. Two thresholds were determined for seven Ss: 1) the lowest tachistoscopic exposure interval necessary for identification of presence of stimulus regardless of whether the color could be identified, and 2) the exposure interval necessary for identification of color of stimulus. The data were analyzed for differences due to type of paint and illumination levels.
T. P 2

18,122
USAF Aerospace Medical Laboratory. BIBLIOGRAPHY OF RESEARCH REPORTS AND PUBLICATIONS ISSUED BY THE BIOACOUSTICS BRANCH. Dec. 1960, 28pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

18,122
Presented here is a bibliography consisting of 13 sections which are arranged according to subject matter or specific technical areas. The categories are: sound sources and noise fields, sound propogation, acoustic instrumentation, noise control--general, noise control structures, hearing and physiology of the ear, speech, biological and psychological effects of noise, ear protection, mechanical characteristics of the human body: effects of vibration and shocks, general noise guides and criteria, bionics, and miscellaneous.
R 318

18,123
Chinn, K.S.K. & Allen, T.H. BODY FAT IN MEN FROM TWO SKINFOLDS, WEIGHT, HEIGHT, AND AGE. Proj. 6X60 11 001, Subproj. I 4, Rep. 248, July 1960, 16pp. USA Medical Research & Nutrition Lab., Fitzsimmons General Hospital, Denver, Colo.

18,123

To establish a currently sound and convenient basis for the prediction of fat in men, body dimensions (height, weight, and skinfolds) in recent nutrition surveys were studied. The theoretical basis for establishing the necessary formulations was analyzed and a fundamental formulation of gross body composition was derived and stated so explicitly that body fat can be computed from measured body density. Unsatisfactory predictions were obtained from height and weight and from skinfolds and weight. A combination of skinfold thickness, body weight, height, and age was found to be most suitable for prediction and a nomogram containing these variables was constructed.
T. G. R 27

18,124

Christal, R.E., Madden, J.M. & Harding, F.D. RELIABILITY OF JOB EVALUATION RATINGS AS A FUNCTION OF NUMBER OF RATERS AND LENGTH OF JOB DESCRIPTIONS. Proj. 7734, Task 17015, WADD TN 60 257, Oct. 1960, 23pp. USAF Personnel Lab., Lackland AFB, Tex.

18,124

To provide information about the reliability of job evaluation ratings, data were collected from 500 officers attending the USAF Command and Staff School. Each of 50 five-level Air Force specialties were rated on 15 factors by approximately 100 officers; short specialty summaries were used. A second rating was made six months later with 100 officers performing the same type of rating; another 100 officers rated the specialties on only six factors using full-length descriptions. Two methods for estimating reliability were compared: Spearman-Brown prophecy formula and random sampling with computation of reliabilities for each. The effect of sample size and length of job descriptions used were evaluated.
T. G. R 10

18,125

Cofer, C.N. EXPERIMENTAL STUDIES OF THE ROLE OF VERBAL PROCESSES IN CONCEPT FORMATION AND PROBLEM SOLVING. Ann. N.Y. Acad. Sci., Dec. 1960, 91(Art. 1), 94-107. (New York University, New York, N.Y.).

18,125

This review is essentially a re-examination of two hypotheses concerning the role of language in cognitive functioning: 1) that thought largely consists of implicit processes (Watson); and 2) that the structure of a language, as well as its words, determine what and how we think and perceive the world (Whorf). Cross-cultural data, experiments on the mediating role of verbal responses in categorization, sorting, and certain discrimination and other concept formation situations that bear on these questions are reviewed. Evidence from these studies is presented and discussed without reference to theoretical issues as such.
R 75

18,126

Conard, R.A., Meyer, L.M., Sutow, W.W., Blumberg, B.S., et al. MEDICAL STATUS OF MARSHALL ISLANDERS IN 1959, FIVE YEARS AFTER EXPOSURE TO FALLOUT RADIATION. Nuclear Med., July 1960, 1(3), 314-330. (Brookhaven National Lab., Upton, N.Y.).

18,126

A brief account of the health status (as of 1959) of Rongelap people who were exposed to the heaviest dose of radiation from accidental fallout in March, 1954, following detonation of an experimental nuclear device at Bikini in the Marshall Islands is presented. The report is divided into the following sections: acute effects and late effects of gamma irradiation, effects on the skin, internal irradiation, and present status.
G. I. R 27

18,127

Chiles, W.D., Cleveland, J.M. & Fox, R.E. A STUDY OF THE EFFECTS OF IONIZED AIR ON BEHAVIOR. Contract AF 33(616) 5839, Proj. 7183, Task 71620, WADD TR 60 598, Nov. 1960, 22pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Physics, Engineering and Chemistry Corporation, Boulder, Colo.).

18,127

The effect on human behavior of an atmosphere containing excesses of unipolar ions was investigated. Fifteen Ss were tested on a complex mental task, an additional 15 performed a vigilance task, and 20 others indicated their attitudes by marking an adjective check list while exposed to five levels of air ionization. The ion conditions for each study were varied from a high excess of positive ions through neutral to a low negative level. Differences between the various ionization conditions as indicated by the various scores were analyzed.
T. I. R 38

18,128

Campbell, D.T. SYSTEMATIC ERROR ON THE PART OF HUMAN LINKS IN COMMUNICATION SYSTEMS. Information & Control, Dec. 1958, 1(4), 334-369. (Department of Psychology, Northwestern University, Evanston, Ill.).

18,128

To the human being considered as a potential link in a communications system are attributed constant errors or biases over and above random imperfection of performance. The psychological research literature was searched for an inventory of recurrent bias tendencies. This review enumerates 21 such bias tendencies and puts them into two major groups: those found in the duplicatory transmission task and those characteristic of the reductive coding task.
R 140

18,129

Close, P. & Ireland, R.G. ALTERATIONS IN THE PURE TONE THRESHOLD FOLLOWING CHANGES IN BOTH ABSOLUTE AND DIFFERENTIAL PRESSURES UPON THE EAR. Proj. MR005.13 1002, Subtask 13, Rep. 1, Nov. 1960, 9pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,129

Variations in both differential and absolute pressures upon the ear are frequently encountered in aviation. The effect of such pressures upon the pure tone threshold of hearing was investigated upon three male Ss known to have normal hearing. Variations in pressures were produced within an airtight plastic cup (clamped over the left ear) by a compressor or vacuum pump; reduction in absolute pressure was produced by decompression in a low pressure chamber. Maximum positive and negative differential pressure magnitudes of ten inches of water (0.36 psi) were compared to zero at both sea level and at 30,000 ft. chamber pressure altitude equivalents. The test tone frequencies were 100, 250, 700, 1000, 2000, 4000, and 7500 cps.
G. I. R 6

18,130

Conard, R.A., Macdonald, H.E., Lowrey, A., Meyer, L.M., et al. MEDICAL SURVEY OF RONGELAP PEOPLE FIVE AND SIX YEARS AFTER EXPOSURE TO FALLOUT. (WITH AN ADDENDUM ON VEGETATION). Rep. BNL 609 (T 179), Sept. 1960, 86pp. Brookhaven National Lab., Upton, N.Y.

18,130

The results of medical surveys of the people of Rongelap in the Marshall Islands, carried out in March of 1959 and 1960 at five and six years after their accidental exposure to fallout radiation, were presented. There were 76 exposed persons and 166 unexposed people who were examined. The latter group of people had not been on the island at time of exposure and thereby served as a comparison population. A brief summary was presented of previous annual surveys. A note on vegetation changes of the atoll was added.
T. G. I. R 35

18,131
Crocker, J.F. & Waitz, C.R. A HEAT PULSE OVEN FOR STUDY OF HUMAN THERMAL TOLERANCE. Proj. 7164, Task 71830, WADD TR 60 733, Dec. 1960, 10pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,131

A four-ft. cubic chamber with thin aluminum walls has been built to simulate the thermal surroundings of the crew of a hypersonic vehicle re-entering the earth's atmosphere. The method of producing wall temperatures that can increase as rapidly as 100 degrees F per minute is described. Preliminary investigations of tolerance to peak wall temperatures as high as 430 degrees F are summarized, and a more detailed investigation of human physiological and psychological performance during a 400 degree peak exposure is described. The results are discussed in relation to the design of air and space vehicles.
T. G. I. R 4

18,132
Ludvigh, E. & Miller, J.W. THE EFFECTS ON DYNAMIC VISUAL ACUITY OF PRACTICE AT ONE ANGULAR VELOCITY ON THE SUBSEQUENT PERFORMANCE AT A SECOND ANGULAR VELOCITY. Contract NONR 586(00), Proj. NR 142 023, Proj. NM 001 110 501.09, Rep. 9, June 1955, 10pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,132

It has been previously shown that visual acuity deteriorates as the angular velocity of the test object, relative to the observer's eye, is increased; also substantial improvement has been shown, with practice, at high angular velocities and a lesser amount at low angular velocities. This study was designed to demonstrate whether or not there is transfer of training from low to high (20 degrees/sec. to 110 degrees/sec.) angular velocities of test object and also of the converse situation. The Ss were 200 naval aviation cadets; 20 successive dynamic acuity thresholds were determined for each angular velocity with half the Ss tested first on the low and half on the high velocity condition.
T. G. R 9

18,133
Loh, Z.N. SOME APPLICATIONS OF THE POISSON DISTRIBUTION. Proj. 7073, Task 70852, ARL TN 60 119, Aug. 1960, 27pp. USAF Aeronautical Research Labs., Wright-Patterson AFB, Ohio.

18,133

A brief summary of the formula and use of the Poisson distribution is given and the meaning of the stochastic processes as a model of statistical processes is discussed along with the special aspect of these devices. The Poisson distribution is known as an exponential function which approximately expresses the probability of random rare events. It can be derived as the limiting case of the binomial distribution. Numerical values for small values of n and t were calculated and graphs drawn by connecting the points corresponding to the small values of t for specific values of n. The use of the Poisson distribution function is illustrated in special examples.
T. G. R 15

18,134
Lockhead, G.R. & Klemmer, E.T. AN EVALUATION OF AN 8-KEY WORD-WRITING TYPEWRITER. Rep. RC 180, Nov. 1959, 26pp. IBM Research Center, Yorktown Heights, N.Y.

18,134

A typewriter was described which utilizes only eight keys and which types entire words with the simultaneous depression of key combinations. Letters of the alphabet and numbers can also be typed in this way. The time required to learn 100 multiple-finger patterns (words) and the speed and accuracy with which they could be typed were investigated. Three Ss performed a sequence of different tasks: initial learning of the words to criterion of three perfect repetitions, speed trials, learning the letter and number code, re-learning the 100 words, and typing textual material. Time required to learn the patterns, error rates, and speed rates were analyzed with some discussion concerning types of error patterns involved in multiple key-press responses.
T. G. R 3

18,135
Lindsley, D.B. (Princ. Investigator). PSYCHOPHYSIOLOGY OF PERCEPTION. Contract DA 49 007 MD 722, Jan. 1960, 36pp. Department of Psychology, University of California, Los Angeles, Calif.

18,135

The experiments reported here are concerned with the temporal aspects of visual perception and, specifically, with a phenomenon (perceptual blanking, PB) in which materials readily perceived after a brief, tachistoscopic projection (ten msec.) will not be perceived if the first informational flash (IF) is followed by a second more intense noninformational flash (BF) of brief duration (ten μsec.). The data present partial information on several aspects of this phenomenon: regular monocular and binocular blanking, effects of retinal area stimulated; effect of different stimulus figures; reversed sequences of BF and IF, dichopic PB; two successive IFs, repetitive BFs, and three flash BFs. Implications of the findings for visual theory are indicated.
G. I.

18,136
Lindsay, J.R. (Chm.). PROCEEDINGS OF THE FIRST CONFERENCE ON VESTIBULAR PHYSIOLOGY AND SPATIAL DISORIENTATION, SCHOOL OF AVIATION MEDICINE, USAF. 24-25 JUNE 1958. 90pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Department of Surgery-Otolaryngology, University of Chicago, Chicago, Ill.).

18,136

This conference was composed of individuals actively engaged in vestibular research to 1) provide a platform for mutual exchange of information and ideas, 2) delineate problem areas for future research, and 3) specify performance characteristics for a research-type vestibular chair for the USAF School of Aviation Medicine. The meeting was purely discussional in nature and this document contains notes recorded during the conference. Discussions were organized around the following: indicated problems--clinical and spatial disorientation; approaches to research in basic vestibular physiology, neuro-anatomy, and neurophysiology; assessment of vestibular sensitivity; basic visual and perceptive mechanisms; rotating device; and research in spatial disorientation.
T. G.

18,137
Lindquist, S.E., Neff, W.D. & Schuknecht, H.F. STIMULATION DEAFNESS: A STUDY OF HEARING LOSSES RESULTING FROM EXPOSURE TO NOISE OR TO BLAST IMPULSES. J. comp. physiol. Psychol., Oct. 1954, 47(5), 406-411. (Laboratories of Physiological Psychology and Otolaryngology, University of Chicago, Chicago, Ill.).

18,137
To investigate temporary hearing losses produced by exposure to noise and permanent losses produced by blast impulses, behavioral tests of hearing were made and intracochlear damage was assessed post-mortem. The Ss were adult cats, one ear of each being surgically destroyed in order to confine testing to one ear. Audiograms at frequencies from 62.5 to 10,000 cps were obtained by a conditioning method. One group of animals was then exposed to intense noise for 15, 30, and 60 minutes, in varying order. The other group was exposed to blasts of noise produced by the firing of a .32 caliber pistol. Hearing tests were then made at intervals until either complete recovery or a deficit level remained over a period of several weeks. The animals were then killed; the cochleas were examined for inner ear damage. G. I. R 13

18,138
Leininger, H.V., Laug, E.P., McConnell, H.J., Chapman, R. D., et al. EFFECT OF FALLOUT CONTAMINATION ON PROCESSED FOODS, CONTAINERS, AND PACKAGING. OPERATION PLUMBBOB. Proj. 38.1 I, Rep. WT 1496, May 1959, 19pp. US Civil Effects Test Group, Food & Drug Administration, Department of Health, Education, and Welfare, Washington, D.C.

18,138
The effect of a comparatively low level of fallout on the protective qualities of 18 packaging materials was examined. The materials were mounted in six-inch squares on plywood board and placed, along with samples of wholesale or bulk containers holding processed foods, at two-mile intervals along an arc, approximately 25 miles from Ground Zero. Three exposure boards were used at each station: one held clean materials, one slightly soiled with dirt, and one streaked with oil. Samples which received the largest amount of fallout were examined. Readings of radioactivity were made in the field and also in the laboratory. Various decontamination procedures were then tested for efficiency.
T. I. R 1

18,139
Larson, L.V. THE CHANGE IN APPARENT IMAGE SIZE CAUSED BY MOTION DURING PHOTOGRAPHIC EXPOSURE. Proj. 6145, WADD TN 60 26, May 1960, 13pp. USAF Flight Accessories Lab., Wright-Patterson AFB, Ohio.

18,139
A photograph of a moving object is always blurred to some extent; this blurring changes the apparent size if measured from the photograph. The case treated here is that of an object viewed in silhouette. The gradation in light quantity striking the areas partially shaded by the moving edges of the object is derived for flash tube and shutter controlled exposure. The resulting image is reconstructed and the apparent change in size determined with the aid of photographic film characteristics. Change in size is found to be a function of film contrast and ratio of object movement during exposure to object length in direction of motion. The effects of diffraction and imperfect focus are considered.
G. I. R 4

18,140
Kryter, K.D. & Noiseux, D. STUDY OF A SPEECH COMPRESSION SYSTEM (SPECTRUM SELECTION). QUARTERLY TECHNICAL REPORT 5 FOR PERIOD 15 JUNE 1960 - 15 OCTOBER 1960. Contract DA 36 039 SC 78078, Task 3B 31 01 001 02, Dec. 1960, 21pp. Bolt Beranek and Newman, Inc., Cambridge, Mass.

18,140
Progress on a long range study of a speech compression system with the objective of developing a simple technique for transmitting speech over a narrow frequency band is reported. Five phases of the work are reported: instrumentation, narrow band-pass filtering, transposition of frequency bands, time plexing, and speaker identification.
G. I. R 1

18,141
Kresse, F.H. USES OF TASK ANALYSIS IN DERIVING TRAINING AND TRAINING EQUIPMENT REQUIREMENTS. Projs. 6287, 6298, 6226, WADD TR 60 593, Dec. 1960, 61pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,141
Presented are a group of papers concerned with the methods, approaches, and specific solutions in task analysis. Some of the papers in the report are: determination of task analysis content, task analysis and proficiency measurement, methods and procedures for selected training equipment and job aids, methods of recording and reporting task analysis information, and others.
T. I. R many

18,142
Kountz, J.C. UNDERWATER COMMUNICATIONS: A DISCUSSION WITH TECHNICAL CONSIDERATIONS. Rep. HTR 6016, Aug. 1960, 18pp. Hallamore Electronics Div., Siegler Corporation, Anaheim, Calif.

18,142
The means by which adequate communications between a diver attempting to aid rescue operations for a ditched aircraft and his home vehicle (helicopter) can be feasibly sustained with minimum preparation and maximum reliability are explored. Several approaches in submerged-to-surface and the reverse transmissions are described. One approach is recommended and technical considerations concerning the major units in such a system are discussed.
I. R 29

18,143
Konecci, E.B. PHYSIOLOGICAL FACTORS IN SPACE FLIGHT. Engineering Paper 759, March 1959, 17pp. Missiles and Space Systems Engineering, Douglas Aircraft Company, Inc., Santa Monica, Calif.

18,143
This presentation delves into some of the more fundamental physiological factors involved in life in a closed ecological system for missions lasting months and possibly years. In particular, the possible reduction of vital payload through lowering metabolism is discussed. Following a discussion of vital human needs, a comparison is made between those of the male and the female and the suggestion is made that "woman in space" is preferable to man. Other means of reducing metabolism discussed are through lowering temperature and the practice of yoga. Research in all these methods is recommended.
T. G. R 8

18,144
Klumpp, R.G. & Webster, J.C. USNEL FLIGHT DECK COMMUNICATIONS SYSTEM. PART 5. MESSAGE ANALYSIS AND PERSONNEL RESPONSE. FINAL REPORT. NEL Rep. 926, Nov. 1960, 44pp. USN Electronics Lab., San Diego, Calif.

18,144
This study is the last of five phases of a comprehensive program initiated to develop a Flight Deck Communication System. This part presents an evaluation of the radio system through an analysis of voice messages passed over the system and the opinions of crew members and researchers as to system effectiveness.
T. G.

18,145
Kinney, M.S. ASYNCHRONOUS SEQUENTIAL LOGIC DESIGN. A SELECTED BIBLIOGRAPHY. 1947-1960. Rep. EM 6317, Oct. 1960, 43pp. Autonetics Div., North American Aviation, Inc., Downey, Calif.

18,145

The important primary sources relating to asynchronous sequential logic design as applied to digital computers are assembled in this bibliography. The period covered is 1947-1960 with particular emphasis on sources published in the past ten years. The references, many of which are annotated, are arranged alphabetically by author with an author and corporate author index following.
R 81

18,146
Kincaid, W.M. & Clarke, A.B. A STATISTICAL APPROACH TO THE PROBLEM OF SPATIAL AND TEMPORAL INTEGRATION IN VISUAL DETECTION. Contract DA 36 039 SC 78801, Rep. 2900 57 T, Oct. 1960, 18pp. Willow Run Labs., University of Michigan, Ann Arbor, Mich.

18,146

A critical examination of an earlier formulation of the effects of target size and shape upon visual detection leads to a more sophisticated approach which is also applicable to the more general problem of the relation between the spatial-temporal characteristics of a target and its detectability. It is postulated that the detection of a target involves a decision process analogous to the testing of a statistical hypothesis, using the most powerful test in the sense of Neyman and Pearson. The determination of the most powerful test in a given situation is equivalent to the solution of a set of equations. A formal solution can be obtained.
R 4

18,148
Kelley, C.R. FURTHER RESEARCH ON THE "PREDICTOR INSTRUMENT". FINAL REPORT. Contract NONR 2822(00), Tech. Rep. 252 60 2, Dec. 1960, 27pp. Dunlap and Associates, Inc., Stamford, Conn.

18,148

The major purpose of this study was to explore ways of utilizing predictor information in controlling a variable in two dimensions. A two dimensional tracking system was devised and three display systems were used. The experiments conducted to test the system were described and the reasons why the predictor instrument works and its applications were given. Also described was the Automanual Predictor Instrument Control which is a concept that arose from the work in the predictor instrument.
I. R 2

18,149
Keating, D.A. & Weiswurm, K. POTASSIUM SUPEROXIDE PASSIVE AIR REGENERATION STUDIES FOR MANNED SEALED ENVIRONMENTS. Proj. 6373, Task 63120, WADD TR 60 707, Dec. 1960, 25pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

18,149

The feasibility of using solid chemicals passively to absorb water vapor, remove carbon dioxide, and supply oxygen in sealed environments for life support in aerospace flight was investigated. Sealed environment research using humans as Ss demonstrated that proper regeneration of the air can be attained without using blowers, fans, or electric power. The series of experiments also indicated the amount of potassium sulphide required per hour for one man. The effect of chemical dust on the human, the manner of handling the chemicals, and the effect of the chemicals on materials were discussed.
T. G. I.

18,151
Jerger, J., Shedd, Joyce L. & Harford, E. ON THE DETECTION OF EXTREMELY SMALL CHANGES IN SOUND INTENSITY. A.M.A. Arch. Otolaryng., Feb. 1959, 69, 200-211.

18,151

A unique method for the clinical assessment of differential intensity discrimination is described. Short (200 msec.) one-db intensity increments are superimposed, at five-second intervals, on a pure tone of constant amplitude at a sensation level of 20 db. The patient responds to the momentary changes in loudness. Findings on selected individual cases are reported to show how the test scores vary with different kinds of hearing loss. Results obtained on 75 patients with various types of hearing loss are reviewed.
T. G. I. R 26

18,152
Jacobson, J.E. THE WILCOXON TWO SAMPLE STATISTIC. Contract NONR 2582(00), Task NR 042 200, Rep. 2, Aug. 1960, 37pp. Department of Statistics, University of Minnesota, Minneapolis, Minn.

18,152

Tables for the Wilcoxon two sample statistics are presented and the normal approximations to the Wilcoxon two sample statistic are considered. The primary purpose of the paper is a compilation of existing tables of exact distributions and a comparison of the exact distribution (in the tails) to the normal approximation.
T. R 57

18,153
Humphreys, C.M., Imalis, O. & Gutberlet, C. PHYSIOLOGICAL RESPONSE OF SUBJECTS EXPOSED TO HIGH EFFECTIVE TEMPERATURE AND ELEVATED MEAN RADIANT TEMPERATURES. Abstract of article in: Am. Soc. Heat. & Vent. Eng. Trans., 1946, 52(1290), 153-166.

18,153

To determine the physiological effect of a four-hour exposure to "effective temperatures" ranging from 80 to 95 degrees, "relative humidity" ranging from 30 to 70 percent, and "mean radiant temperatures" elevated to 40 degrees above air temperature, 36 Ss were studied under simulated ship's boiler room conditions. The Ss wore Navy clothing and rotated in light activities. The data collected were body temperatures (rectal and oral), pulse rate, weight before and after test, weight of consumed water and expelled urine, blood pressure, dry and wet bulb temperatures, globe thermometer reading, and air velocity. The resulting relationships were shown graphically.
T. G.

18,155
Howe, R.M. & Schetzer, J.D. A STUDY OF THE COMPUTER SECTION OF FLIGHT SIMULATORS. FINAL REPORT. Contract AF 33(616) 2131, EO R668 421 PO 3A, Proj. 2164, Rep. 2164 1 F, March 1954, 71pp. Engineering Research Institute, Department of Aeronautical Engineering, University of Michigan, Ann Arbor, Mich.

18,155

A study of the computer section of flight simulators used for training aircraft crews is reported. The chapter titles are: "Summary of the Flight Equations: Present and Proposed Electronic Methods Used in Their Solution"; "Improvement of Reliability and Ease of Maintenance Automatic Testing Circuits"; "Comparison of Aircraft Dynamic Performance with Flight Simulators"; and "Summary of Simulator Activity in the Air Force, Navy, and Aircraft Industry." Specific recommendations for the computer sections of future training type simulators are offered.
G. R 7

18,156
Hitt, W.D., Schutz, H.G., Christner, C.A., Ray, H.W., et al. DEVELOPMENT OF DESIGN CRITERIA FOR INTELLIGENCE DISPLAY FORMATS. FINAL REPORT. Contract AF 30(602) 2078, RADC TR 60 201, Sept. 1960, 120pp. USAF Rome Air Development Center, Griffiss AFB, N.Y. (Battelle Memorial Institute, Columbus, Ohio).

18,156
The purpose of this research program was to develop design criteria for intelligence display formats to be used in the Samos data-processing subsystem. The following five experiments were conducted to meet that objective: 1) a comparison of vertical and horizontal arrangements of alpha-numeric material, 2) an evaluation of formats for graphic trend displays, 3) an evaluation of metnods 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.
T. G. I. R 18

18,157
Hill, E.B. & Nowak, Elaine. RANGES FOR TRAINING AIRCRAFT PILOTS IN SPECIAL-WEAPON-DELIVERY TECHNIQUES. Proj. 958, NOTS TP 2343, Sept. 1960, 24pp. USN Ordnance Test Station, China Lake, Calif.

18,157
This report describes instrumentation designed and developed at the USN Ordnance Test Station, China Lake, California, for aircraft ranges used in training pilots in low-level special-weapon-delivery techniques. Range operating procedures, range personnel requirements, and instrumentation costs are discussed.
T. I.

18,158
Henry, F.G. & Merrow, C.M. A VISUAL COMMUNICATION SYSTEM FOR ROUTING STEREOTYPED MESSAGES IN AIR TRAFFIC CONTROL. PO 06401, S R006 09 02, Task 5742 (NEL N5 5), Rep. 1003, Nov. 1960, 18pp. USN Electronics Lab., San Diego, Calif.

18,158
To design and develop an improved method of handling routine internal communications in Navy radar air traffic control centers, a study of voice messages involved in internal communications at NAS Miramar was made. A visual signalling system was developed to replace and/or supplement voice transmissions of messages found to be stereotyped in nature. The equipment was installed in seven operating positions in the control center and evaluated in terms of traffic flow and noise conditions. Recommendations for further development are made.
G. I.

18,159
Henneman, R.H. (Princ. Investigator). CONDITIONS INFLUENCING CHOICE BEHAVIOR IN MULTIPLE TASK SITUATIONS. FINAL TECHNICAL REPORT. 30 MAY 1954 TO 30 SEPTEMBER 1960. Contract DA 49 007 MD 537, Oct. 1960, 34pp. Psychological Lab., University of Virginia, Charlottesville, Va.

18,159
Described are five studies designed to investigate factors influencing complex behavior of the type involved in numerous operational situations. The studies are: 1) conditions determining the efficiency of complex task performance, 2) conditions determining short-term retention in sequential tasks, 3) variables influencing choice behavior in simple response situations, 4) the influence of irrelevant information upon complex visual discrimination, and 5) factors determining the identification of ambiguous visual stimuli.

18,160
Healy, J.W. (Ed.). RESEARCH AND DEVELOPMENT ACTIVITIES IN THE FIELD OF RADIOLOGICAL SCIENCES JANUARY-MARCH, 1959. QUARTERLY PROGRESS REPORT. Contract W 31 109 ENG 52, Rep. HW 60137, UC 41, TID 4500, April 1959, 36pp. Hanford Atomic Products Operation, Richland, Wash.

18,160
Presented are summaries of the studies and research conducted in the field of radiological sciences from January through March 1959. The areas of study include biology, physics and instrumentation, and chemistry and separations processes. A summary and the status of the research program in the area are also presented.
T. G.

18,161
Headley, R.N., Brinkley, J.W., Lokatos, G. & Managan, R.F. HUMAN FACTORS RESPONSES DURING GROUND IMPACT. Proj. 7222, Task 71748, WADD TR 60 590, Nov. 1960, 33pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

18,161
This study was designed to better define some of the problems of human responses to be encountered during landing impact in an escape capsule. Eleven subjects were tested in a simulated B-70 capsule. A series of tests consisted of impact velocities from 9.8 to 30 ft./sec. with paper honeycomb as the impact attenuator. Three restraint systems were evaluated: the standard military lap belt-shoulder harness configuration, an experimental nylon full restraint suit, and the Stanley B-58 capsule restraint harness. The accelerometer data were evaluated and discussed.
T. G. I. R 10

18,162
JS Technical Information Service. PROCEEDINGS OF THE 1958 ATOMIC ENERGY COMMISSION AND CONTRACTOR SAFETY AND FIRE PROTECTION CONFERENCE HELD AT ATOMIC ENERGY COMMISSION HEADQUARTERS BUILDING, GERMANTOWN, MARYLAND, JUNE 24-25, 1958. Rep. TID 7569, May 1959, 121pp. JS Technical Information Service, Atomic Energy Commission, Washington, D.C.

18,162
A number of reports which were delivered at the 1958 conference are presented. The major purpose for the meeting was to promote maximum interchange of experience in the area of accident control and prevention. Some of the reports are: "Metal Fire and Explosion Research"; "Spontaneous Ignition, Safety Personnel Requirements in Nuclear Energy Plants"; "Shipping of Radioactive Materials at the National Reactor Testing Station"; etc. A panel discussion is also included in the report.
T. G. I.

18,163
USA Analysis & Research Div. FATAL ARMY HELICOPTER ACCIDENTS. Rep. HF 3 60, 1960, 11pp. USA Analysis & Research Div., Board for Aviation Accident Research, Fort Rucker, Ala.

18,163
Twenty-seven Army helicopter accidents involving fatalities were studied; 44 deaths occurred in these accidents during the period July 1957-December 1959. Using accepted criteria for survivability, the records were analyzed to determine how many of these accidents were survivable ones. The causes of death and injury, production methods (exclusive of thermal injuries), were tabulated along with usage or lack of use of equipment essential for crash survival. Safety measures were recommended on the basis of the analysis.
T. R 7

18,164
Kamen, J.M. & Peryam, D.R. (Princ. Investigators). EFFECTS OF REPETITIVE EATING OF LIMITED GROUPS OF FOOD ITEMS ON FOOD ACCEPTANCE. MIPR 33(616)59 19, Proj. 7164, Task 71833, WADD TR 60 750, Dec. 1960, 26pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (USA Quartermaster Food & Container Institute for the Armed Forces, Chicago, Ill.).

18,164
To test the effects of the type of menu planning and the number of different foods in food preferences and consumption, 72 Ss were submitted to one of three treatments. The treatments were: three-day cycle, self-planning of menus; three-day cycle, preplanned menus; and six-day cycle, preplanned menus. Consumption preferences were obtained from each S after each mean and food evaluations and personal reactions toward the test were obtained at the end of the testing period. Precooked dehydrated items and several experimental foods such as high protein high caloric drinks were served.
T. R 7

18,165
US Office of Civil and Defense Mobilization. THE FAMILY FALLOUT SHELTER. Rep. MP 15, Reprinted Nov. 1960, 31pp. US Office of Civil and Defense Mobilization, Battle Creek, Mich.

18,165
The booklet contains building plans for five basic fallout shelters. One of the five--the Basement Concrete Block Shelter--has been designed specifically as a do-it-yourself project. Each of the shelters incorporates the fundamentals for fallout protection--shielding mass, ventilation, space to live.
I.

18,166
US Technical Information Service. WORKS OF THE ALL-UNION CONFERENCE ON MEDICAL RADIOLOGY. EXPERIMENTAL MEDICAL RADIOLOGY. Translation Series, AEC TR 3661(Book 1), Aug. 1959, 277pp. US Technical Information Service, Atomic Energy Commission, Washington, D.C.

18,166
Presented are some 80 reports which make up the body of two books on medical radiology and experimental medical radiology. These reports are translations of the works reported at the All-Union Conference on that topic. Some of the reports are: "Biochemical Changes in the Organism on Exposure to Ionizing Radiation," "Effect of Ionizing Radiation on Infection and Immunity," "Heart and Skeletal Muscles During Radiation Sickness," "Structural Changes in Tissue of Irradiated Animals," "Permeability of Erythrocytes to Phosphates Under Normal Conditions and in Burns," and others.

18,167
Unger, H.R. & Turner, W.F. RECURRENT DYSBARISM IN FLIGHT. A CASE REPORT. Aerospace Med., Dec. 1960, 31, 1010-1015. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

18,167
The case of a 36-year-old senior pilot in the USAF who experienced two separate episodes of dysbarism in flight is presented. The cabin altitudes at which symptoms began and the pattern of symptoms are described. Subsequent physical examination and test results from simulated flight in the low-pressure altitude chamber are also given in detail. The seriousness of the problem of dysbarism is discussed in connection with the transition period into jet aircraft program and additional indoctrination concerning symptoms and corrective procedures is urged.
R 5

18,168
Tamler, E., Marg, E., Jampolsky, A. & Nawratzki, I. ELECTROMYOGRAPHY OF HUMAN SACCADIC EYE MOVEMENTS. A.M.A. Arch. Ophthal., Oct. 1959, 62, 657-661.

18,168
The results of an electromyographic study of saccadic eye movements (rapid versions) performed during a previously reported study of coactivity of human extraocular muscles are reported here. Photographic records of the saccade are analyzed for activity of the agonist, inhibition of the antagonist, coactivity of the extraocular muscles, and durations of different degrees of excursion. The evidence is examined with reference to the question as to whether the saccadic eye movements are or are not ballistic.
T. I. R 7

18,169
Tamler, E., Jampolsky, A. & Marg, E. ELECTROMYOGRAPHIC STUDY OF FOLLOWING MOVEMENTS OF THE EYE BETWEEN TERTIARY POSITIONS. A.M.A. Arch. Ophthal., Nov. 1959, 62, 804-809.

18,169
A study of coactivity of extraocular muscles (simultaneous increased contraction of muscles which are normally antagonistic in their primary field of action) during following movements of the eye between tertiary positions was attempted using multiple channel electromyography. Movements between tertiary positions were defined as horizontal movements in upper and lower fields of gaze and vertical movements in right and left fields. The target was a small light. While no coactivity was found in tertiary plane movements, the type of muscle activity that was found was discussed in this paper.
I. R 9

18,170
Taylor, J.H. VISUAL CONTRAST THRESHOLDS FOR LARGE TARGETS. PART I. THE CASE OF LOW ADAPTING LUMINANCES. Contract NOBS 72092, Index NS 714 100, SIO Ref. 60 25, June 1960, 11pp. Visibility Lab., Scripps Institution of Oceanography, University of California, San Diego, Calif.

18,170
To provide visual contrast thresholds for large targets (subtending more than 360 minutes) at low luminance levels, the assumption was made that a very large target near threshold was detected on the basis of seeing some part of its edge. A target consisting of a positive luminance increment of infinite duration was used to obtain "split-field" thresholds for three observers using unrestricted binocular vision. Targets were exposed for six seconds and the "yes-no" method of constant stimuli was used. Five target luminance levels were chosen to yield probabilities of detection from 0.00 to nearly 1.00; two scotopic adaptation luminance levels were used. The data were used to extend existing curves relating target size to contrast threshold (Blackwell).
T. G. I. R 7

18,171
Taylor, C.W. (Princ. Investigator). THE THIRD (1959) UNIVERSITY OF UTAH RESEARCH CONFERENCE ON THE IDENTIFICATION OF CREATIVE SCIENTIFIC TALENT. JUNE 11-14, 1959. 334pp. University of Utah, Salt Lake City, Utah.

18,171
An almost verbatim transcription is presented of the third in a series of conferences involving a sustained attack on the nature of creative scientific talent. The participants presented reports of their research efforts in the above field. The first group of reports is on criteria of creativity, the second is on predictors of creativity, the third on training and development, and the fourth on other external conditions that might influence creativity and thus alter any attempted predictions. Committee reports on each of these areas plus one on an overview of the entire movement of research and implementation are included.
R 264

18,172
Thomasian, A.J. AN ELEMENTARY PROOF OF THE AEP OF INFORMATION THEORY. Ann. math. Statist., June 1960, 31(2), 452-456. (University of California, Berkeley, Calif.).

18,172
Properties of the sequence of random variables -(1/n) log p are obtained for an arbitrary, not necessarily ergodic or stationary, information source. These permit an elementary combinatorial proof of the asymptotic equipartition property.
R 5

18,173
Scodel, A. & Minas, J.S. THE BEHAVIOR OF PRISONERS IN A "PRISONER'S DILEMMA" GAME. J. Psychol., 1960, 50, 133-138. (Department of Psychology, Ohio State University, Columbus, Ohio & Department of Psychology, Case Institute of Technology, Cleveland, Ohio). (AFOSR TN 60 1052).

18,173
To compare the competitive versus collaborative behavior of prisoners and of college students, 18 pairs of inmates at a federal reformatory participated in a "prisoner's dilemma" game--a two-person non-zero-sum game--which offers opportunities for either a collaborative or a noncollaborative strategy. Cigarettes were assigned to outcomes and the game was repeated for 50 trials. The choices made by the prisoners were compared with those of college students who had played the game for money (reported fully in an earlier paper).
R 4

18,174
Shagass, C., Muller, K. & Acosta, H.B. THE PENTOTHAL "SLEEP" THRESHOLD AS AN INDICATOR OF AFFECTIVE CHANGE. Proj. D50 45 04, Rep. DRB 9345 04, ca 1958, 26pp. Allan Memorial Institute of Psychiatry, McGill University, Montreal, Quebec, Canada.

18,174
Factors influencing the sleep threshold (amount of intravenous pentothal required to produce unresponsiveness to verbal stimulation) were studied in relation to the situation in electroconvulsive therapy (ECT). Threshold tests were made on 28 psychiatric patients prior to any ECT; tests were then continued as premedication for ECT. Additional tests were carried out using from three to five observers in order to assess difficulty in judging unresponsiveness. Clinical data of doctors and nurses were used to gather clinical correlates of behavior. The data were analyzed to determine 1) the repeatability of the sleep threshold, 2) the effect of ECT on the threshold, and 3) whether affective changes were reflected in the threshold.
T. G. R 13

18,175
Sendroy, J., Jr. & Collison, H.A. NOMOGRAM FOR THE DETERMINATION OF HUMAN BODY SURFACE AREA FROM HEIGHT AND WEIGHT. Proj. MR 005.12 3001.01, Rep. 2, July 1960, 8pp. USN Medical Research Institute, Bethesda, Md.

18,175
Previously published experimental data and body measurements which were used for the graphical determination of human body surface area, are used here to construct a new chart in the form of a nomogram. Results obtained from both types of charts are compared. Extension of the previous work is made to make possible the calculation from one chart, of surface area values of all humans of whatever size, given the height and weight of the individual.
G. R 1

18,176
Schwab, R.S. THE STUDY OF FATIGUE IN NORMALS AND PATIENTS WITH NEUROLOGICAL AND PSYCHIATRIC DISORDERS. FINAL REPORT. 1947-1957. Contract N5ORI 76/VIII, Rep. NR 113 141, Oct. 1958, 21pp. Harvard University, Cambridge, Mass.

18,176
This is a final report of a long term study of fatigue in normal Ss and in those with psychiatric difficulties and neurologic disorders. Subjective feelings of tiredness and objective deficit or impairment are considered separately throughout the report. Situations where fatigue of both types are encountered in both military and civilian settings are listed and the source of subjects is defined. Studies conducted with various equipments and tests are discussed: step-test and hanging-bar test; and electronic ergography. A summary of results from each of the above is given. Finally, the problems of differential diagnosis and the methods found most successful are treated.

18,177
Schuknecht, H.F. & Neff, W.D. HEARING LOSS AFTER EXPERIMENTAL INJURY TO APEX OF THE COCHLEA. Federation Proc., March 1951, 10(1, Part 1), 1p. (Division of Otolaryngology and Laboratory of Physiological Psychology, University of Chicago, Chicago, Ill.).

18,177
This study was undertaken to obtain further information as to the degree of localization of low tones in the cochlea. An operative method was developed by which a small circumscribed lesion could be made in the apical turn of the cochlea. Audiograms of experimental animals were determined by avoidance conditioning procedure before and after making the cochlea lesion. The cochlea were sectioned and graphic reconstructions were made after the post-operative testing.

18,178
Seidenstein, S., Chernikoff, R. & Taylor, F.V. THE RELATIONSHIP OF A RETINAL-GAIN INDEX TO SYSTEM PERFORMANCE. Proj. RR 006 09 41 5351, NRL Prob. Y02 01, NRL Rep. 5548, Sept. 1960, 7pp. USN Engineering Psychology Branch, NRL, Washington, D.C.

18,178
This study investigates the relationship of optical display and retinal gain to tracking precision using a compensatory tracking system. In a closed-loop man-machine control system, the relationship between a given system error and the error signal as imaged on the retina of the tracker's eye is determined by 1) the display gain and 2) the viewing distance. The reciprocal of viewing distance can be termed "optical gain." Display and optical gains can be combined to yield a single index, "retinal gain," which indicates the ratio between the error as imaged on the retina and system error. Mean integrated error scores of the tracking performance are analyzed as a function of display gain, viewing distance, and system dynamics.
T. I. R 1

18,179
Silver, C.A. RESEARCH ON COMPLEX PERCEPTUAL MOTOR SKILLS. FINAL REPORT. Contract NONR 3011(00), MH MPG Res. Rep. 1520 TR1, July 1960, 29pp. Military Products Group, Minneapolis-Honeywell Regulator Company, Minneapolis, Minn.

18,179
The purpose of this study was to assess the effects of a particular kind of redundancy of displayed information on human behavior. Three experiments were conducted with ten Ss participating in each experiment. The apparatus consisted of a Cathode-Ray-Oscillograph with signals generated from a three-channel noise generator displaced on it. The experiments consisted of: 1) perception of positive correlation, 2) perception of negative correlation, and 3) the free range of correlations from -1.0 to +1.0.
T. G. I.

18,180
Siegel, A.I. & Crain, K. AIRCRAFT DETECTABILITY AND VISIBILITY: I. VISUAL FIELDS FOR FLUORESCENT AND ORDINARY PAINTS. Contract N156 38581, Proj. TED NAM AE 42222, Part 2, Rep. NAMC ACEL 440, Sept. 1960, 20pp. USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.

18,180
As part of a study of the effective stimulus properties of certain fluorescent pigments, red-orange, yellow-orange, and blue fluorescents were compared among themselves and with those of "matching" ordinary pigments and white. Through visual perimetric methods, two points were measured on each of eight meridians: 1) the point at which the stimulus was first seen as it was brought in from the periphery, and 2) the point at which the true color could be identified. The sizes of the resultant visual fields were compared.
T. G. I. R 4

18,181
Simons, J.C. & Gardner, M.S. SELF-MANEUVERING FOR THE ORBITAL WORKER. Proj. 7184, Task 71585, WADD TR 60 748, Dec. 1960, 27pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,181
Presented are some studies dealing with the major psychophysical problem facing the free-floating orbital worker and some of the basic requirements for aiding and controlling the worker's motions are summarized. Basic human factors to be considered in the design of personnel gyropropellant systems are also outlined.
T. G. I. R 11

18,182
Scharf, B. & Stevens, J.C. THE FORM OF THE LOUDNESS FUNCTION NEAR THRESHOLD. Rep. PNR 232, ca. 1959, 4pp. Psychological Labs., Harvard University, Cambridge, Mass.

18,182
The form of the loudness function near threshold was investigated by two methods: ratio production and magnitude estimation. In the former, the S adjusted a 1000-cycle tone to sound either half as loud or twice as loud as a "standard" 1000-cycle tone. The level of the standard was set at five different values between 10 and 50 db. Sixteen Ss were tested. In the latter method, the S assigned numbers proportional to the apparent loudness of a 1000-cycle tone presented at six different levels. A standard stimulus (at about 10 db) was identified as "10" at the beginning of one series; in another, the standard (of about 20 db) was called "20." The results were presented graphically.
G. R 7

18,183
Scharf, B. & Stevens, J.C. THE FORM OF THE LOUDNESS FUNCTION NEAR THE MASKED THRESHOLD. Paper presented at the 1960 EPA Meeting, 4pp. Psychological Labs., Harvard University, Cambridge, Mass.

18,183
An experiment was performed to test the hypothesis that the loudness function for a 1000-cycle tone heard in white noise follows the same power law as a tone heard in quiet, provided the zero of the scale is set near the masked threshold of the tone. Loudness was measured by the method of magnitude estimation. The S assigned numbers proportionate to the apparent loudness of a 1000-cycle tone heard in white noise at sound pressure levels of 35, 65, or 95 db; the tone was presented at six or seven different levels in irregular order spaced five or ten db apart. The standard tone was identified as "10." The results were summarized graphically.
G.

18,184
Schlosberg, H. THE PSYCHOLOGICAL LABORATORY OF BROWN UNIVERSITY. Amer. J. Psychol., Dec. 1958, LXXI, 768-776. (Brown University, Providence, R.I.).

18,184
This note describes the planning, construction, and use of the Walter S. Hunter Laboratory of Psychology at Brown University. Floor plans are included and some advice is proffered to departments constructing new laboratories.
I.

18,185
Stevens, K.N. REVIEW OF EXISTING SPEECH COMPRESSION SYSTEMS. RADC TN 60 197, Oct. 1960, 27pp. Bolt Beranek and Newman Inc., Cambridge, Mass.

18,185
An attempt is made to summarize quantitative information on a number of speech compression systems that have been described in published papers and to present a preliminary evaluation of the various compression techniques represented by these systems. Comparisons are made on the basis of a single measure of intelligibility (percentage of phonetically balanced words correct), informational capacity of the channel, voice quality, and an estimate of complexity on a rank order scale from A to F. A graphical plot of these measures is presented and discussed in relation to the various systems.
T. G. R 31

18,186
Stevens, S.S. (Dir.). PERIODIC STATUS REPORT XXXV. PERIOD COVERED: 16 NOVEMBER 1959-15 MAY 1960. Contract NONR 1866(15), Proj. NR 142 201, Grant G 2668, Rep. PNM 87, May 1960, 22pp. Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.

18,186
A summary report of the studies and investigations conducted at the Psycho-Acoustics Laboratory since November 15, 1959, is presented. Some of the reports are: "Auditory Facilitation Following Stimulation at Low Intensities"; "Ratio Scales, Partition Scales, and Confusion Scales"; "The Speaker's Subjective Scale of Vocal Effort"; and "The Binaural Summation of Loudness." A summary of the research in progress is also presented.

18,187
Russell, R.W. (Princ. Investigator). BASIC PSYCHOLOGICAL STUDIES OF THE EFFECTS OF INCAPACITATING AGENTS. Contract RFP 55 DA18 108 405 CML 738, Rep. 1, Sept. 1960, 22pp. Research Div., Indiana University Foundation, Bloomington, Ind.

18,187
This report presents a summary of objectives and requirements of a research program designed to identify and evaluate chemical agents for potential incapacitating properties, and to specify requirements for achieving these objectives. This summary is to serve as a basis for further work.

18,189
Rohrer, J.H. HUMAN ADJUSTMENT TO ANTARCTIC ISOLATION. Contract NONR 1530 (07), Sept. 1960, 25pp. Department of Psychiatry, Georgetown University Medical School, Washington, D.C.

18,189

Problems of human adjustment experienced by men who wintered over in the Antarctic were reported here. The data on which the discussion was based resulted from interviews with, and observations of, 163 men. A structured interview schedule was used by the psychiatric team to obtain much of the data which was given here much in the manner of a clinical report. Three rather different levels of behavior were described: cyclic adjustment, interpersonal relations, and adjustive phenomena.
R 6

18,190

Robinson, E.A. SIMULTANEOUS SYSTEMS SUBJECTED TO STATISTICAL DISTURBANCES. Contract DA 11 022 ORD 2059, MRC TR 192, Sept. 1960, 7pp. USA Mathematics Research Center, University of Wisconsin, Madison, Wisc.

18,190

An expository account of the main features of the theory and applications of simultaneous systems subjected to statistical disturbances is presented. Mathematical arguments are avoided and block-diagram models are used to show what the mathematics is doing. The simulation concept and its fundamental importance is first discussed followed by types of feedback simulation by pure (or explicit) causal chains, conditional (or implicity) causal chains, and the causal circle.
I. R 4

18,191

Ring, F., Jr. (Compiler). SIXTH HOT LABORATORIES AND EQUIPMENT CONFERENCE. INTERNATIONAL AMPHITHEATRE, CHICAGO, ILLINOIS, MARCH 19-21, 1958. Rep. TID 7556, April 1959, 167pp. US Technical Information Service Extension, Atomic Energy Commission, Oak Ridge, Tenn.

18,191

This report contained 18 papers dealing with various operational and design aspects of Hot Laboratories and related equipment. A panel of seven men representing extensive Hot Laboratory operating experience in several types of laboratories throughout the country answered questions (concerning design and operations) which were asked by members of the conference. Questions and answers were presented here.
T. G. I. R 30 (approx.)

18,192

Riblett, V.T. & Hodge, J.W., Jr. EVALUATION OF NO. I HAND (SERIAL NO. 2). Tech. Rep. 6023, Sept. 1960, 3pp. USA Prosthetics Research Lab., Walter Reed Army Medical Center, Washington, D.C.

18,192

The results of functional tests on the No. 1 hands (small size prosthetic device) were reported. The main point of interest was whether a brass bac loc shoe could maintain tentative standards for distance between thumb and index finger under endurance testing. A nylon bac loc shoe had previously been found unsuitable.
T.

18,193

Reitzel, W.A. DECISION MAKING—A PRIMARY EXECUTIVE RESPONSIBILITY. Publ. L60 34, Sept. 1959, 21pp. Industrial College of the Armed Forces, Washington, D.C.

18,193

This lecture describes the role of the executive as a decision maker and this is explained in terms of the role of the organization and the meaning of an executive which are defined and elaborated upon. A question and answer period follows the text of the lecture.
I.

18,194

Rees, D.W. & Copeland, Nola K. DISCRIMINATION OF DIFFERENCES IN MASS OF WEIGHTLESS OBJECTS. Proj. 7184, Task 71586, WADD TR 60 601, Dec. 1960, 21pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,194

Studied was the ability of subjects to discriminate small differences in mass of objects handled in a weightless environment. Employing the method of constant stimulus differences, four series of weights were used, each consisting of one standard and nine comparison stimuli. A weightless condition was simulated and each subject was tested under both weight and weightless conditions to compare results.
T. G. I. R 4

18,195

Ray, W.S. ON THE SEARCH MECHANISM IN PROBLEM SOLVING. Contract NONR 2315 (00), Tech. Rep. 5, Oct. 1960, 10pp. Cognitive Operations Lab., Bethany College, Bethany, W. Va.

18,195

An examination of the "search" or "search mechanism" to which different writers have referred as a feature of the total process of problem-solving is presented. A general model of problem-solving is first presented within which assumptions are made about the search mechanism and some hypotheses about the search itself. These are illustrated with reports of experiments.
R 16

18,196

Ratliff, F., Miller, W.H. & Hartline, H.K. NEURAL INTERACTION IN THE EYE AND THE INTEGRATION OF RECEPTOR ACTIVITY. Ann. N.Y. Acad. Sci., Nov. 1958, 74(Art. 2), 210-222. (The Rockefeller Institute for Medical Research, New York, N.Y.).

18,196

The complexity of the nervous center in the retina and the interplay of excitatory and inhibitory influences yielding patterns of optic nerve activity are discussed. This paper examines two important processes in this integrative action: 1) the enhancement of differences in neural activity from differently illuminated regions of the retina, and 2) the enhancement of neural responses to temporal changes in intensity. Both processes are studied in an invertebrate eye and in the more complex retinas of vertebrates and related to the detection and signalling of information about contours.
G. I. R 25

18,198

Rapoport, A. & Horvath, W.J. INFORMATION PROCESSING IN NEURONES AND SMALL NETS. Contract AF 33(616) 6272, Proj. 7232, Task 71782, WADD TR 60 652, Dec. 1960, 506pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Mental Health Research Institute, University of Michigan, Ann Arbor, Mich.).

18,198

The neurophysiological literature was surveyed to determine the current state of knowledge on the characteristics of neurons as elements in information-handling systems. An extensive bibliography of reports bearing on this subject was appended and abstracts of slightly over 100 of the most relevant ones were included. These abstracts, together with comments by the present investigators formed the body of this report. Major sections were devoted to the following: sensory units and associated primary fibers; synaptic responses; central responses; and integration, information processing, and behavioral correlates of neural events.
T. G. I. R 450 (approx.)

18,199
O'Connor, W.F. THE INTERRELATIONSHIPS OF SOCIAL PERCEPTION, SOCIOMETRIC STATUS, PERSONALITY, AND THE ABILITY TO JUDGE PERSONALITY TRAITS. Proj. MR005.13 5001, Subtask 2, Rep. 9, Nov. 1960, 67pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,199
The interrelationships between various aspects of the self-concept and the perception of others with sociometric status and social behavior were studied. Changes in some of these relationships over time were also studied. The Ss were 12 groups or sections of cadets (20-29 in number) training for preflight. Each section was tested three times: second, sixth, and sixteenth week of training with measures designed to yield sociometric scores (status, behavior, and relation); personality scores (personal traits, peer ratings, and social distance); and trait rating accuracy scores. Various hypotheses concerning expected relationships and changes were examined in light of the resultant data.
T. R 102

18,200
Notterman, J.M. & Trumbull, R. NOTE ON SELF-REGULATING SYSTEMS AND STRESS. Behav. Sci., Oct. 1959, 4(4), 324-327. (Princeton University, Princeton, N.J. & USN Office of Naval Research, Washington, D.C.).

18,200
Some comments are made concerning the use of the servosystem analogy as a conceptual framework for theorizing and research in stress. Some speculations are presented which bear upon certain assumed underlying processes--detection, identification, and response availability--in such a frame of reference.
R 7

18,201
Newquist, E.A., Cassidy, M.D., Lindblom, C.W. & Sullivan, P.J. DEVELOPMENT OF AN EJECTABLE-NOSE ESCAPE CAPSULE. Contract AF 33(600) 35430, Proj. 1362, Task 13438, WADC TR 59 493, June 1959, 209pp. USAF Aircraft Lab., Wright-Patterson AFB, Ohio. (Lockheed Aircraft Corporation, Burbank, Calif.).

18,201
The results of a study made to develop an optimum ejectable-nose escape capsule for use in single place high performance type aircraft are presented. The speed and altitude ranges for which the capsule will provide safe escape are given. Capsule construction and the devices necessary for stabilization, separation, deceleration, descent, and alighting are described. Trajectories of the capsule and fuselage afterbody are plotted and the accelerations on the pilot are shown for the most critical case and compared to human limits. Environment and survival problems are discussed. Weight and volume requirements are estimated and compared with conventional escape systems.
T. G. I. R 21

18,202
Nall, M.L. SELECTION, TRAINING, AND EVALUATION OF RADAR OBSERVERS AND BOMB-NAVIGATION SYSTEM OPERATORS. WORKING BIBLIOGRAPHY. Contract NONR 2718(00), M 1451, Q 11, March 1959, 5pp. Man-Machine Information Center, Documentation Incorporated, Washington, D.C.

18,202
A bibliography of 44 items is listed alphabetically by author which are relevant to the selection, training, and evaluation of radar observers and bomb-navigation system operators. The period covered is from 1943 to 1956.
R 44

18,204
Baker, L.E. (Chm.). SIXTH ANNUAL ARMY HUMAN FACTORS ENGINEERING CONFERENCE. USA ENGINEER RESEARCH AND DEVELOPMENT LABS., FT. BELVOIR, VA. 3-6 OCTOBER 1960. 247pp. USA Office of the Chief of Research and Development, Washington, D.C.

18,204
This report contains a record of a conference called to provide direct interchange of information on human factors engineering among personnel of the USA development agencies, and between these and representatives of user agencies. The report provides a compendium of current work programs and related information concerning all USA human factors engineering research and development activities.
T. G. I. R 250 (approx.)

18,205
Johnson, J. VISION TRANSFORMS AND ELEMENTARY DECISION MAKING. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 13-19. USA Office of the Chief of Research and Development, Washington, D.C.

18,205
Electronic image intensifiers with light gains of 50,000 to 100,000 can be used in many night applications to extend human vision by factors of 10 and 100 times. The analysis of the decision-making performance of such electro-human vision systems is very considerably simplified by the use of the vision transformer concept. The vision transform method in conjunction with the statistical theory governing image fluctuations allows the optimum matching and synthesis of electro-human vision systems for a variety of applications. This method of performance analysis is discussed in some detail.
G. I.

18,206
Hyler, J.H. PRACTICAL EXAMPLES OF HUMAN FACTORS IN DESIGN OF EARTH-MOVERS. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 20-25. USA Office of the Chief of Research and Development, Washington, D.C.

18,206
The manner and methods of incorporating human engineering factors in the design of earth-moving equipment by one company is discussed. Some areas where a human problem has been recognized by the designer, the test engineer, or by the user operator are given: cable controls, shifting of transmissions, suspensions, visibility, and maintenance factors. Balance in the design process such that human capabilities can be used, as well as the machine's characteristics, to provide optimum performance is discussed as the key to successful design.

18,207
Chwalow, M.L.E. LOW AND HIGH LIGHT LEVEL ELECTROVISUAL PROBLEMS. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 29-30. USA Office of the Chief of Research and Development, Washington, D.C. (Frankford Arsenal, Philadelphia, Penn.).

18,207
Progress made in recent years in extending night fire control capabilities to the darkest conditions of illumination by way of electrovisual equipment is discussed. One approach to the problem is in the direct modification of standard television pickup tubes and the extension of standard television techniques. The human engineering problems involved in introducing night fire control electrovisual equipment in vehicles are indicated.
T.

18,208
Hicks, S.A. VEHICLE CONFINEMENT STUDIES. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 36-39. USA Office of the Chief of Research and Development, Washington, D.C. (USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.).

18,208
A series of studies were described which had as their objective the determination of the effects of prolonged confinement on the crew and passengers of tracked vehicles. The two studies included here were concerned with the performance of infantry men after a four- and an eight-hour confinement. A series of tests (obstructed-running, grenade-throwing, rail-walking, and rifle-firing) were administered before and after confinement to four squads of ten men each. A fifth squad served as a control and was tested twice but was not confined. The results were discussed in terms of future efforts in this series of studies.

18,209
LaPorte, H.R., Jr. HUMAN FACTORS ANALYSIS OF AN AUTOMATIC CHECKOUT DEVICE. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Fort Belvoir, Va. 3-6 October 1960," 40-46. USA Office of the Chief of Research and Development, Washington, D.C. (North American Aviation, Inc., Downey, Calif.).

18,209
A typical equipment design problem, the re-design of an automatic checkout device called the programmer-comparator, is described as an example of the activities of the Autonetics Human Engineering Unit of North American Aviation, Inc. It is shown that human engineering recommendations are accepted by equipment designers and that considerable product improvement can be accomplished thereby. The problems involved which bear directly on the relationship between industry and military are pointed out: need for more adequate and effective human engineering design standards, need for military specifications for these design standards, and need for applicable design data based on human errors in equipment usage.
I.

18,210
Schutz, H.G. RELATION BETWEEN PHYSICAL AND SUBJECTIVE PROPERTIES OF ODORANTS. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 49-57. USA Office of the Chief of Research and Development, Washington, D.C. (Battelle Memorial Institute, Columbus, Ohio).

18,210
The accomplishments of a research program directed toward an attempt to relate physical properties of compounds to subjective or psychological properties and to use this information to help understand the olfactory process and to develop a classification system for odorants. Three phases are discussed: 1) the selection of odorants and collection of physical data (30 chemical compounds and 18 physical properties chosen), 2) the collection of subjective data (intensity and quality characteristics), and 3) relating the physical to the subjective data (intercorrelations with subsequent factor analysis).
T. G.

18,211
Hawkes, G.R. COMMUNICATION BY ELECTRICAL STIMULATION OF THE SKIN. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 82-97. USA Office of the Chief of Research and Development, Washington, D.C. (USA Medical Research Lab., Fort Knox, Ky.).

18,211
Possible uses of communication by stimulation of the skin in cases where the eye and ear are not available are discussed. A series of studies are then described in which the electrical current is used for stimulation and cues already demonstrated to be useful in the mechanical vibration system (intensity, duration, and locus) are investigated. Intensity discrimination values are determined for only one kind of sensation, vibration, by both the "beat" and successive stimuli methods; intensity levels equally spaced in terms of apparent subjective magnitude are determined; the effect of knowledge of results and extended physical range on information transmitted is investigated; and a series of similar studies on stimulus duration is conducted.
G. I. R 15

18,212
Bishop, E.W. HUMAN FACTORS IN THE EVALUATION OF SIGNAL CORPS SYSTEMS. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October, 1960," 101-107. USA Office of the Chief of Research and Development, Washington, D.C. (Dunlap and Associates, Inc., Stamford, Conn.).

18,212
The question "How can the human factors specialist support the evaluation required in the normal course of equipment development?" is discussed. The approach used and the specific guidance given to design engineers by Dunlap and Associates, Inc., in their role of human engineering consultants are discussed in relation to the design and development of a radar intended for battle field surveillance.
T. R 1

18,213
Armsby, D.H. & Huebner, D.L. SYSTEMS DEMANDS ANALYSIS: A METHOD FOR SPECIFYING PROCEDURES. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October, 1960," 108-114. USA Office of the Chief of Research and Development, Washington, D.C. (Applied Psychology Corp., Arlington, Va. & USA Signal Research and Development Lab., Fort Monmouth, N.J.).

18,213
This report deals principally with the concepts and methods formulated in an effort to develop for and provide tools and data for increasing their aid in the design of maximally effective systems. A method for procedure analysis is described which first determines the "demands" imposed on the operator; the demands are analyzed in terms of those qualifications of type and intensity which apply to each; these qualities are called "dimensions." Through changes in demands or their dimensions, "operations" are identified, described, and limited; and by noting changes in key demands "procedures" are identified. Finally, effective means of standardizing "tasks" will be developed.
I.

18,215
Mead, L.C. DISSEMINATING HUMAN FACTORS ENGINEERING INFORMATION WITHIN THE CHEMICAL CORPS. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 119-120. USA Office of the Chief of Research and Development, Washington, D.C. (Tufts University, Medford, Mass.).

18,215
A brief summary was given of the manner in which human factors engineering information was disseminated in one technical command of the Army. After it was decided that there were human engineering problems within this command (on basis of visits and observations), a series of indoctrination seminars were held. Upon the basis of a follow-up questionnaire to the participants, a program of circuit seminars was conducted and a further follow-up questionnaire was sent out. Examples of seminar programs and questionnaires were given.
T.

18,216
Davy, E. PSYCHOPHARMACOLOGY AND HUMAN FACTORS ENGINEERING IN THE U.S. ARMY CHEMICAL CORPS (UNCLASSIFIED ABSTRACT OF A CONFIDENTIAL PAPER). Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 120-121. USA Office of the Chief of Research and Development, Washington, D.C. (USA Psychology and Human Engineering Branch, Chemical Center, Md.).

18,216
This unclassified abstract of a confidential paper summarizes the objectives and work of the Chemical Corps Psychology and Human Factors Engineering Branch. The general objectives of their program are 1) to determine the effects of drugs upon man in terms of the extent to which they increase or decrease the proficiency of his performance, and 2) to conduct human factors research related to the design and use of equipment. Specific activity areas are named and general testing procedures are outlined.

18,217
McCourt, F.P. AVIATION CRASH INJURY RESEARCH. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 125-127. USA Office of the Chief of Research and Development, Washington, D.C. (USA Research and Analysis Div., Fort Eustis, Va.).

18,217
The major objectives and procedures followed in aviation crash injury research are described. The importance of resultant data in providing crash safety engineering specifications, requirements, and design are discussed. Useful crash survival data are produced both by the study of accidents and from experimental crashes. The importance of these programs for continuing air safety is indicated.

18,218
Vallance, T.R. SOME RELATIONS BETWEEN TRAINING RESEARCH AND HUMAN ENGINEERING IN THE DESIGN OF WEAPON SYSTEMS. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 131-137. USA Office of the Chief of Research and Development, Washington, D.C. (Human Resources Research Office, George Washington University, Washington, D.C.).

18,218
A short orientation is given to the Human Resources Research Office (HumRRO) which includes its organization, deployment, and method of operation. The major emphasis of the paper is placed on a discussion of some relationships between those activities called training research and those called human factors engineering. Samples of HumRRO research that exemplify such relationships are presented and discussed.
I.

18,219
Zeidner, J. HUMAN FACTORS STUDIES IN TACTICAL PHOTO INTERPRETATION. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 137-145. USA Office of the Chief of Research and Development, Washington, D.C. (USA Personnel Research Branch, Adjutant General's Office, Washington, D.C.).

18,219
The kinds of problems in image systems that are appropriate to the techniques and skills of the measurement psychologist are discussed in broad terms first and then in relation to a given research program. Five tasks are to be investigated: 1) identification of basic factors in image interpretation, 2) development of selection techniques for image interpreter personnel, 3) utilizatior measures under conditions of emergency demand, 4) identification of basic factors in "real time" interpretation, and 5) effective group patterns for accomplishment of missions. Findings from current pilot studies (stereoscopic versus nonstereoscopic viewing, and the influence of informational set on image interpretation) are presented.
T. I.

18,220
Sadacca, R. THE ACCURACY AND COMPLETENESS OF INDIVIDUAL AND TEAM PHOTO INFORMATION EXTRACTION. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 145-150. USA Office of the Chief of Research and Development, Washington, D.C. (USA Personnel Research Branch, Adjutant General's Office, Washington, D.C.).

18,220
The problem of utilization of photo interpreters (PI) was studied through an initial investigation into the effects of varying the number and composition of interpreters in PI teams and the work methods the teams employ Four methods of combining efforts of team members were studied: 1) each PI worked independently and their separate responses were pooled later, 2) as in 1) except that the method of pooling responses was varied, 3) PIs worked first alone and then in teams while examining imagery and recorded only those responses agreed upon by team members, and 4) PIs worked as a team at all times. The results from one exercise of photo interpretation were presented.
T. I.

18,221
Tidmarsh, H.A. COMMENTS ON THE HUMAN FACTORS ENGINEERING COURSES AT MCGILL AND THE UNIVERSITY OF MICHIGAN. Report from: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October 1960," 173-177. USA Office of the Chief of Research and Development, Washington, D.C. (USA Transportation Research and Engineering Command, Fort Eustis, Va.).

18,221
This paper presents some comments and comparisons regarding the short courses in human factors engineering offerred by the University of Michigan and by McGill University during the summer of 1960. The writer is an engineer who attended both courses. Comparisons are offerred as follows: 1) objectives of courses, 2) attendance, 3) instruction, and 4) material covered. Some recommendations are made in relation to the use of such courses by the Army.

18,223
Boynton, R.M. RECOGNITION OF FORMS AGAINST A COMPLEX BACKGROUND. Section I of Publ. 835, "Vision Research Reports," 1960, 3-9. National Academy of Sciences-National Research Council, Washington, D.C. (University of Rochester, Rochester, N.Y.).

18,223
The purpose of this study was to determine the probability of correct recognition of "critical targets" of rectilinear shape when these targets are presented among a background of curvilinear "struniforms." In the experimental situation, a critical target may or may not be presented. A special feature of the experiment was a system of rewards to control guessing and to maintain high motivation.
T. G. R 5

18,224
Gebhard, J.W. & Mowbray, G.H. SENSITIVITY OF THE VISUAL SYSTEM TO CHANGES IN THE RATE OF INTERMITTENCE. Section I of Publ. 835, "Vision Research Reports," 1960, 10-12. National Academy of Sciences-National Research Council, Washington, D.C. (Applied Physics Lab., Johns Hopkins University, Baltimore, Md.).

18,224
The ability of the eye to discriminate small differences in the rate of intermittence of stimuli was examined. Separate standard and comparison electronic pulse generators were used to provide variable frequency intermittent operation of flash tube, random noise choppers, and mechanical vibrators. The psychophysical method of adjustment was used and comparisons of the three sensory processes, the eye, ear, and skin, were made in terms of temporal resolving power.
R 8

18,225
Hurvich, L.M. & Jameson, Dorothea. THE OPPONENT-COLORS MECHANISM OF VISION. Section I of Publ. 835, "Vision Research Reports," 1960, 13-20. National Academy of Sciences-National Research Council, Washington, D.C. (Color Technology Div., Eastman Kodak Company, Rochester, N.Y.).

18,225
The need for a quantified hypothetical structure which may serve to integrate and clarify the phenomenon of color vision was discussed and categories of these phenomena were presented. A quantitative formulation of a hypothetical structure of color vision derived from the Hering theory of opponent colors was included in the report. The Hering theory was briefly described.
G. R 16

18,226
Westheimer, G. ACCOMMODATION LEVELS IN EMPTY VISUAL FIELDS. Section I of Publ. 835, "Vision Research Reports," 1960, 21-23. National Academy of Sciences-National Research Council, Washington, D.C. (School of Optometry, Ohio State University, Columbus, Ohio).

18,226
To determine the origin of night myopia, a series of experiments were conducted. A subjective optometric device was used which flashed a beam into the trained observers eye, the configuration of which gave information about the refractive state of the eye. Accommodation measurements were obtained every ten sec. for sessions lasting 30 minutes or more. The observers were exposed to visual fields containing: 1) no visual stimuli at all (darkness), 2) a central bright 175 mL region 12-15 degrees in diameter without sharp borders, and 3) a small red spot.
R 5

18,227
Tousey, R., Koomen, M.J. & Gulledge, Irene S. THE VISIBILITY OF THE VANGUARD SATELLITE. Section I of Publ. 835, "Vision Research Reports," 1960, 24-33. National Academy of Sciences-National Research Council, Washington, D.C. (USN Research Lab., Washington, D.C.).

18,227
The aspects concerning the visibility of the vanguard satellite were reviewed. The program designed to determine visual threshold for the vanguard satellite under simulated conditions was described. These conditions included: visibility during full daylight, visibility during late twilight to night, the effect of motion of the satellite, the presence of fixed stars, and the advantage of using a telescope.
T. G. I. R 5

18,228
Anderson, Edythe M.S. THE STATUS OF RESEARCH ON THE EFFECT OF PRE-EXPOSURE ON DARK ADAPTATION. Section II of Publ. 835, "Vision Research Reports," 1960, 41-55. National Academy of Sciences-National Research Council, Washington, D.C. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.).

18,228
Presented is the third of a series of annotated bibliographies designed to collate the dark adaptation literature with emphasis on the effects of pre-exposure variables. The present report covers the literature through April, 1956. The report provides a brief summary of results, suggests solutions to a communication problem, and points up areas for future research.
G. R many

18,229
Blackwell, H.R. OUTLINE STATEMENT OF A GENERALIZED METHOD FOR SPECIFICATION OF INTERIOR ILLUMINATION LEVELS ON THE BASIS OF PERFORMANCE DATA. Section II of Publ. 835, "Vision Research Reports," 1960, 56-63. National Academy of Sciences-National Research Council, Washington, D.C. (Departments of Psychology and Ophthalmology and Vision Research Labs., University of Michigan, Ann Arbor, Mich.).

18,229
Presented is a brief description of a method which may be used to specify illumination levels for various practical visual tasks. The two major components of the method are: 1) performance data for standard circular targets, and 2) a device which may be used to establish the circular target which is equivalent in difficulty to any practical visual task of interest. Also presented are sample illumination values specified by the method.
T. G. I. R 6

18,230
Alpern, M. CERTAIN EFFECTS OF BACKGROUND ILLUMINANCE ON ACCOMMODATION AND VERGENCE FUNCTION. Section II of Publ. 835, "Vision Research Reports," 1960, 64-67. National Academy of Sciences-National Research Council, Washington, D.C. (Department of Ophthalmology and Vision Research Labs., University of Michigan, Ann Arbor, Mich.).

18,230
The effects which background illuminance have upon the accommodation and convergence of the two eyes were tested. Measurements were made by viewing an ordinary Snellen test chart at the other end of the room through a half-silvered mirror and an artificial pupil two mm in diameter mounted in the spectacle plane. A variety of stimuli and various neutral density filters placed over the projectors which illuminate the test chart were used. Graphs depicting the responses for various accommodation stimuli for one observer were included in the report.
G. R 3

18,231
Knoll, H.A. A BRIEF INTRODUCTION TO DYNAMIC VISUAL ACUITY. Section II of Publ. 835, "Vision Research Reports," 1960, 68-69. National Academy of Sciences-National Research Council, Washington, D.C. (Department of Biophysics and Division of Ophthalmology, University of California Medical Center, Los Angeles, Calif.).

18,231
Described was the apparatus used to measure dynamic visual acuity under conditions approximating driving conditions. The angular velocities tested included 0, 20, 60, and 180 degrees per second. The results of the study were also briefly presented.
R 1

18,232
Ludvigh, E. VISUAL ACUITY DURING OCULAR PURSUIT. Section II of Publ. 835, "Vision Research Reports," 1960, 70-75. National Academy of Sciences-National Research Council, Washington, D.C. (Kresge Eye Institute, Detroit, Mich.).

18,232
Reported are a series of experiments on the subject of visual acuity when relative motion exists between the eye and the object. Emphasized is the fact that the field of investigation known as "dynamic visual acuity" is a misnomer. This is further demonstrated by the experiments described.
G. I. R 8

18,233
Rushton, W.A.H. THE INTENSITY FACTOR IN VISION. Section III of Publ. 835, "Vision Research Reports," 1960, 104-111. National Academy of Sciences-National Research Council, Washington, D.C. (Trinity College, Cambridge, England).

18,233
Discussed is the photochemical theory of human visual performance and the methods of measuring the increment threshold and the technique of measuring visual pigments in man. Measurements upon the author's cones are given and the relation of increment threshold to visual pigment, the relation of absolute threshold to visual pigment, and the results of the experiments are cited.
G. R 4

18,234
Hurvich, L.M. & Jameson, Dorothea. INTERACTIVE AND INDUCTIVE EFFECTS IN COLOR VISION. Section III of Publ. 835, "Vision Research Reports," 1960, 155-159. National Academy of Sciences-National Research Council, Washington, D.C. (Department of Psychology, New York University, New York, N.Y.).

18,234
The purpose of this study was to obtain the measurement, by color matching procedures, of the changes that occur in the perceived color of a focal stimulus when a contrasting stimulus or an increasingly complex array of contrasting stimuli are introduced in the visual field. The observer viewed a stimulus pattern composed of a uniform background and five squares which differed from each other and the background in chromaticity and luminance.
G. I. R 5

18,235
Judd, D.B. COLOR-VISION THEORY--IMPLICATIONS AND APPLICATIONS. Section III of Publ. 835, "Vision Research Reports," 1960, 160-182. National Academy of Sciences-National Research Council, Washington, D.C. (National Bureau of Standards, Washington, D.C.).

18,235
Presented is a review of color vision theory which includes a discussion of the types of color vision, ways of expressing the conditions for color matching, spectral absorption curves of photopigments, and segregation of photopigments within classes of receptors. Applications of color-vision theory are discussed and included in the discussion are problems such as perception of colors in complicated scenes, chromatic adaptation, and others.
T. G. R many

18,236
Sylvania Electronic Systems. SURVEY OF MAINTENANCE EQUIPMENT AND PROCEDURES IN THE 416L SYSTEM. VOLUME I. Contract AF 30(602) 2071, RADC TN 60 174A, Rep. TN451 2, Oct. 1960, 70pp. 416L Instrumentation Program Staff, Sylvania Electronic Systems, Waltham, Mass.

18,236
The purpose of this study was to analyze present and future requirements in SAGE for instrumentation in system maintenance. A survey and tabulation of all tests and test equipment that are used or recommended in maintaining operational equipment in the SAGE system were made. The sources used and the organization of the data obtained as well as the presentation were described. The equipments covered are: radar and auxiliary subsystems; voice-communications subsystems; identification systems; ground/air data-link subsystems; and data-processing subsystems.
T.

18,238
Schwartz, R., Hofstetter, E. & Wholey, J. TECHNIQUES OF PICTORIAL DATA REDUCTION, GENERATION, AND DISPLAY. FINAL REPORT. Contract AF 33(616) 5589, Proj. 9(610 6190), Task 50787, WADD TR 60 462, June 1960, 106pp. Applied Science Div., Melpar, Inc., Watertown, Mass.

18,238
The primary purpose of this study was to determine methods of reducing storage requirements for binary sequences representing two-color pictures. The possibility of using shift-register devices and recursive logic technique to generate pictorial data sequences was investigated. Exact coding techniques and approximation methods were analyzed and a theory which determines bounds on the maximum achievable comprehension of binary digital sequences was presented.
T. G. I. R 25

18,239
Hawkes, G.R. (Ed.). SYMPOSIUM ON CUTANEOUS SENSITIVITY. 11-13 FEBRUARY 1960. Proj. 6X95 25 001, Task 05, Rep. 424, Dec. 1960, 165pp. USA Medical Research Lab., Fort Knox, Ky.

18,239
Papers presented at a symposium on skin sensitivity are reproduced in this report. The 13 papers are devoted to two main topics: an assessment of progress toward answering some of the basic theoretical questions regarding cutaneous sensory phenomena and mechanisms, and the requirements of an efficient cutaneous communication system.
T. G. I. R 200 (approx.)

18,240
Uttal, W.R. THE NEURAL CODING OF SOMESTHETIC SENSATION: A PSYCHOPHYSICAL-NEUROPHYSIOLOGICAL COMPARISON. Report from: "Symposium on Cutaneous Sensitivity. 11-13 February 1960," Rep. 424, Dec. 1960, 26-49. USA Medical Research Lab., Fort Knox, Ky. (IBM Research Center, Yorktown Heights, N.Y.).

18,240
Research studies in which neural and psychophysical responses in man have been compared were discussed in relation to the problem of intensity coding of somesthetic sensation. Using electrical pulses for stimuli, compound action potentials were recorded from intact human peripheral nerves; the Ss also made estimates of magnitude to the same set of stimulus patterns. With these procedures, various factors of the stimulus--duration, number of pulses, interval between patterning, etc.--were studied in relation to the coding of sensory intensities. The findings were discussed in relation to existing knowledge based upon pulse stimulation of nerves.
T. G. I. R 12

18,241
Jones, F.N. SOME SUBJECTIVE MAGNITUDE FUNCTIONS FOR TOUCH. Report from: "Symposium on Cutaneous Sensitivity. 11-13 February 1960," Rep. 424, Dec. 1960, 63-72. USA Medical Research Lab., Fort Knox, Ky. (University of California, Los Angeles, Calif.).

18,241

One of the somesthetic senses, touch, and the way in which some stimulus parameters affect judgments of magnitude were investigated. The stimulus variables under study were velocity, load, and depth of stimulus intrusion; the rates varied from 0.27 to 120.8 mm/sec.; the loads from 2.2 to 50 grams; and the depths from 1 to 5 mm. In the latter two cases; the rate of stimulus application was 1.9 mm/sec. In each series, the middle value was the arbitrary standard called "10." The data from 24 Ss were fitted with the most appropriate power functions. Some speculative remarks were presented concerning the implications of these scaling results for the action of the touch system.
G. R 13

18,242

Gregg, L.W. SOME CODING PROBLEMS IN THE DESIGN OF A CUTANEOUS COMMUNICATIONS CHANNEL. Report from: "Symposium on Cutaneous Sensitivity. 11-13 February 1960," Rep. 424, Dec. 1960, 85-102. USA Medical Research Lab., Fort Knox, Ky. (Carnegie Institute of Technology, Pittsburgh, Penn.).

18,242

This paper is addressed to the question "How can we utilize trains of electrical impulses to the skin as a means of communication?" The viewpoint expressed is that the task should be that of producing a system based upon the English language, such that the richness and complexity of both written and spoken language might be achieved. Ideas on coding are elaborated by considering some very general evidence concerning the rate of reception of auditory and visual signals. From this, certain requirements for defining the process by which human receivers interpret sensory data are derived and used to construct a theory of code interpretation. Finally, coding problems and suggestions for research upon the skin and other senses are discussed.
T. I. R 11

18,243

Howell, W.C. ON THE POTENTIAL OF TACTUAL DISPLAYS: AN INTERPRETATION OF RECENT FINDINGS. Report from: "Symposium on Cutaneous Sensitivity. 11-13 February 1960," Rep. 424, Dec. 1960, 103-113. USA Medical Research Lab., Fort Knox, Ky. (Ohio State University, Columbus, Ohio).

18,243

A broad spectrum of communication problems are considered, with the aim of pointing out the possible contributions which the tactual mode could make to each. In terms of the criteria of need, practicability of instrumentation, unique characteristics, and possible limitations, the feasibility of the tactual display in relation to several classes of input information are discussed: those characterized by frequent and those by infrequent signals, those containing a high and those containing a low degree of uncertainty, and those displayed via continuous and those via discrete signals. The most fertile areas for tactual displays are identified.
G. R 13

18,244

Alluisi, E.A. ON OPTIMIZING CUTANEOUS COMMUNICATION: A RESPECTFUL SUPPLEMENT TO SOME ADVENTURES IN TACTILE LITERACY. Report from: "Symposium on Cutaneous Sensitivity. 11-13 February 1960," Rep. 424, Dec. 1960, 114-130. USA Medical Research Lab., Fort Knox, Ky. (Emory University, Atlanta, Ga.).

18,244

Man's ability to handle symbolically encoded linguistic information is the general topic considered here. Specific attention is given to studies that bear directly on the transmission of linguistic information tactually and on optimizing such cutaneous communication. Two generalizations, founded on empirical evidence, are presented to show how optimum codes might be constructed. The generalizations refer to the construction of maximally stimulus-response ensembles through the use of "correspondence" and "stereotypy." Finally, some suggestions are offered representing hypotheses concerning how specific response-alphabets might be expected to interact with man's information-handling tasks.
R 34

18,245

Sherrick, C.E., Jr. OBSERVATIONS RELATING TO SOME COMMON PSYCHOPHYSICAL FUNCTIONS AS APPLIED TO THE SKIN. Report from: "Symposium on Cutaneous Sensitivity. 11-13 February 1960," Rep. 424, Dec. 1960, 147-158. USA Medical Research Lab., Fort Knox, Ky. (Central Institute for the Deaf, St. Louis, Mo.).

18,245

Brief summaries are presented of progress made on three experimental problems relating to common psychophysical functions as applied to the skin. First, the frequency response of spots on the skin (hairy and hairless) to vibrotactile forces are made; the spatial relations of vibratory- and pressure-sensitive spots on both types of skin are also studied. Second, the problem of masking of vibratory patterns on the skin are investigated; frequency-intensity functions are obtained and compared with those obtained when masked by tones and by noise; both stimuli in one locus and in separate loci. Third, magnitude estimation of tones in quiet and noise in both hearing and vibration are investigated.
G. I. R 10

18,255

Wallace, H.L., Jr. (Chm.). BIONICS SYMPOSIUM. LIVING PROTOTYPES--THE KEY TO NEW TECHNOLOGY. 13-14-15 SEPTEMBER 1960. WADD TR 60 600, Dec. 1960, 490pp. USAF Directorate of Advanced Systems Technology, Wright-Patterson AFB, Ohio.

18,255

Papers presented at a symposium on Bionics are included herein. The introductory session discusses the background from which bionics arose, the military and general need, attitudes toward intelligent machines (a product of Bionics) and a survey of current research on living prototypes. The four technical sessions deal with current work in stages successively closer to practical devices. Beginning with logic derived from study of neurones but applicable to design of electronic networks, the discussion continues through to theories, devices, and techniques based on simulating visual and auditory perceptual processes. The final session has technical papers on the mechanization of higher functions.
T. G. I. R 350 (approx.)

18,263

Watson, J.F., Cherniack, N.S. & Zechman, F.W., Jr. RESPIRATORY MECHANICS DURING FORWARD ACCELERATION. Proj. 7222, Task 71746, WADD TR 60 594, Sept. 1960, 16pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,263

To test whether forward acceleration stimulates negative pressure breathing, measurements were made of the pressure volume relationships and the changes in lung volume during forward acceleration. Vital capacity, expiratory reserve, inspiratory reserve, and tidal air were measured at 1, 2, 3, and 4 g on four normal male subjects Static relaxation pressure volume curves were plotted. The results were presented and a discussion followed.
T. G. I. R 26

18,264
Weltman, G. & Lyman, J. THE EFFECTS OF ELECTRONIC TRANSFORMATIONS ON THE PATTERN OF MYOELECTRIC ACTIVITY DURING ARM MOVEMENT. Contract V1005M 2075, Rep. 60 78, Biotechnology Lab. Tech. Rep. 6, Sept. 1960, 33pp. Department of Engineering, University of California, Los Angeles, Calif.

18,264
To provide an empirical basis for quantitative evaluation of the surface EMG signals as a control source in complex prostheses, EMGs were recorded from four arm muscles during the natural execution of six arm movements. The subjects were a group of six males and three females. The results were examined to determine differences between EMG activities of the males and females. A quantitative measure of active-inactive discrimination which served as a signal-to-noise indicant was used.
T. G. I. R 12

18,265
Wüest, F.J. TACTICAL CONTROL III: EARTH-REFERENCE, SELF-REFERENCE, AND MIXED-REFERENCE DISPLAYS. Contract NONR 2512(00), Tech. Rep. SPD 60 091, P60 134, Sept. 1960, 9pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

18,265
In this experiment the performance of 60 subjects on four types of pictorial displays was studied. The subject's task was to judge the position of his own ship and one or more targets after a course change. Each display showed a different movement relationship between his own ship's symbol and the map background. Each display was based on one of four combinations of rotation and no rotation, with translation and no translation. A two by two factorial design was conducted on the data with the main effects being rotation and translation.
T. I. R 9

18,266
Welter, N.E. & Feddersen, W.E. THE SCALING OF PLATFORM MOTIONS TO A PARTICULAR VEHICULAR SYSTEM AND THE DETERMINATION OF MOTION THRESHOLDS. Contract NONR 1670(00), Rep. D228 430 005, Jan. 1959, 13pp. Bell Helicopter Corporation, Fort Worth, Tex.

18,266
Effective utilization of the moving platform potential as applied to instrumentation, controls, and training research necessary to the operation of helicopters leads to the requirement that the motions of the platform should be scaled to meet the requirements of any given helicopter system. An approach is summarized by which such scaling will be accomplished. In addition, the psychophysical procedures to be used in the determination of displacement thresholds as they relate to the human's perceptual capabilities are described.
G.

18,267
Wilkerson, L.E. & Matheny, W.G. DISCRIMINATION AND CONTROL OF TRANSLATION AS DETERMINED BY A PERSPECTIVE METHOD OF GROUND-PLANE ENCODEMENT. Contract NONR 1670(00), Tech. Rep. D228 421 004, Feb. 1960, 21pp. Bell Helicopter Corporation, Fort Worth, Tex.

18,267
To determine the most effective type of display for presenting information necessary to stabilize a hovering vehicle, 16 male Ss were tested on three variables: 1) orientation of the grid, 2) display position, and 3) referent. Two levels of each of these variables were studied: a 0 and 45 degrees orientation of the grid, the use of one tube vs. two tubes presenting the display, and operating with or without a referent circle.
T. G. I. R 3

18,268
White, J.C. ATMOSPHERIC CONTROL IN THE TRUE SUBMARINE. Rep. NRL Progress, Dec. 1958, 1-16. (USN Electrochemistry Branch, NRL, Washington, D.C.).

18,268
Accomplishments in submarine habitability of a 30-year old program are reviewed. The direction and progress of efforts toward atmospheric control in the true submarine (capable of indefinite periods of submergence) are discussed. Present problems and their status are treated under the following subjects: effects of nitrogen, oxygen supply, humidity control, carbon dioxide removal, control of hydrogen, carbon monoxide removal, trace contaminants, aerosols, and gas detection and analysis. The development of an integrated system of atmospheric control is also treated.
I.

18,269
Webster, J.C. & Klumpp, R.G. USNEL FLIGHT DECK COMMUNICATIONS SYSTEM. PART 2. NOISE AND ACOUSTIC ASPECTS. FINAL REPORT. SC 06402, NE 090602 5 2.1, Rep. 923, Nov. 1960, 48pp. USN Electronics Lab., San Diego, Calif.

18,269
This is the second part of a five-part report covering the development and evaluation of an integrated system designed to provide reliable communications on jet aircraft carriers. This part deals with the acoustical aspects of the problem as they relate to talking and listening in high-level noise. Four approaches to the problem are reported together with the results of evaluation tests in the laboratory and on shipboard: 1) acoustic treatment of Flight Deck Control Office, 2) acoustic component selections for noise reduction in the Flight Deck Radio Communications System, 3) modification of sound powered telephone headsets by noise shields, 4) installation of a powerful, modulated air-flow loud speaker.
G. I. R 8

18,270
Weiner, H. SOME EFFECTS OF OBSERVER RESPONSE COST UPON INSTRUMENTAL OBSERVER RESPONSES. INTERIM REPORT. Grant M 3850, Rep. AIR 332 60 IR 134, Dec. 1960, 23pp. Behavioral Research Lab., American Institute for Research Washington, D.C.

18,270
Instrumental observer responses of human monitors were conditioned for three and one-half hours on either a one-minute variable-interval or a one-minute fixed-interval schedule of critical signal detections without cost response. In addition to the reinforcement received by the detection of signals, the monitors were awarded 100 "points" per critical signal detection. Two 30-minute observer response cost periods were then introduced which involved a loss of one "point" per response. The first condition was then reintroduced for a 30-minute period. The effect of the interpolated observer response cost (risk) upon performance under intermittent schedules of positive reinforcement were discussed.
T. G. R 7

18,271
Wilcox, W.J., Jr. THE RELIABILITY AND RELEVANCE OF A MODIFIED CRITICAL INCIDENTS PERFORMANCE EVALUATION SYSTEM. Contract W7405 ENG 26, Rep. K 1392, Oct. 1958, 50pp. Union Carbide Nuclear Company, Oak Ridge, Tenn.

18,271
To estimate the reliability and relevance of a modified critical incidents performance appraisal form, performance appraisals on a group of 160 monthly salaried employees were obtained. Two ratings were obtained on 101 persons for use in estimating reliability. The ratee was rated by his immediate supervisor. Department heads ranked the employees on the basis of over-all job performance.
T. I. R 46

18,272
Walraven, P.L. ON THE BEZOLD-BRUCKE PHENOMENON. Rep. IZF 1960 14, ca. 1960, 13pp. Institute for Perception RVO-TNO, Soesterberg, The Netherlands.

18,272
This paper attempts to explain the Buzold-Brücke effect in the framework of the Young-Helmholtz theory by reviving and defending the idea of Pierce which is associated with it. In doing so, the objections presented by Purdy and Judd are refuted by presenting an extended quantitative picture of Pierce's idea. The experimental data are presented and defended.
G. R 18

18,273
Witkin, H.A. PSYCHOLOGICAL SELF-CONSISTENCY. Trans. N.Y Acad. Sci., May 1960, 22(7), 541-545. (Downstate Medical Center, State University of New York, Brooklyn, N.Y.).

18,273
The thesis of this paper is that investigations of coherent constellations of characteristics in people and their underlying bases can help to further one important objective of differential psychology, namely, the exploration of the patterning of individual variations. To support this thesis, results of ivestigations on space orientation are cited. Beginning with observations of individual differences in this type of perception, it has been possible to characterize people who consistently show two divergent types of psychological functioning in many situations: field-dependent and field-independent. Possible sources of these differences have been explored.
R 3

18,274
Young, D.R. A COMPARISON OF ENERGY EXPENDITURE IN MAN AND DOG AT REST AND DURING WORK IN THE NORMAL AND FASTING STATE. INTERIM REPORT. Proj. 7 84 13 002A, QMFCIAF Rep. 7 60, Feb. 1960, 14pp. USA Nutrition Branch, QM Food & Container Institute for the Armed Forces, Chicago, Ill.

18,274
The energy expenditure of man and dog at rest and during work are described with some comments on the effects of fasting. Variability of energy requirements with respect to body size and composition and in relation to workload are discussed, and comparisons are made of body weight loss and resting energy expenditure during inanition.
G. R 31

18,275
Zubek, J.P., Sansom, Wilma & Prysiazniuk, A. INTELLECTUAL CHANGES DURING PROLONGED PERCEPTUAL ISOLATION (DARKNESS AND SILENCE). Canad. J. Psychol., 1960, 14(4), 233-243. (University of Manitoba, Winnipeg, Canada).

18,275
To investigate changes in intellectual functioning during prolonged perceptual isolation, 16 Ss were placed in a dark, soundproofed chamber for a period of a week or longer. A battery of tests, measuring 11 different abilities, was administered before, during, and one day after isolation. A carefully matched group of 16 control Ss were given the same tests at the same intervals. Test results for the two groups were compared for differences attributable to the isolation. Subjective reports were also gathered from the experimental Ss after isolation; these were summarized.
G. I. R 13

18,276
Zeigen, R.S., Alexander, M., Churchill, E., Emanuel, I., et al. A HEAD CIRCUMFERENCE SIZING SYSTEM FOR HELMET DESIGN. INCLUDING THREE-DIMENSIONAL PRESENTATIONS OF ANTHROPOMETRIC DATA. Proj. 7222, Task 71749, WADD TR 60 631, Dec. 1960, 97pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,276
This report presents the development and testing of several new approaches of presenting anthropometric data in three-dimensional forms for use in the design and sizing of helmets. The statistical sizing procedure is fully described as is the selection of key dimensions used. The design rationale used is presented along with comprehensive tables and preliminary validation results.
T. I. R 23

18,278
Woodruff, M.W. RESEARCH DIRECTED TOWARD DESIGN AND DEVELOPMENT OF EXPERIMENTAL DATA PROCESSING EQUIPMENT. INTERIM SCIENTIFIC REPORT. Contract AF19(604) 6104, AFCRL TN 60 1133, Nov. 1960, 86pp. Engineering Services Div., Lockheed Electronics Company, Metuchen, N.J.

18,278
Technical and engineering support provided by the contractor for the Electronics Laboratory for Surveillance Research are summarized. The Laboratory houses a complete and complex data processing system which is used as a simulation facility for a program of studies in the field of aerospace surveillance on problems at any command and control level. The equipments employed and the manner of utilization are described along with operational and maintenance problems. Also reported are technical improvements and engineering developments that have contributed to improved operational reliability and flexibility for the simulation of operational problems.
I. R 10

18,279
Weckroth, J. DIMENSIONS OF COLOR SENSATION. Rep. 88, Dec. 1960, 6pp. The Psychological Lab., University of Stockholm, Stockholm, Sweden. (Institute of Occupational Health, Helsinki, Finland).

18,279
This investigation of the dimensions of color sensation was based on a dimensional (similarity) analysis of color sensation by Eckman. Eckman worked with 14 color filters to create pairs of colors which he presented to his Ss for estimates of subjective similarity. These estimates were subjected to a centroid analysis to obtain primary factors. The starting point of this analysis is the above mentioned centroid matrix. It was assumed that the factor loadings on the first three factors would correspond to the proportions of blue, green, and red required when these colors are mixed, to match different wavelengths of the spectrum. Curves obtained by rotating these factors were compared with those obtained from the calorimeter.
T. G. R 8.

18,280
Nordø, J. SIGNIFICANCE OF REGRESSION EQUATIONS DERIVED FROM SERIALLY CORRELATED DATA, AND A PROCEDURE OF SELECTING OPTIMAL PREDICTORS. Contract AF 61 (052) 374, Tech. Note 1, ca. 1959, 20pp. USAF Geophysics Research Directorate, AFCCDD, Bedford, Mass.

18,280

The significance of statistical parameters derived from serially correlated data is discussed and a proposal is made for a procedure to follow in selecting optimal predictors. It is suggested that this procedure will be more efficient than some of those in operational use.
R 8

18,281

Noriega, V., Jowdy, F.J. & Palmer, J.M. A METHODOLOGY FOR DETERMINING OPTIMUM MANNING FOR BASE LEVEL AIRCRAFT MAINTENANCE. June 1960, 67pp. USAF Institute of Technology, Wright-Patterson AFB, Ohio.

18,281

To develop a methodology for determining optimum manning for base-level aircraft maintenance, interviews were conducted with personnel at all levels; visits were made to factories, schools, government laboratories, and Air Force bases; numerous documents, including completed research reports pertinent to the subject, were analyzed; and current aircraft maintenance manning techniques were analyzed. These activities provided a basis for determining and analyzing workloads; identifying and quantifying the skills necessary to accomplish the work; and identifying those factors which influence aircraft maintenance manning. A methodology was developed which provides a technique for evaluating the maintenance manpower spaces required to support a given weapon (aircraft).
T. G. R 54

18,282

Madden, W.F. A METHOD FOR DERIVING PERSONALITY QUESTIONNAIRE ITEMS. Proj. MR005.13 3003, Subtask 5, Rep. 1, Nov. 1960, 169pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,282

The purpose of this study was to re-examine the fundamental assumption behind the derivation of trial items as stimuli in personality questionnaires for use in measurement and/or prediction. Methodological requirements for the derivation of trial items were considered, and an hypothesis "The Theory of Event-Structure" was developed and tested. An experimental questionnaire was developed, administered, and analyzed.
R many

18,283

Goodall, McC. & Berman, M.L. URINARY OUTPUT OF ADRENALINE, NORADRENALINE, AND 3-METHOXY-4-HYDROXYMANDELIC ACID FOLLOWING CENTRIFUGATION AND ANTICIPATION OF CENTRIFUGATION. J. clin. Investigation, Oct. 1960, 39(10), 1533-1538. (Research Center and Hospital, University of Tennessee, Knoxville, Tenn. & USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

18,283

To determine the effect of gravitational stress and the anticipation of such stress by centrifugation upon the release of adrenaline, noradrenaline, and their common matabolic product, (3-methoxy-4 hydroxymandelic acid), nine Ss were centrifuged at one g per five sec. to 12 g or were given a mock ride. Each S was unaware as to whether he would receive a real or a mock ride. Urine samples were collected before and after each ride and bioassayed for adrenaline and noradrenaline; 3-methoxy-4 hydroxymandelic acid was determined chromatographically. Analyses were made in relation to the experimental conditions.
T. G. R 34

18,284

Matheny, W.G. & Hardt, H.D. FURTHER STUDY IN THE DISPLAY OF SPATIAL ORIENTATION INFORMATION. Contract NONR 1670 (00), Rep. D228 421 002, Aug. 1959, 13pp. Bell Helicopter Corporation, Fort Worth, Tex.

18,284

Presented was the seventh of a series of studies designed to arrive at the variables which influence an operator's perception of his orientation when presented with information as to the attitude of his aircraft by means of a representation of the earth's plane. Two referents, the aircraft and the ground plane, were encoded and some relationship between them was displayed to the subject. The subject's task was to report the relationship in terms of pitch and bank. Four sets of variables were used on the 15 subjects tested.
T. I.

18,286

McCormack, P.D. PERFORMANCE IN A VIGILANCE TASK AS A FUNCTION OF LENGTH OF INTER-STIMULUS INTERVAL. Canad. J. Psychol., 1960, 14(4), 265-268. (Defence Research Medical Labs., Toronto, Ontario, Canada). (DRML Rep. 234 7).

18,286

To determine whether performance of a vigilance task may be dependent upon whether males or females are used as Ss, ten males and ten females performed a vigilance task consisting of two 35-minute sessions. Subjects were instructed to press a switch immediately after a light was seen. The light appeared randomly in time with the interval between presentations being 30, 45, 60, 75, and 90 seconds. Response times were analyzed first by variance techniques. The main effects and their interactions were tested for significance. Response time was shown graphically as a function of task duration. The results were compared with those from two earlier studies.
T. G. R 4

18,287

Mackworth, N.H. SOME SUGGESTED USES FOR THE OPTISCAN--A HEAD-MOUNTED EYE CAMERA. Paper 60 WA 304, 1960, 7pp. The American Society of Mechanical Engineers, New York, N.Y. (Dunlap and Associates, Inc., Stamford, Conn.).

18,287

A simple optical periscope has been designed to mark immediately and directly onto a motion picture of the changing visual surroundings the exact position of the moving gaze of the person wearing the camera. The possible uses of this new technique are discussed in this article. A wide range of problems--real life as well as laboratory--are indicated under four main groupings: engineering problems, consumer research, medical research, and basic studies.
I. R 11

18,288

Mudd, S.A. & McCormick, E.J. THE USE OF AUDITORY CUES IN A VISUAL SEARCH TASK. J. appl. Psychol., 1960, 44(3), 184-188. (Purdue University, Lafayette, Ind.).

18,288

To test the hypothesis that auditory cueing can reduce response time to a deviant dial in a visual search task, 50 Ss were required to search a 32-dial display, locate the dial not same as others, and respond by throwing the corresponding toggle switch. The Ss were assigned randomly to five groups in which the auditory cueing varied: 1) auditory signal with no cueing dimension, 2) signal indicating right or left half of panel by being presented to either right or left ear, 3) a high frequency or low frequency signal in either ear cued to top or bottom quadrant, 4) a long or short tone to either ear cued to outside or inside column, and 5) all three types of cueing dimensions combined. Response times were analyzed for effect of cueing conditions and for sectors in which the deviant dial appeared. I. R 9

18,289
Mann, H.B. MAIN EFFECTS AND INTERACTIONS. Contract DA 11 022 ORD 2059, MRC Rep. 182, Sept. 1960, 33pp. USA Mathematics Research Center, University of Wisconsin, Madison, Wisc.

18,289
In a factorial experiment on two factors, each factor is applied on varying levels to various experimental units. It is assumed here that this application yields for each unit a quantity called the yield of this unit. A unit yield is obtained when applied at each of the levels of the factors under study. This function is defined mathematically. The question of the main effects and interactions which ensue from choice of experimental design (levels) is considered. Methods for solving two situations are then developed: (case 1) assuming that interaction, if any, will arise from the inclusion of certain specified levels, known in advance; and (case 2) when no such a priori information is known.
R 5

18,290
McGinn, J.W. DETECTION OF SIGNALS IN NON-GAUSSIAN NOISE. COMPUTATION RESULTS FOR THE LINEAR AND LIMITING DETECTOR SYSTEMS. Contract AF 19(604) 7400, Rep. 47G 0007, Oct. 1960, 26pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

18,290
Some results of the computation of probability functions for the detection of pulse signals in a noise background of time varying power are presented. The results are concerned with linear and limiting detector systems.
T. G. R 1

18,291
Mattson, R.L. AN APPROACH TO PATTERN RECOGNITION USING LINEAR THRESHOLD DEVICES. Rep. LMSD 702680, Sept. 1960, 25pp. Missiles and Space Div., Lockheed Aircraft Corporation, Sunnyvale, Calif.

18,291
The general problem of pattern recognition is here represented as a mapping between three fundamental spaces: pattern, data (measurements on pattern), and classification (various classes of patterns to be recognized). The mapping from pattern to data space is accomplished by equipment that measures characteristics of the patterns of interest that have utility for the system. Three examples of this initial process are presented. An automatic design procedure for a binary classification system capable of mapping from the data space into a recognition class in the classification space is presented. Networks of linear threshold devices are used to perform the mapping and are easily designed by a high-speed digital computer.
T. I. R 8

18,292
Mann, I. & Shapley, L.S. VALUES OF LARGE GAMES. IV. EVALUATING THE ELECTORAL COLLEGE BY MONTE CARLO TECHNIQUES. Contract AF 49(638) 700, Project RAND, Res. Memo. 2651, Sept. 1960, 41pp. The Rand Corporation, Santa Monica, Calif.

18,292
The "power index" concept of game theory is illustrated through application to the analysis of the electoral-vote system used in United States presidential elections. Part I contains a nontechnical description of the underlying game model, followed by a presentation of the numerical power indices for both the 48-state game (pre-Alaska) and the 50-state game (post-Hawaii). The results are only approximations to the true power indices. Part II is a more technical account of the "montecarlo" sampling methods that were devised to carry out the computations. The potential applications of these methods to other tasks are indicated.
T. G. R 8

18,294
Madden, J.M. A COMPARISON OF THREE METHODS OF RATING-SCALE CONSTRUCTION. Proj. 7734, Task 17015, WADD TN 60 262, Nov. 1960, 15pp. USAF Personnel Lab., Lackland AFB, Tex.

18,294
Four job evaluation factors were used as the basis of rating ten Air Force specialties. For each factor three different methods were used in constructing the scale: 1) each scale division was defined and illustrated, 2) definitions and illustrations were omitted, and 3) definitions only were used. Ratings by samples of aviation cadets were analyzed for effects of method on mean ratings.
T. R 13

18,295
Murrell, K.F.H. & Forsaith, B. AGE AND THE TIMING OF MOVEMENT. Occup. Psychol., Oct. 1960, 34(4), 275-279. (University of Bristol, Bristol, England).

18,295
Investigated was the effect of age on the movement elements of some industrial task in the actual settings. Two groups were studied with 42 individuals in the young group (22-29) and 32 in the older group (40-56). Decimal minute watches were used by two time study engineers to time individual elemental movements made by the men in the two groups. The results of the investigation were given and discussed.
T.

18,296
Higham, T.M. COMMUNICATING THE FINDINGS OF PSYCHOLOGICAL RESEARCH IN INDUSTRY. Occup. Psychol., Jan. 1960, 34(1), 38-44.

18,296
Discussed were the problem and the process which the psychologist in industry is concerned with when he wishes to communicate the findings of his research or investigation. Considered were the technical problem of setting up the investigation, the statistical plan, and the written or verbal report. Also discussed were the status and prestige of the psychologist in industry.
R 20

18,297
Das, Rhea S. COMPARISON OF WORKER ANALYSIS RATINGS BASED ON JOB DESCRIPTION AND MOTION-TIME STUDY. Occup. Psychol., April 1960, 34(2), 141-147. (Indian Statistical Institute, Calcutta, India).

18,297
The purpose of this study was to determine whether or not ratings for worker requirements based on two different methods of job observation would agree. The methods used were motion-time study and job description. Three types of repetitive work were chosen with two jobs representing each type. Three observers were assigned to each job once so that comparisons could be made. The degree of agreement between the methods was analyzed and discussed.
T. R 7

18,298
Laner, S. & Sell, R.G. AN EXPERIMENT ON THE EFFECT OF SPECIALLY DESIGNED SAFETY POSTERS. Occup. Psychol., July 1960, 34(3), 153-169. (Human Factors Section, Operational Research Dept., British Iron and Steel Research Association, London, England).

18,298
The purpose of this investigation was to determine what effect safety posters of various types have on the accident rate in the iron and steel industry. The experiment consisted of displaying three posters on properly hooking slings 1) simultaneously in a group of three plants and 2) consecutively at fortnightly intervals in another group of three plants, and no posters in the remaining two plants. A baseline was established prior to the display of the posters. Counts were taken twice daily of the number of slings properly hooked. The results of the current study as well as those of a follow-up study are presented.
T. I. R 1

18,299
Ehrenberg, A.S.C. & Shewan, J.M. THE DEVELOPMENT AND USE OF A TASTE PANEL TECHNIQUE--A REVIEW. Occup. Psychol., Oct. 1960, 34(4), 241-248.

18,299
Described was the manner in which a sensory assessment technique was developed and the approach used to render it an objective and reliable instrument. A score sheet with characteristics of the food (white cod fish) was developed and the scoring technique was described. The value and merits of the technique were presented and discussed.
R 12

18,300
Gregson, R.A.M. BIAS IN THE MEASUREMENT OF FOOD PREFERENCES BY TRIANGULAR TESTS. Occup. Psychol., Oct. 1960, 34(4), 249-257.

18,300
Considered are the methods of food tasting. It is suggested that the standards are poor and that there is a preference bias established in the Triangle Test method. Data obtained on tomato juice solutions using the Triangle Test method are presented and discussed to support the author's contentions.
T. R 3

18,301
Heron, A. & Chown, Sheila M. SEMI-SKILLED AND OVER FORTY. Occup. Psychol., Oct. 1960, 34(4), 264-274. (University of Liverpool, Liverpool, England).

18,301
Presented is a paper designed to indicate a realistic approach to future research on the life-pattern of male manual workers over forty. Of concern are the health aspects of income, employment, and retirement. Twenty firms participated in a study conducted by furnishing information on company policy, age differences in employee behavior, working conditions, and job demands; and on the attitudes of departmental managers and foremen towards age changes in their men. Recommendations on the basis of the study are offered.
R 11

18,302
Crossman, E.R.F.W. THE INFORMATION-CAPACITY OF THE HUMAN MOTOR-SYSTEM IN PURSUIT TRACKING. Quart. J. exp. Psychol., 1960, XII(Part 1), 1-16. (Reading University, Reading, England).

18,302
This study investigated human performance at a typical pursuit tracking task in terms of information theory. Four Ss were tested with each given two practice runs and one experimental run at each of eight speeds with short (one-half cm) and long (eight cm) previews. The performance was then analyzed in terms of the theory and the results were discussed.
T. G. I. R 16

18,303
Oldfield, R.C. A SIMPLIFIED METHOD OF TREATMENT FOR SIZE-CONSTANCY DATA. Quart. J. exp. Psychol., Feb. 1960 XII(Part 1), 33-35. (Institute of Experimental Psychology, University of Oxford, Oxford, England).

18,303
Presented is a simple procedure for treating size-constancy data. T is defined differently from the traditional method and often allows the data to be plotted on a single graph in a way that allows T to be immediately read off.
G. R 2

18,304
Wilkinson, R.T. THE EFFECT OF LACK OF SLEEP ON VISUAL WATCH-KEEPING. Quart. J. exp. Psychol., Feb. 1960, XII(Part 1), 36-40. (Applied Psychology Research Unit, MRC, Cambridge, England).

18,304
The effect of lack of sleep on a prolonged, simple task such as that of visual watchkeeping was investigated. A standard vigilance test lasting 40 minutes was given to 16 Ss once after sleep and once after no sleep. Both tests were performed at the same hour of the same week day, one week apart. The degree to which performance deteriorated in relation to normal levels as a result of loss of sleep was examined.
T. G. R 8

18,305
Deutsch, J.A. APPARATUS. THE REFLECTING SHUTTER PRINCIPLE AND MECHANICAL TACHISTOSCOPES. Quart. J. exp. Psychol., Feb. 1960, XII(Part 1), 54-56. (Institute of Experimental Psychology, University of Oxford, Oxford, England).

18,305
Described are a high speed projection tachistoscope and a direct view tachistoscope, and the principles employed. The feasibility of producing these tachistoscopes is discussed as are the advantages and drawbacks of these models.
G. I.

18,306
Mowbray, G.H. CHOICE REACTION TIMES FOR SKILLED RESPONSES. Quart. J. exp. Psychol., Nov. 1960, XII (Part 4), 193-202. (Applied Physics Lab., Johns Hopkins University, Silver Spring, Md.).

18,306
This study was designed to investigate reaction time and to determine whether there is an increase in reaction time with an increase in the number of alternative choices. Two kinds of choice reaction time experiments were conducted, both of which made use of a highly overlearned sensori-motor response. The task was the vocal identification of visually presented Arabic numerals. Five different degrees of choice were provided with one of 150 Ss assigned randomly to one of the five possible conditions. The results of both experiments were presented.
G. R 14

18,307
Harris, S.J. THE EFFECTS OF SLEEP LOSS ON COMPONENT MOVEMENTS OF HUMAN MOTION. J. appl. Psychol., 1960, 44(1), 50-55. (Lehigh University, Bethlehem, Penn.).

18,307
To investigate the effects of prolonged sleep loss on component movements in skilled motions of stress, several special tests of perceptual and motor functions were administered to 19 Ss. The tests were given in a five-day training period, in a three-day sleep loss period, and in a two-day recovery period. The tests given were: panel-control test, bimanual coordination, leg movement, critical flicker frequency, and steadiness.
G. R 6

18,308
Tinker, M.A. LEGIBILITY OF MATHEMATICAL TABLES. J. appl. Psychol., 1960, 44(2), 83-87. (University of Minnesota, Minneapolis, Minn.).

18,308
This study was designed to study legibility of mathematical and statistical tables by studying variables such as type size, arrangement of numerals in columns, and space versus space plus rules between columns on the speed with which the correct numbers can be located. Nine studies were completed with 24 to 30 Ss in each study. The results were presented and followed by a discussion.
T. R 1

18,309
Edgerton, H.A. A TABLE FOR COMPUTING THE PHI COEFFICIENT. J. appl. Psychol., 1960, 44(3), 141-145. (Richardson, Bellows, Henry & Company, New York, N.Y.).

18,309
Presented is a table developed for computing the Phi coefficient. The value of Phi can be found from the table with its accompanying nomograph when three items of information are known. The procedure is described and accompanied by an example.
T. R 1

18,310
Ellis, H.C. & Ahr, A.E. THE ROLE OF ERROR DENSITY AND SET IN A VIGILANCE TASK. J. appl. Psychol., 1960, 44(3), 205-209. (University of New Mexico, Albuquerque, N.M.).

18,310
This study was designed to determine the effects of error density on the probability of error detection in a proof-reading task, the type errors detected, and the effect of error density in the number of false reports made. An excerpt from Canada was proof read by 216 Ss. The Ss were tested in groups of 15 to 50 with differential treatment of the groups consisting of six levels of error density, defined as the frequency of built-in typographical errors per five pages. The last five pages were divided into three error levels per group.
T. G. R 9

18,311
Regan, J.J. TRACKING PERFORMANCE RELATED TO DISPLAY-CONTROL CONFIGURATIONS. J. appl. Psychol., 1960, 44(5), 310-314. (Fordham University, New York, N.Y.).

18,311
The purpose of this study was to investigate the effects that display-control features, control order, and kind of tracking have on tracking performance. Six different display-control configurations were studied in a continuous tracking task using both pursuit and compensatory tracking, and position and rate control. The merits of each were determined.
T. G. R 9

18,312
Churchill, A.V. THE EFFECT OF POINTER WIDTH AND MARK WIDTH ON THE ACCURACY OF VISUAL INTERPOLATION. J. appl. Psychol., 1960, 44(5), 315-318. (Defence Research Medical Labs., Toronto, Ontario, Canada).

18,312
To investigate the role that the ratio of pointer width to scale unit width may play in visual interpolation, ten Ss were tested under 18 conditions. The displays viewed consisted of three different interval lengths, 0.5, 1.5, and 3.0 inches; three pointer widths, 0.25, 1.0, and 4.0 scale units; and two scale mark widths, 0.25, and 1.0 scale unit. The results were presented and discussed.
T. G. R 8

18,313
Baker, C.H. MAINTAINING THE LEVEL OF VIGILANCE BY MEANS OF ARTIFICIAL SIGNALS. J. appl. Psychol., 1960, 44(5), 336-338. (Defence Research Medical Labs., Toronto, Ontario, Canada).

18,313
The purpose of this study was to investigate the effect of knowledge of results with artificial signals during a vigilance task. Two conditions were compared. The control condition consisted of the Mackworth sequence of signals involving intersignal intervals of 3/4 to 10 minutes. The experimental condition consisted of intersignal intervals for the artificial signals at 2 1/2, 1 3/4, 1 1/2, 2, and 2 1/4 minutes. The results of the performance under the two conditions were compared.
G. R 9

18,314
Goldman, M. SOME FURTHER REMARKS ON ONE-TAILED TESTS AND "UNEXPECTED" RESULTS. Psychol. Rep., 1960, 6, 171-173. (University of Kansas City, Kansas City, Mo.).

18,314
Under discussion is the use of the one-tailed test in experimental psychology. Considered are three courses of action set forth by Goldfried as criteria for using the one-tailed tests. Thus, the objections raised in the literature against the one-tailed tests are reconsidered and a conclusion is reached.
R 4

18,315
Morin, R.E. STRATEGIES IN GAMES WITH SADDLE-POINTS. Psychol. Rep., 1960, 7, 479-485. (University of Texas, Austin, Tex.).

18,315
In this study, a special class of saddle-point games, ones which could be solved by examining dominance relations among strategies, were used to investigate properties of game matrices which may "seduce" players into decision errors. Twenty-eight matrices were presented to each of 28 Ss. The three variables used in the game were: the number of the opponent's strategies which were dominated by his saddle-point strategy, the sign of the value of the game, and the relationship of the algebraic sum of the values of Ss saddle-paired row to the algebraic sum of the values in his other row.
T. R 1

18,316
Lacey, O.L. & Pate, J.L. AN EMPIRICAL STUDY OF GAME THEORY. Psychol. Rep., 1960, 7, 527-530. (University of Alabama, University, Ala.).

18,316
This study was an exploratory investigation of the question: will Ss, naive with respect to game theory, learn the "correct" solution empirically? Two experiments were conducted in which six Ss played against a human opponent in one experiment and against a machine utilizing a nonoptimum strategy in the second experiment. The results were indicated and discussed.
T.

18,317
Suci, G.J., Davidoff, M.D. & Surwillo, W.W. REACTION TIME AS A FUNCTION OF STIMULUS INFORMATION AND AGE. J. exp. Psychol., 1960, 60(4), 242-244. (Cornell University, Ithaca, N.Y.).

18,317
Investigated were the hypotheses that the regression of reaction time on stimulus information measured in bits is linear for young and old Ss and that age decrement in reaction time increases as a function of greater amounts of information. Two groups of 12 males, meadian age being 63.0 years for the old group and 18.5 years for the young group, were tested. Reaction time to a stimulus of one light-off in sub sets of one light (0.00 bits of information), two lights (1.00 bit), three lights (1.58 bits), and four lights (2.00 bits) were measured. The hypotheses were examined in terms of the findings.
T. G. R 7

18,318
Michaels, R.M. ANISOTROPY AND INTERACTION OF FIELDS OF SPATIAL INDUCTION. J. exp. Psychol., 1960, 60(4), 235-241. (USN Research Lab., Washington, D.C.).

18,318
This study was designed to examine the nature of the interaction of the fields of spatial induction and to test the validity of a linear hypothesis set forth. Also tested for was anisotropy. The magnitude of induction was determined about one yellow dot and between two using the electrical phosphene threshold as a measure of spatial induction. Anisotropy was determined by making measurements in both horizontal and vertical dimensions. The results of previous studies conducted in the area were analyzed and discussed.
T. G. I. R 5

18,319
Hawkes, G.R. & Warm, J.S. MAXIMUM I_t FOR ABSOLUTE IDENTIFICATION OF CUTANEOUS ELECTRICAL INTENSITY LEVEL. J. Psychol., 1960, 49, 279-288. (USA Medical Research Lab., Fort Knox, Ky.).

18,319
To provide a closer approximation of the channel capacity involved for a specific task and of the general channel capacity for such identifications, the effects of extension of the physical range of intensities close to the tolerance level, and the provision of feedback information on the S's ability to absolutely identify correct intensity levels were investigated. Two matched groups were tested and made absolute identifications of correct intensity levels. The results were compared to those of the previous study conducted and discussed in the report.
G. R 15

18,320
Nelson, T.M., Bartley, S.H. & DeHardt, Doris. CONSIDERATIONS INVOLVED IN OBTAINING AVERAGES OF CFF DATA. J. Psychol., 1960, 49, 263-277. (Department of Psychology, Michigan State University, East Lansing, Mich.).

18,320
This study is concerned with the problem of data averaging and the considerations made with cff data. The data from 30 Ss were obtained. One experiment involved 29 observers and another involved one. They were examined to determine whether they displayed characteristics which would provide for generalization in regard to the procedure of averaging. A lengthy discussion follows the presentation of the results.
R 39

18,321
Hawkes, G.R. CUTANEOUS COMMUNICATION: ABSOLUTE IDENTIFICATION OF ELECTRICAL INTENSITY LEVEL. J. Psychol., 1960, 49, 203-212. (USA Medical Research Lab., Fort Knox, Ky.).

18,321
This study was designed to determine the number of current intensity levels which could be absolutely identified with perfect accuracy, and the channel capacity for such stimuli. Four sets of stimuli were used for absolute identification of current intensity. Eighteen naive and six sophisticated Ss were used. Mean values for the number of correct identifications were calculated and presented as were graphic presentations of the channel capacity for the intensity levels.
T. G. I. R 18

18,322
Kenshalo, D.R., Nafe, J.P. & Dawson, W.W. A NEW METHOD FOR THE INVESTIGATION OF THERMAL SENSITIVITY. J. Psychol., 1960, 49, 29-41. (Department of Psychology, Florida State University, Tallahassee, Fla.).

18,322
Described is a new apparatus which controls many of the variables known to affect thermal thresholds and which allows a systematic investigation of several of these variables. The major characteristic of the apparatus is that the two principal means of delivering thermal energy to the skin are by radiation and conduction. A preliminary study on the threshold of warmth and cold was conducted to demonstrate the capabilities and limitations of the equipment.
G. I. R 20

18,323
Nelson, T.M., Bartley, S.H. & DeHardt, Doris. A COMPARISON OF VARIABILITY OF THREE SORTS OF OBSERVERS IN A SENSORY EXPERIMENT. J. Psychol., 1960, 49, 3-11. (Department of Psychology, Michigan State University, East Lansing, Mich.).

18,323
The purpose of this study was to investigate the performance of trained, sophisticated, and naive Ss in a psychophysical experiment. Three groups of Ss--one group with extended experience, one group had been instructed and trained, and one group was naive--were compared on a task which consisted of viewing an intermittent target. The rate of intermittency was varied by the observer until all vestiges of flicker just disappeared. Four different intensity levels and seven different pulse-to-cycle fractions were used. The results were presented in graphical and statistical form.
T. R 2

18,324
Eysenck, S.B.G. RETENTION OF A WELL-DEVELOPED MOTOR SKILL AFTER ONE YEAR. J. gen. Psychol., 1960, 63, 267-273. (Institute of Psychiatry, University of London, London, England).

18,324
This study was designed to determine the amount of decrement in performance after one year of no practice, the speed with which the old level of skill was regained, and the length of warm up necessary to reach a stable level after one year of rest as compared with one day of rest. Ten Ss performed a pursuit rotor task for 50 15 minute periods. After one year the S performed three trials of 15 minutes each. The results were examined and discussed.
T. G. R 10

18,325
Adamson, R.E. & Bevan, W. A SIMPLE AND INEXPENSIVE PROGRAMMING DEVICE FOR PSYCHOPHYSICAL AND LEARNING EXPERIMENTS. J. gen. Psychol., 1960, 63, 103-106. (Department of Psychology, Emory University, Emory University, Ga.).

18,325
Presented is the description of a programming device which is a form of tape reader in which the tape advance is determined by closure of a pole switch. The apparatus is believed to have applicability in stimulus control and will provide standardized presentation of variable stimulus input in psychophysical and learning experiments.
I. R 1

18,326
Oberg, W. AGE AND ACHIEVEMENT--AND THE TECHNICAL MAN. Personn. Psychol., 1960, 13(3), 245-259. (Michigan State University, East Lansing, Mich.).

18,326
This paper considers the problem of age and performance of men in technical fields. The findings of recent studies are discussed and the implications of the studies for technical management are considered. The methodology and results of one study are presented. Policy proposals for research and development organizations as well as policy proposals for research and engineering organizations are included.
T. R 2

18,327
Tiffin, J. & Vincent, N.L. COMPARISON OF EMPIRICAL AND THEORETICAL EXPECTANCIES. Personn. Psychol., 1960, 13(1), 59-64. (Occupational Research Center, Purdue University, Lafayette, Ind.).

18,327
The purpose of this paper was to present the results of 15 validation studies in which the procedure for using theoretical expectancies in showing the relationship between a predictor and a criterion was compared with the empirical method. Fifteen independent sets of data were analyzed by computing a phi coefficient and testing the deviations of the theoretical expectancies from the empirical expectancies with chi square.
T. G. R 2

18,328
Collier, R.O., Jr. & Meyer, D.L. RESEARCH METHODS: EXPERIMENTAL DESIGN AND ANALYSIS. Rev. Educ. Res., Dec. 1960, XXX(5), 430-439.

18,328
Presented is an overview of the literature and writings which are relevant for use in educational experimentation. Some of the areas covered are: design and analysis of experiments, factorial experiments, the analysis of variance, analysis of covariance, nonparametric techniques in experimental design, and some current throught in experimental design.
R many

18,329
Harootunian, B. & Tate, Merle W. THE RELATIONSHIP OF CERTAIN SELECTED VARIABLES TO PROBLEM SOLVING ABILITY. J. educ. Psychol., 1960, 51(6), 326-333. (University of Delaware, Newark, Del. & University of Pennsylvania, Philadelphia, Penn.).

18,329
The relationship that the variables of problem recognition, word fluency, ideational fluency, closure, judgment, intelligence, and reading have on problem-solving was investigated. Six hundred thirty-six seventh and eighth grade pupils were tested. The criteria of problem-solving used were: "The Differential Aptitude tests of verbal and abstract reasoning, the Davis-Eells games, and a test of 40 reasoning problems." The predictor variables were measured by tests similar to those used in factor analysis of reasoning ability and by tests constructed for the study.
T. R 20

18,330
Pierce, J.R. SOME WORK ON HEARING. Amer. Scientist, March 1960, 48(1), 40-45.

18,330
This paper discusses some of the older work conducted on hearing and presents some more recent work in psychoacoustics. The work of Schroeder concerning phase and the work of Hanson on the phenomena of binaural perception are discussed. Several observations are made and discussed.

18,331
Newton, G. & Heimstra, N. EFFECTS OF EARLY EXPERIENCE ON THE RESPONSE TO WHOLE-BODY X-IRRADIATION. Canad. J. Psychol., June 1960, 14(2), 111-120. (University of Rochester, Rochester, Rochester, N.Y.).

18,331
This study was designed to test the effect of early handling and cold stress on mortality, ambulatory activity, and the pattern change in body weight of irradiated rats. Four groups of 16 albino rats were studied. Group A received early handling, group T was intermittently cold stressed, and group XC was irradiated with groups A and T. The remaining animals (group C) continued as nonirradiated controls. The tests conducted were on body weight, ambulatory activity, and mortality.
R many

18,332
Ostwald, P.F. VISUAL DENOTATION OF HUMAN SOUNDS. Arch. gen. Psychiat., Aug. 1960, 3(2), 25/117-29/121.

18,332
The purpose of this report is to present an acoustic method of denoting human sounds for use in psychiatric diagnosis. Described is the procedure of obtaining a graphic denotation of human sounds by playing loops of tape recordings through an acoustic analyzer. Several types of sounds are identified and labelled to correspond with a particular pattern. It is felt that these sound patterns may be correlated with clinical variables such as stress, personality, etc.
G. R 10

18,333
Garner, W.R. RATING SCALES, DISCRIMINABILITY, AND INFORMATION TRANSMISSION. Psychol. Rev., Nov. 1960, 67(6), 343-352. (Johns Hopkins University, Baltimore, Md.).

18,333
The purpose of this paper was to indicate how both information measures and discriminability scaling procedures can be used to aid in the solution of the rating scale problem. Also, the relation of these two procedures were shown and an illustrative set of data was presented to clarify the nature of the relations. The data used were ratings of the legibility of handwriting samples.
G. R 11

18,334
Silverman, R.E. AUTO-INSTRUCTIONAL DEVICES. SOME THEORETICAL AND PRACTICAL CONSIDERATIONS. J. higher Educ., Dec. 1960, 481-486. (University College of Arts and Science, New York University, New York, N.Y.).

18,334
This paper discusses the recent interest in teaching machines, indicates the unsatisfactory nature of the term, and advocates the use of the term "auto-instructional." The types of devices and their limitations are described. The question of comparing the effectiveness of auto-instructional techniques with other teaching techniques is dealt with and recent studies concerned with comparisons between the use of programmed material and conventional instruction are described and discussed.
R 9

18,335
Dixon, N.F. APPARENT CHANGES IN THE VISUAL THRESHOLD: CENTRAL OR PERIPHERAL? Brit. J. Psychol., Nov. 1960, 51(Part 4), 297-309. (University College, London, England).

18,335
Investigated was the issue of perceptual defense by measuring the threshold of one eye during the subliminal presentation to the other eye of anxiety-producing stimulus material. Of concern was whether the site of threshold change is likely to be the peripheral receptor or centrally located receptor of the cortex. The Ss, eight males and four females, looked through a stereoscope and threshold determinations were obtained by the method of limits. Half the group viewed the bar of light in red and the other half viewed the bar in green. The stimulus words used were cancer and stance. The results were presented and discussed.
G. I. R 22

18,336
Litterer, J.A. PITFALLS IN PERFORMANCE APPRAISAL. Personn. J., July-Aug. 1960, 39(3), 85-88. (University of Illinois, Urbana, Ill.).

18,336
This article considers the problem of executive appraisal programs and attempts to determine why this tool is in trouble. The topics of discussion are: the setting within which the rater makes the appraisal; the rater's attitude; the rater's knowledge of and skill in appraisal; and the nature of the appraisal problem.

18,337
Lawley, D.N. APPROXIMATE METHODS IN FACTOR ANALYSIS. Brit. J. statist. Psychol., May 1960, XIII(Part 1), 11-17. (Mathematical Institute, University of Edinburgh, Edinburgh, Scotland).

18,337
This study was designed to deal with the problem of estimating a factor matrix when certain specified factor loadings are known or assumed in advance to be zero. Two methods, one for orthogonal factors and one for correlated, were given for estimating factor loadings. A test for the significance of the residuals was presented and the process was illustrated by an example.
R 2

18,338
Dale, H.C.A. A STUDY OF SUBJECTIVE PROBABILITY. Brit. J. statist. Psychol., May 1960, XIII(Part 1), 19-29. (Applied Psychology Research Unit, MRC, Cambridge, England).

18,338
These investigations were conducted to determine whether or not adult Ss confronted with a number of items would choose them at random. Two techniques were used: 1) Ss made free selections; and 2) a number of selections were made by the experimenter and the Ss were required to choose between them. Preferences established by the Ss were examined, and the results were discussed.
R 9

18,339
Gyr, J.W. AN INVESTIGATION INTO, AND SPECULATIONS ABOUT, THE FORMAL NATURE OF A PROBLEM-SOLVING PROCESS. Behav. Sci., Jan. 1960, 5(1), 39-59. (Mental Health Research Institute, University of Michigan, Ann Arbor, Mich.).

18,339

Considered here is problem solving as a process rather than the ultimate outcome of the process. Of interest is the succession of trials made by the S in solving a problem, the information available to him prior to each trial, and the "mechanism" inside the S which might account for the specific linkage between information and trial which can be observed. Three theoretical models concerning the nature of a control system within a human S are formulated and tested.
T. G. I. R 9

18,340
Hagensick, P.W. LOGIC BY MACHINE: PROGRAMMING THE LGP-30 TO SOLVE PROBLEMS IN SYMBOLIC LOGIC. Behav. Sci., Jan. 1960, 5(1), 87-94. (Ohio University, Athens, Ohio).

18,340
A paper describing a computer which can solve problems in symbolic logic is presented. The types of problems are described as are the coding operations and the types of symbols used. This program has been designed for use on a specific computer, but it is believed that it can be adapted for use on other machines.
I.

18,341
Green, B.F., Jr. IPL-V: THE NEWELL-SHAW-SIMON PROGRAMMING LANGUAGE. Behav. Sci., Jan. 1960, 5(1), 94-100. (Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.).

18,341
Described is a programming language designed to be interpreted by a special computer program that effectively turns the machine being used into an information processing language (IPL) computer with a flexible memory structure and with the capacity for executing recursive subroutines. The properties of the IPL lists are described as are the processes and routines. The uses of the IPL and its accomplishments are cited.
R 2

18,342
Vandenberg, S.G. MEDICAL DIAGNOSIS BY COMPUTER: RECENT ATTEMPTS AND OUTLOOK FOR THE FUTURE. Behav. Sci., April 1960, 5(2), 170-174. (Mental Health Research Institute, University of Michigan, Ann Arbor, Mich.).

18,342
Discussed was the feasibility and possibility of using computers in psychiatric diagnosis. Three types of diagnostic computer types were considered and were: simulation, statistical analysis, and logical diagnosis. The potential effects of such programs were discussed and suggestions for future research were included in the report.
R 25

18,343
Silberman, H.F. A COMPUTER AS AN EXPERIMENTAL LABORATORY MACHINE FOR RESEARCH ON AUTOMATED TEACHING PROCEDURES. Behav. Sci., April 1960, 5(2), 175-176. (System Development Corporation, Santa Monica, Calif.).

18,343
Described is a plan to use a computer as a research tool for teaching students. This investigation is concerned with machine responsiveness to the student as an important variable. An appraisal of the effect of dynamic adaptation of instructional procedures to the individual student is made. Also described is a possible design for the computer program being formulated.
R 1

18,344
Uhr, L. INTELLIGENCE IN COMPUTERS: THE PSYCHOLOGY OF PERCEPTION IN PEOPLE AND IN MACHINES. Behav. Sci., April 1960, 5(2), 177-182. (Mental Health Research Institute, University of Michigan, Ann Arbor, Mich.).

18,344
Discussed were the potential powers of computers and the "intelligence" of computers. The need for better perceptual mechanisms in machines was pointed out. Also discussed were processing methods of a simple-minded nature such as the machines that process specially prepared bank checks. Described was a program for reading alphanumeric symbols and emphasized was how closely this machine approaches perceiving.
R many

18,345
Wrigley, C. THEORY CONSTRUCTION OF FACT-FINDING IN A COMPUTER AGE? Behav. Sci., April 1960, 5(2), 183-186. (Michigan State University, East Lansing, Mich.).

18,345
Discussed was whether the technical developments such as computers will change our views on psychological methods. Of particular concern was the importance of theory as opposed to fact finding in psychology.
R 1

18,346
Roby, T.B. COMMITMENT. Behav. Sci., July 1960, 5(3), 253-264. (Tufts University, Medford, Mass.).

18,346
Discussed is the empirical study of human decision-making and the need to better define decision. This paper attempts to explore the meaning of the term "commitment" and to consider various possibilities for exact measurement as it is used in decision-making. Some of the critical issues are presented and discussed.
T. G. R 9

18,347
Lieberman, B. HUMAN BEHAVIOR IN A STRICTLY DETERMINED 3X3 MATRIX GAME. Behav. Sci., Oct. 1960, 5(4), 317-322. (Harvard University, Cambridge, Mass.).

18,347
The purpose of this study was to determine how closely the behavior of a group of intelligent individuals conformed to the commands of the minimax model when playing a two-person, zero-sum game having a saddle point. Tested were 30 Ss with two Ss playing each game. After each game the Ss were each asked how they played the game. The results and a discussion followed.
G. R 9

18,348
Taylor, F.V. FOUR BASIC IDEAS IN ENGINEERING PSYCHOLOGY. Amer. Psychologist, Oct. 1960, 15(10), 643-649. (USN Research Lab., Washington, D.C.).

18,348
Presented are four basic ideas in engineering psychology. These ideas have stemmed from the recognition that the human has limitations and that this fact must be considered in man-machine systems. The basic ideas presented and discussed are: the limited flexibility of the man, the concept of the man-machine system, the importance of human input-output relationships, and the use of engineering models to describe the behavior of the human elements within a system.
G. I. R 13

18,349
Hovland, C.I. COMPUTER SIMULATION OF THINKING. Amer. Psychologist, Nov. 1960, 15(11), 687-693. (Yale University, New Haven, Conn.).

18,349
Discussed are the capabilities of high speed computers and their features which are similar to human thinking. The implications of the applications of these machines are considered. Concrete examples of some new techniques such as the simulation of the solving of geometry problems are also presented.
R 18

18,352
Bhatia, B. SOME FACTORS DETERMINING THE MAXIMUM ANGULAR VELOCITY OF PURSUIT OCULAR MOVEMENTS. J. opt. Soc. Amer., Feb. 1960, 50(2), 149-155. (Defence Science Lab., New Delhi, India).

18,352
To determine the maximum angular velocity of pursuit movements of the eyes, the critical velocities of four Ss were obtained. A set of 15 test objects, five black vertical lines on a white background forming four white vertical columns with one or more containing a thin black horizontal line, were presented to the S at regular intervals with the velocity steadily and gradually reduced. Critical velocities were obtained at different vertical dimensions of the viewing slit and different distances between the observer and the object. The results and discussion followed.
T. R 9

18,354
Sperling, H.G. CASE OF CONGENITAL TRITANOPIA WITH IMPLICATIONS FOR A TRICHROMATIC MODEL OF COLOR RECEPTION. J. opt. Soc. Amer., Feb. 1960, 50(2), 156-163. (USN Medical Research Lab., New London Submarine Base, Conn.).

18,354
To obtain luminous efficiency, color mixture, and spectral color confusion data on a congenital tritanope, the tristimulus colorimeter designed by Fry after the basic principles of the Wright colorimeter was used. The color confusion data were obtained by metameric matches to violet with mixtures of red and blue light and by finding spectral lights from the green-yellow-orange regions which matched wavelengths in the violet regions. The results obtained were compared with the results of the Wright study.
T. G. R 22

18,355
Simonson, E. FLICKER BETWEEN DIFFERENT BRIGHTNESS LEVELS AS DETERMINANT OF THE FLICKER FUSION. J. opt. Soc. Amer., April 1960, 50(4), 328-331. (Laboratory of Physiological Hygiene & Department of Ophthalmology, University of Minnesota Medical School, Minneapolis, Minn.).

18,355
Presented is a study designed to develop a suitable method for investigating flicker. Described is the apparatus which produces flicker by phasic variations of brightness level and provides continuous variations of flicker rate, luminance, light-dark ratio, ambient light ratio, and monocular or binocular exposure.
T. G. R 20

18,356
Lloyd, V.V. & Landis, C. ROLE OF THE LIGHT-DARK RATIO AS A DETERMINANT OF THE FLICKER-FUSION THRESHOLD. J. opt. Soc. Amer., April 1960, 50(4), 332-336. (Department of Research Psychology, New York State Psychiatric Institute, New York, N.Y.).

18,356
The purpose of this study was to determine the more or less complete critical flicker fusion-log I relationship for a broad range of light-dark ratios with two sizes of area of favored stimulation. Two Ss were presented with brightness levels in order of decreasing magnitude. Consecutive levels were spaced approximately one-third of a log unit apart. Six judgments were made by each S during each series.
T. G. R 15

18,357
Wulfeck, J.W., Johannsen, Dorothea E. & McBride, Patricia I. STUDIES ON DARK ADAPTATION. III. PRE-EXPOSURE TOLERANCE OF THE HUMAN FOVEA AS MEASURED BY CONTRAST SENSITIVITY. J. opt. Soc. Amer., June 1960, 50(6), 556-558. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.).

18,357
The purpose of this study was to investigate the effect of low brightness and brief duration of pre-exposure upon the course of subsequent adaptation, as measured by the contrast threshold. Thresholds were determined by a modified method of limits and contrast thresholds were obtained for each observer against adaptation brightness of 0.010, 0.10, and 1.0 ft.-L. Adaptation curves measured by contrast sensitivity were also obtained on each observer.
T. G. R 3

18,358
Krendel, E.S. & Wodinsky, J. SEARCH IN AN UNSTRUCTURED VISUAL FIELD. J. opt. Soc. Amer., June 1960, 50(6), 562-568. (Laboratories for Research & Development, The Franklin Institute, Philadelphia, Penn.).

18,358
The purpose of this study was to determine the time required to detect small visual targets in a broad unstructured visual field. Search was conducted with unaided binocular vision under a range of conditions which included different areas, contrasts, background luminance, and target sizes of possible significance in field operations. The study was conducted in three phases with the final phase providing the essential content of this paper.
T. G. R 3

18,359
Wald, G. ANALYSIS OF RETINAL FUNCTION BY A TWO-FILTER METHOD. J. opt. Soc. Amer., July 1960, 50(7), 633-641. (Biological Labs., Harvard University, Cambridge, Mass.).

18,359
Described is a procedure for analyzing retinal functions. The procedure is applicable to any type of visual measurement which involves changes in spectral sensitivity The results of several experiments using the method are included in this report. Studied are the changes accompanying transitions between rod and cone functions, the screening of the visual receptors in the central retina by the macular pigment, and the differentiation of two types of rod spectral sensitivity function in the amphibian eye.
G. R 10

18,360
McColgin, F.H. MOVEMENT THRESHOLDS IN PERIPHERAL VISION. J. opt. Soc. Amer., Aug. 1960, 50(8), 774-779. (Columbia University, New York, N.Y.).

18,360
The present study was designed to obtain some basic data on thresholds for real movement in peripheral vision. The absolute velocity thresholds of movement were determined at 48 positions in peripheral vision by using the method of limits. Four types of movements were investigated under conditions of constant photopic light. The types of movement were clockwise and counter-clockwise rotation and vertical and horizontal motion. Results were reported and discussed.
G. R 12

18,361
Walraven, P.L. & Bouman, M.A. RELATION BETWEEN DIRECTIONAL SENSITIVITY AND SPECTRAL RESPONSE CURVES IN HUMAN CONE VISION. J. opt. Soc. Amer., Aug. 1960, 50(8), 780-784. (Institute for Perception RVO-TNO, Soesterberg, The Netherlands).

18,361
The purpose of this paper is to connect the general aspects of the Stiles-Crawford effect by consideration of the relationship between the shape of the spectral response curves in human cone vision and the angle of incidence of the light in the receptor. The theoretical considerations are discussed and experimental data are presented to challenge the theory. A lengthy discussion follows.
G. R 18

18,362
Schroeder, A.C. THEORY ON THE RECEPTOR MECHANISM IN COLOR VISION. J. opt. Soc. Amer., Oct. 1960, 50(10), 945-949. (RCA Labs., Princeton, N.J.).

18,362
Presented is a new theory of color vision which does not require three different kinds of photochemicals or three different kinds of cones. This theory explains the mechanism of color vision in terms of a variation in color sensitivity as a function of position along the outer segment of the cone with receptors placed at appropriate positions along it.
G. R 14

18,363
Luria, S.M. & Schwartz, I. EFFECT OF RED VS WHITE ADAPTATION AND TARGET ILLUMINATION ON THE TEMPORAL COURSE OF SCOTOPIC ACUITY. J. opt. Soc. Amer., Nov. 1960, 50(11), 1075-1080. (USN Medical Research Lab., New London Submarine Base, Conn.).

18,363
Of interest in this investigation was the time saved as a function of the target brightness in resolving a series of high contrast targets after initial adaptation to red or white light of 3.4 ft.-L when the target luminances were 3.22, 3.82, 4.17, 4.77, and 5.3 $\log_{\mu\mu}$L. Curves indicating the resolving times of three Ss were presented and the results were discussed.
T. G. R 21

18,364
Beck, H.S. THE RELATIONSHIP OF COLORS TO VARIOUS CONCEPTS. J. educ. Res., Jan. 1960, 53(5), 194-196. (University of Virginia, Charlottesville, Va.).

18,364
This study was designed to evaluate and validate the Word-Color Association Test as a projective technique. The hypotheses tested were: certain colors are more commonly associated with a given concept than other colors, certain colors are rarely associated with certain concepts, and these associations will remain relatively stable over a period of time. The word association test was given to 455 white boys and 409 white girls between the ages of 12 to 16 years old. The third hypothesis was tested on 15 boys and 22 girls. The results were presented as were the conclusions drawn from the study.
T. R 4

18,365
Seymour, R.B. MISSING DATA IN NON-LINEAR TREND ANALYSIS OF REPEATED MEASUREMENTS ON THE SAME INDIVIDUALS. J. educ. Res., Dec. 1960, 54(4), 141-144.

18,365
Presented are formulas for estimating missing data in Grant's design for analysis of non-linear trend. Thus, it is possible to use individuals whose data is not complete and apply the same computations as are used for a complete set of data. Formulas are presented for the case of one missing datum in Grant's and Alexander's methods and for all cases of two missing data in Grant's method. An example is presented.
T. R 10

18,366
Banghart, F.W. GALVANIC SKIN RESPONSES DURING PROBLEM SOLVING. J. exp. Educ., Dec. 1960, 29(2), 133-142. (University of Virginia, Charlottesville, Va.).

18,366
This study was designed to investigate the relationship between GSRs and interests, intelligence, grouping, anxiety, and grades. Twenty-two Ss were administered the Taylor Anxiety Scale, Wonderlie Test, and the California Occupational Interest Inventory. While the S solved problems in the presence and absence of a second person, GSRs were recorded. Graphs were presented and the results were discussed.
G. R 24

18,367
Sheldon, M.S. & Sorenson, A.G. ON THE USE OF Q-TECHNIQUE IN EDUCATIONAL EVALUATION AND RESEARCH. J. exp. Educ., Dec. 1960, 29(2), 143-151. (System Development Corporation, Santa Monica, Calif. & University of California, Los Angeles, Calif.).

18,367

The purpose of this paper was to present some illustrations of how Q-technique can be used with groups of students. Four examples were given: the measurement of personal adjustment, measuring attitudes and beliefs, an investigation in educational philosophy, and as an instructional tool. Discussed were some of the problems that arise with the use of the Q-technique in the classroom.
T. R 5

18,368
Creaser, J.W. A DEVICE FOR QUICKLY ADDING WEIGHTED SCORES. J. exp. Educ., Dec. 1960, 29(2), 201-202. (University of Illinois, Urbana, Ill.).

18,368

Presented is a device which may be used to add weighted scores. A table or graph can be made to eliminate the repetition of many calculations. An illustration of how to determine the predicted grades or scores from a regression equation is given.
R 2

18,369
Rose, A.M. SOCIAL PSYCHOLOGICAL EFFECTS OF PHYSICAL DEPRIVATION. J. Hlth hum. Behav., 1960, I(4), 285-289. (University of Minnesota, Minneapolis, Minn.).

18,369

Presented was a study conducted under nonlaboratory conditions. The hypothesis tested is that the individual is desocialized to a certain extent, perhaps temporarily, when his biological system does not function with a certain undetermined degree of satisfactoriness. The data were provided by 1754 combat enlisted men fighting in 1945, and the information was obtained by questionnaire. The two measures of deprivation were loss of sleep and insufficiency of food supplies due to combat conditions. The chi-square test was used to measure the relationship between the indices of deprivation and the indices of acceptance of group norms.
T. R 4

18,370
Brown, I.D. ABSOLUTE JUDGMENTS AND OPERATIVE-INSPECTOR RELATIONS. Occup. Psychol., Oct. 1960, 34(4), 258-263. (Applied Psychology Research Unit, MRC, Cambridge, England).

18,370

Investigated were the causes for discrepancy in absolute judgments made by operatives and inspectors in a typical industrial situation. Each of a range of nine weights was judged by the method of single stimuli and rated on a three-point symmetrical scale as "light," "medium," or "heavy." The Ss performed the task under two conditions: 1) 72 judgments were made one test period, and 2) 18 judgments were made on each of four successive days. Scores on the AH4 test of intelligence were used to compare the two groups. The results were analyzed to determine the effect of frequency and sensory experience on absolute judgments.
T. G. R 12

18,371
Broadbent, D.E. & Little, E.A.J. EFFECTS OF NOISE REDUCTION IN A WORK SITUATION. Occup. Psychol., April 1960, 34(2), 133-140. (Applied Psychology Research Unit, MRC, Cambridge, England).

18,371

A study designed to investigate the effects of noise reduction in a work situation is presented. A comparison of performance in a workplace which was acoustically treated was made with performance of the same people in a room which was not treated. In the acoustically treated room, the sound level fell by 8 to 10 db. Measurements were made on: communication, working efficiency, work rate, number of shutdowns of the process, labor turnover, absenteeism, and maintenance.
R 4

18,372
Michael, W.B. & Hunka, S. RESEARCH TOOLS: STATISTICAL METHODS. Rev. educ. Res., December 1960, XXX(5), 440-486.

18,372

An overview of the statistical methodology is presented. It includes the following: general developments in statistical theory with particular stress on contributions to statistical inferences involving parametric proceedings; theory and application of chi-square and contingency tables; research concerning binomial, Poisson, and multinomial distributions; innovations and modifications in nonparametric theory and techniques; developments in regression and correlation theory; and methodological advances in factor analysis. A list of references is also included.
R many

18,373
Fleishman, E.A. & Ornstein, G.N. AN ANALYSIS OF PILOT FLYING PERFORMANCE IN TERMS OF COMPONENT ABILITIES. J. appl. Psychol., 1960, 44(3), 146-155. (Yale University, New Haven, Conn. & North American Aviation, Inc., Columbus, Ohio).

18,373

The purpose of this study was to specify the variance in common between flying maneuvers which may provide insight into the dimensions of individual differences in this complex task. Of special concern was a factorial analysis of performance in different flying maneuvers. Measures of flying proficiency in 24 separate maneuvers were obtained on 63 Ss and the intercorrelations among these maneuver performances were subjected to factor analytic study. A number of factors were arrived at, and the interpretation of these factors was discussed.
T. R many

18,374
Ripps, H. & Kaplan, I.T. INFLUENCE OF EXTRATEST ILLUMINATION ON THE CRITICAL FLICKER FREQUENCY OF THE HUMAN FOVEA. J. exp. Psychol., 1960, 60(4), 255-262. (Postgraduate Medical School, New York University, New York, N.Y.).

18,374

Studied was foveal cff as a function of inducing field luminance for several different configurations of extratest stimulation. In this experiment, veiling luminance was employed to simulate the influence of stray light on cff. The luminance levels of the inducing stimuli were presented in ascending order. Analysis of the component parts of the veiling luminance configuration was made and discussed.
G. R 13

18,375
White, C.T. & Ford, A. EYE MOVEMENTS DURING SIMULATED RADAR SEARCH. J. opt. Soc. Amer., Sept. 1960, 50(9), 909-912. (USN Electronics Lab., San Diego, Calif.).

18,375

Studied were the characteristics of visual search behavior during radar monitoring. Of interest was whether or not there were any patterns of search behavior which may tend to decrease the effectiveness of the operator in dealing with the radar plan position indicator. A simulated radar screen was used and electrical eye-movement recordings were made on six Ss while they searched for targets on two 20 minute display films. Results and a discussion were included.
G. R 4

18,376
Boynton, R.M. THEORY OF COLOR VISION. J. opt. Soc. Amer., Oct. 1960, 50(10), 929-944. (Department of Psychology & Institute of Optics, University of Rochester, Rochester, N.Y.).

18,376

Presented is a theory of color vision which attempts to account for the physics, physiology, and psychology of the color-vision process. The color theory described is a quantitative, tri-stimulus, five-receptor, opponent-colors description of the human color-vision process. Suggestions for research are also included.
G. R 54

18,377
Wolf, E., Zigler, M.J. & Cowen-Solomons, Hope B. VARIABILITY OF DARK ADAPTATION. J. opt. Soc. Amer., Oct. 1960, 50(10), 961-965. (Wellesley College, Wellesley, Mass.).

18,377

The purpose of this study was to investigate variability in dark adaptation based upon variability within the organism and variability caused by other factors. A visual discriminometer was used and dark-adaptation curves were obtained from three observers. Half of the tests were taken immediately upon entering the darkroom; the other half after 30 minutes rest in total darkness. Two Ss were tested 24 times each and the third was tested 15 times. The dark-adaptation functions were presented and discussed.
R 20

18,378
Ditchburn, R.W. & Pritchard, R.M. BINOCULAR VISION WITH TWO STABILIZED RETINAL IMAGES. Quart. J. exp. Psychol., Feb. 1960, XII(Part I), 26-32.

18,378

This study was designed to investigate what occurs when both eyes are used to view a stabilized image. Similar patterns were presented alternately to each eye on corresponding parts of the retina and in noncorresponding areas; and different targets were presented to the two eyes. The results were discussed at length.
T. I. R 6

18,379
Eckstrand, G.A., Rockway, M.R., Kopstein, F.F. & Morgan, R.L. TEACHING MACHINES IN THE MODERN MILITARY ORGANIZATION. Proj. 1710, Task 77535, WADD TN 60 289, Dec. 1960, 24pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,379

This paper considers the teaching machine and its applicability in the military organization. Some of the basic considerations such as cost of training, individual differences of military personnel, quality control, shortage of instructors, and trainee motivation are discussed. A more specific discussion of some particular teaching machines, current problems and areas of investigation, and some military uses of automated training devices is given. The need for further investigation and support of such devices in the military is expressed.
G. I. R 17

18,385
von Bekesy, G. CURRENT STATUS OF THEORIES OF HEARING. Science, May 1956, 123(3201), 779-783. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.).

18,385

Considered here is the current status of theories of hearing. Four major theories of hearing are discussed with emphasis on the various vibration patterns of the basilar membrane and the elastic properties of the membrane. Described are the mechanical models of the cochlea designed by the author to investigate the problem of vibration patterns.
G. I. R 3

18,387
US Armed Services Technical Information Agency. MAINTENANCE AND MAINTAINABILITY. Rep. AD 247 300, Nov. 1960, 72pp. US Armed Services Technical Information Agency, Arlington, Va.

18,387

This bibliography represents those reports in the Armed Services Technical Information Agency's collection pertaining to maintenance engineering and maintainability. The categories included are: maintainability, maintenance, maintenance engineering, maintenance personnel, electronic and electric equipment, guided missiles, and military equipment.
R many

18,388
Arduini, A. & Hirao, T. ENHANCEMENT OF EVOKED RESPONSES IN THE VISUAL SYSTEM DURING REVERSIBLE RETINAL INACTIVATION. Arch. ital. Biol., 1960, 98, 182-205. (Istituto di Fisiologia, Universita di Pisa, Pisa, Italia).

18,388

This study was concerned with the tonic influence of the retinal dark discharge on the specific visual system. The experiments were conducted on cats with a complete transection of the brain at a mid-pontine level. Single electrical pulses were applied through bipolar concentric electrodes to the lateral geniculate body. Evoked potentials were recorded from visual area I in the lateral gyrus. Standard light illumination was achieved by the beam of a 30-watt filament lamp suspended above the preparation. A lengthy and full report of the findings was included in the report.
R 60

18,389
Mackworth, N.H. SOME SUGGESTED USES FOR THE OPTISCAN--A HEAD-MOUNTED EYE CAMERA. Paper 60 WA 304, 1960, 7pp. American Society of Mechanical Engineers, New York, N.Y. (Dunlap and Associates, Inc., Stamford, Conn.).

18,389
Described is a new device designed to mark immediately and directly onto a motion picture of the changing visual surroundings the exact position of the moving gaze of the person wearing this eye camera on his head. This optical periscope is designed to provide an opportunity of studying how people look as they work at real-life situations. Discussed are the engineering problems, consumer research applicability, medical applications, and its use in basic visual studies.
I. R 11

18,395
Parsons, H.M. THE DEVELOPMENT AND INSTALLATION OF A SYSTEM TRAINING PROGRAM. THE SAGE ECCM MODEL. SP 265, Sept. 1960, 38pp. System Development Corporation, Santa Monica, Calif.

18,395
This paper described the training program which is a team or system training program. It also described the development and installation of the SAGE ECCM-Model and it includes the determination of training requirements, selection of training methods, specification of exercise configuration, development and procurement of simulation equipment, determination of exercise content, determination of exercise duration, frequency and scheduling, development of exercise-aiding techniques, and the installation of the training program in the field. The responsibilities and requirements after installation of the program are also considered.
I. R 5

18,396
Parker, J.F., Jr. & Fleishman, E.A. ABILITY FACTORS AND COMPONENT PERFORMANCE MEASURES AS PREDICTORS OF COMPLEX TRACKING BEHAVIOR. Psychol. Monogr., 1960, 74(16), 1-36. (Psychological Research Associates, Inc., Encino, Calif. & Yale University, New Haven, Conn.).

18,396
This study was designed to investigate the relationships between ability variables and progress in learning a complex perceptual-motor skill. Another objective was to compare the predictability of terminal performance from external measures with predictions from measures taken earlier in practice on the task itself. The Ss (203) were first given a large battery of printed and psychomotor apparatus tests and then spent time mastering the criterion task. Performance measures were taken at various stages of practice on this task. Correlations among the scores were obtained and factor techniques were applied.
T. G. I. R 23

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

Abbey, D.S. 16,701, 16,702, 17,088
Abma, J.S. 16,157, 16,457, 16,703
Aborn, M. 16,758
Abramson, L. 16,913
Acosta, H.B. 18,174
Adams, G.L. 18,072
Adams, J.A. 505, 2161, 16,290, 16,577, 16,597, 17,195
Adams, O.S. 16,156
Adamson, R.E. 18,325
Adelson, M. 2162
Ades, H.W. 3148
Adler, H.E. 3989
Adler, S. 15,390
Adorno, D.S. 16,912
Adrian, W. 16,704
Aeronautical Research Council 4120
Aeroplane & Armament Experimental Establishment 4677
Aero Service Corporation 18,071
Aerospace Medicine 17,111
Ahr, A.E. 18,310
Air Reduction Company, Inc. 15,358
Albert, B.S. 16,623
Albitz, Diane 4482
Alexander, J.D., Jr. 17,020
Alexander M. 18,276
Alford, W.L. 15,428
Algranti, J.S. 17,241
Allen, Patricia S. 16,422
Alien, R.G. 18,074
Allen, T.H. 16,276, 16,911 18,123
Alluisi, E.A. 18,244
Alpern, M. 3629, 18,230
Altman, I. 16,167, 16,174, 16,250, 18,075
Altman, P.L. 16,233
Alvord, R.W. 18,024
Alzate, R. 16,892
Ambler, Rosalie K. 17,133
American Optical Co. 16,532
American Psychological Association 16,209
Ammerman, H.L. 16,960
Ammons, Carol H. 3631, 17,161
Ammons, R.B. 3631, 3632
Anast, J. 16,800
Anastasio, F.J. 16,651, 16,653, 16,689, 16,691, 16,857, 16,928, 16,929
Anderson, Edythe M.S. 16,513, 16,514, 16,515, 16,516, 18,228
Anderson, M.J. 16,206
Anderson, N.H. 3999
Anderson, Nancy S. 18,058, 18,073
Anderson, W.L. 16,194
Andreassi, J.L. 15,376, 16,645
Andrews, W.H. 16,910
Archer, E.J. 3997, 4381, 17,057
Archibald, E.R. 16,173
Arduini, A. 18,388
Armington, J.C. 15,430
Armour Research Foundation of Illinois Institute of Technology 15,336, 16,223, 16,458, 16,994
Armsby, D.H. 16,020, 16,289, 16,356, 18,213
Armstrong, J.G. 4526
Arndt, W. 16,716
Arnoult, M.D. 17,197, 17,198
Ashby, W.R. 18,025
Ashkenas, I.L. 16,263, 16,583
Askren, W.B. 16,418
Atkinson, R.C. 16,355, 16,419
Audley, R.J. 17,033
Austin, R.W. 16,723

Bach, L.M.N. 4458, 4459
Backlund, F. 16,033
Bailey, R.W. 16,519
Baines, D.J. 15,360
Bair, J.T. 17,133
Baker, Alma S. 18,062
Baker, C.A. 16,035, 16,164, 17,313
Baker, C.H. 15,361, 16,085, 16,326, 18,313
Baker, D.F. 16,352, 16,720
Baker, L.E. 18,204
Baker, P. 16,799
Baldwin, A.W. 4008
Balke, B. 4141, 17,130
Bancroft, R.W. 3415
Banet, L. 4291
Banghart, F.W. 16,621, 16,837, 16,908, 18,366
Banks, Robin 17,095
Barch, A.M. 17,086
Barger, D.M. 4006
Barlett, C.J. 17,021
Barlow, R. 17,279
Baron, P. 16,797, 16,798
Baron, S. 15,440
Barr, N.L. 18,055
Barthol, R.P. 16,814, 17,222
Bartlett, R.G., Jr. 15,359, 16,907
Bartley, S.H. 16,128, 16,129, 17,085, 18,320, 18,323
Bass, D.E. 3916
Bastian, J. 16,881
Bauerschmidt, D.K. 16,206
Baxter, J.R. 15,360, 16,134, 16,327, 16,459
Beach, C.K. 4515
Beck, H.S. 18,364
Beck, J. 16,964
Becker, H.D. 16,995
Beckman, E.L. 15,385 16,137, 16,242, 17,112, 18,065
Bedford, T. 17,331
Beecroft, R.S. 16,891
Beeding, E.L., Jr. 16,573
Beeson, E.J.G. 16,707
Behar, I. 17,093
Bell, C.G. 16,466
Bell Helicopter Corporation 16,794, 16,795
Belleville, R.E. 16,757, 18,057
Bellman, R. 18,063
Bellows, R.M. 16,619, 16,620

Bendix Aviation Corporation 16,334
Bennett, E.M. 16,422
Bennett, G. 16,708
Benson, A.J. 15,425, 15,426
Beranek, L.L. 3467, 16,957
Berger, C. 16,618
Bergere, S.P. 16,474
Berman, M.L. 18,283
Berridge, H.L. 16,305
Berrien, F.K. 3926, 4325
Berry, C.A. 17,117, 17,146 17,147
Berry, F.B. 17,140
Berryman, R. 17,214
Beuter, N.C. 16,838
Bevan, W. 17,093, 18,325
Bhatia, B. 18,352
Bickle, A.J. 3883
Biersdorf, W.R. 15,430
Billingham, J. 17,232, 17,233, 17,333, 18,066, 18,067, 18,068
Billings, C.E., Jr. 17,269
Bilodeau, E.A. 2186, 2228
Bingel, A.G.A. 4390
Birdsall, T.G. 16,087, 16,443
Birmingham, H.P. 17,003
Birnbaum, A. 16,328, 16,581
Birzis, Lucy 16,473
Bishop, A.B. 16,097
Bishop, E.W. 16,645, 18,212
Bishop, G.H. 16,846
Bitterman, M.E. 3857
Bittini, Marcella 16,231, 16,969, 18,011, 18,020 18,027
Bixel, G.A. 18,070
Bjorksten Research Laboratories, Inc. 16,225
Bjurstedt, H. 17,230
Black, D.P. 15,320
Black, J.W. 1820, 16,354, 18,064
Blackwell, H.R. 18,070, 18,229
Blackwell, S.A. 16,230
Blair, W.C. 16,539, 18,059, 18,093
Blaise, P. 16,709, 16,710
Blanchard, W.G. 6557
Blatteis, C.M. 15,427, 16,019
Blethrow, J.G. 17,260
Bliss, W. 18,060
Blockley, W.V. 15,326
Bloom, A. 16,574
Bloom, R. 16,612
Blumberg, B.S. 18,126
Blyth, C.S. 16,175
Boardman, L.J. 16,792
Bobbert, A.C. 17,183
Bock, R.D. 16,876
Boeing Airplane Company 16,711
Bolt, Beranek and Newman, Inc. 3884, 16,806
Bolt, R.H. 3467
Bolton, Carolyn 17,158
Bommarito, C.L. 4026, 4685
Bond, G.F. 16,058
Bond, N.A., Jr. 2183, 3356 4255, 16,790
Bondurant, S. 6557
Boneau, C.A. 17,025
Bonner, R.H. 16,249
Borresen, C.R. 18,008
Bose, R.C. 16,906
Bosee, R.A. 16,512, 16,905
Botha, E. 16,351
Botwinick, J. 17,054
Bouman, M.A. 15,351, 16,599, 18,361
Bovard, R.M. 17,107
Bowen, H.M. 15,376, 16,370, 18,069
Bowen, J.H. 16,576
Boyle, A.J. 16,904
Boynton, R.M. 18,061, 18,223, 18,376
Bradford, C.E. 16,856
Bradley, J.V. 16,353, 16,977, 17,076, 17,164
Brandenburg, R.E. 4364
Brandt, W. 17,151
Braunstein, M. 18,058, 18,073
Brebner, J. 16,112
Breckenridge, F.C. 16,791
Breiman, L. 16,329
Brent, H.P. 17,141
Bridges, D.B.J. 4037
Bridgman, C.S. 4127, 4379
Brierly, W.B. 18,018
Briggs, G.E. 16,066, 16,099, 16,291, 16,338
Briggs, M.H. 17,240
Briggs, P. 18,053
Brinkley, J.W. 18,161
Brinley, J.F. 17,054
Brissenden, R.F. 15,428
Britton, J.H. 16,713
Broadbent, D.E. 16,153, 18,371
Brock, F.J. 16,571
Brody, Hilda R. 16,005
Brody, L. 16,484
Brogden, W.J. 50
Brokaw, L.D. 2159, 16,247
Bromer, J. 16,121
Brooks, F.A., Jr. 16,069, 17,004
Brooks, Virginia 17,248
Brown, B.P. 16,111, 16,714
Brown, F.A. 18,074
Brown, F.G. 3997
Brown, F.R. 3453
Brown, G.L. 16,182
Brown, I.D. 17,176, 17,184, 18,370
Brown, J. 16,947
Brown, J.L. 3989, 15,406, 16,246, 16,325, 16,712, 17,266
Brown, K.T. 3635
Brown, R.H. 4008, 4076, 15,407, 15,429, 16,414, 17,265
Brown, V. 17,340
Brown, W.L. 15,379
Brubaker, R. 16,075
Brunner, L.K. 18,054
Bryan, C.A. 17,109
Bryan, G.L. 16,339, 16,501, 16,790, 17,143
Bryden, M.P. 17,036
Buchanan, A.R. 16,471
Buchanan, D.A. 16,503
Buckhout, R. 16,139
Buckley, Barbara B. 3932
Buckner, D.N. 16,018, 16,021, 16,026, 16,639, 16,903
Buegel, H.F. 17,202
Buel, W.D. 17,079
Buettner, K.J.K. 16,502
Bulinkis, J. 15,398, 16,686
Buongiorno, J.A. 16,292
Burch, G.E. 16,902, 17,124
Burdick, R.L. 16,160
Burket, G.R. 16,051
Burns, N.M. 16,160, 16,161, 16,178, 16,179, 16,625, 16,789, 16,914
Burns, W. 16,413
Burnstein, E. 16,226
Burrows, A.A. 16,112
Bursack, W.W. 16,195
Busch, A.C. 16,208
Bush, W.R. 17,001
Bushey, T.J. 16,227, 16,324
Buskirk, E.R. 16,029
Buss, W. 16,245, 16,316
Butler, R.A. 16,126
Byers, Laura 17,202
Byers, R.H. 16,561, 16,602
Byrne, M.J. 339

Cacioppo, A.J. 16,258, 16,538, 16,624
Cacoullos, T. 16,901
Cafaro, J.A. 18,119
Caldwell, L.S. 15,404
Calfee, R.C. 17,099
California Institute of Technology 16,041, 16,071, 16,078, 16,081, 16,101
Callaway, E., III. 15,363 16,274, 17,020
Calvert, J.F. 108
Cameron, C. 16,109
Camp, R.T., Jr. 16,975
Campbell, D.T. 3933, 18,128
Campbell, F.W. 16,125
Campos, L.P. 17,249
Capp, L.J. 16,707
Cappon, D. 17,095
Carbery, W.J. 17,144
Carey, T.M. 17,141
Carhart, R. 3894, 4010
Carlson, L.D. 16,502
Carlson, Q.H. 4673
Carlson, W.S. 16,122
Carr, C.R. 18,010
Carrier, W.M. 16,869
Carroll, J.B. 3459
Carson, D.H. 15,415
Carter, C.V. 16,715
Carter, C.W. 17,314
Carter, E.T. 3415, 17,269
Cartolano, D.H. 16,949
Case Institute of Technology 16,070
Cassidy, M.D. 18,201
Celent, C. 16,016
Chadwick, E. 16,172, 18,113
Chaffee, J.W. 16,900
Challen, P.J.R. 17,326
Chambers, D.A. 17,218
Chambers, R.M. 16,207, 16,812
Chang, S.H. 4479, 16,277, 16,811, 16,859
Chang, S.S.L. 16,349, 16,810, 16,897, 16,898, 16,899
Chanmugam, J. 16,524, 16,669
Channell, R.C. 1140, 16,645
Chapanis, A. 16,038, 16,040 16,475
Chapman, K.M. 16,566
Chapman, R.D. 18,138
Charipper, B.A. 16,813
Charlesworth, G. 18,043
Chase, J.M. 17,018
Chase, R.A. 15,402, 15,403, 16,158, 16,468
Cheatham, D.C. 15,440
Cheatham, P.G. 16,083, 16,110
Cheatham, T.E., Jr. 16,896
Cheeseman, S.A. 17,259
Chenzoff, A.P. 16,406
Cherniack, N.S. 18,017, 18,263
Chernikoff, R. 16,609, 18,178
Chiang, C.L. 17,162
Chicago Medical School 16,297
Chiles, W.D. 16,156, 18,127
Chin, T. 16,918
Chinn, H.I. 3895, 3896, 4145
Chinn, K.S.K. 18,123
Chown, Sheila M. 18,301
Christal, R.E. 2159, 16,281, 18,124
Christensen, M.L. 15,397
Christensen, P.R. 2183, 16,340
Christie, A.W. 16,237, 16,238, 16,239, 16,240, 16,241, 16,264
Christie, L.S. 1857
Christman, R.J. 15,384, 16,244
Christner, Charlotte A. 16,056, 16,170, 16,561, 16,602, 18,156
Chu, J.T. 16,547
Church, S.A. 2226
Churchill, A.V. 18,117, 18,312
Churchill, E. 18,276
Churchman, C.W. 3927
Chwalow, M.L.E. 18,207
Cicala, G.A. 17,015
Ciccolella, J.A. 16,808
Clamann, H.G. 17,130
Clark, B. 4310, 16,462, 16,463
Clark, C.C. 16,493, 16,802, 16,807
Clark, C.E. 17,336
Clark, D.L. 16,350
Clark, F.C. 18,057
Clark, J.A. 17,226
Clark, K.E. 4482
Clark, R.K. 17,205, 17,223
Clark, R.T., Jr. 15,441, 16,956, 17,130
Clark, W.C. 16,455, 16,895
Clarke, A.B. 18,146
Clarke, F.R. 15,405, 16,087
Clarke, N.P. 6557
Clarke, W.V. 17,077
Clemedson, C-J. 17,228
Cleveland, J.M. 18,127
Clevenger, L.J. 18,054
Clifton, C.T. 3938
Close, P. 18,129
Coakley, J.D. 4387
Coburn, R. 16,177
Coburn, T.M. 18,043
Coermann, R.R. 17,258
Cofer, C.N. 18,125
Coffey, J.L. 16,703
Cogswell, J.F. 2747
Cohen, A. 16,497, 18,101
Cohen, B.D. 13,400
Cohen, E. 16,365
Cohen, J. 3929, 4371
Cohen, S.I. 18,118
Cohen, W. 16,011
Cole, E.L. 3986
Cole, J.N. 16,243
Coleman, H.J. 15,433
Coleman, P.D. 16,395
Coles, R.R.A. 17,060, 17,264
Collier, R.O., Jr. 18,328
Collins, L.R. 18,050
Collins, W. 17,022
Collins, W.E. 16,570, 16,967
Collison, H.A. 18,175
Colman, K.W. 16,423, 16,455, 16,895
Combs, J.J. 17,259
Comfort, Elizabeth 4005, 16,348
Comstock, C.C. 4409
Conard, R.A. 18,126, 18,130
Connelly, M.E. 18,115
Connelly, R.E. 16,491
Connor, J.A., Jr. 16,569, 17,268
Conover, D.W. 18,026
Consolazio, C.F. 16,718
Constantine, T.T. 18,116
Conticelli, M. 16,965
Contini, R. 16,141
Cook, K.G. 16,020, 16,356
Coombs, C.H. 16,228, 17,030, 17,189
Coombs, W.C. 16,633
Cooper, I. 18,106
Cooper, J.I. 16,037, 16,567
Cope, F.W. 16,229, 17,174
Copeland, Nola K. 18,194
Corbin, H.H. 16,005
Corkindale, K.G. 16,109
Cornog, D.Y. 16,589
Cornsweet, T.N. 16,540
Corso, J.F. 4007, 4020, 16,075, 17,209
Cosgriff, R.L. 16,291
Costello, C.G. 17,206
Cotes, J.E. 17,180
Cotterman, T.E. 16,564, 16,565
Cottrell, D.E. 16,633
Coules, J. 16,719
Coulter, N.A., Jr. 16,970
Courtney, D. 4050, 16,895
Cowan, G.E. 16,415
Cowan, P.A. 16,702

Cowen-Solomons, Hope B. 18,377
Crain, K.J. 15,398, 16,686, 16,974, 18,121, 18,180
Cramer, K.R. 16,522
Cramer, R.L. 16,582
Crampton, G.H. 16,416, 16,570
Crane, E. 16,330
Crawford, B.M. 16,720
Crawford, W.A. 16,234, 16,235, 16,236
Creamer, L.R. 17,168
Creaser, J.W. 18,368
Creelman, C.D. 15,362, 16,088, 16,154, 16,721, 17,061
Creer, B.Y. 16,568, 16,774, 17,256
Crispino, P.A. 16,722
Crist, B. 15,377, 18,101
Crittenden, R.L. 16,406
Crocker, J.F. 18,131
Crockett, Frances 17,158
Cronly-Dillon, J.R. 16,917
Crook, Dorothea J. 15,401
Crook, M.N. 16,498
Crossman, E.R.F.W. 18,302
Crow, E.L. 16,894
Crumley, L.M. 3425
Cumming, R.W. 16,327
Cunningham, C. 17,236
Curtis, T.T. 16,317
Cutting, Hazel E. 18,120

Daily, A.D. 16,076
Dale, H.C.A. 18,338
Dalziel, C.F. 16,563
Damon, A. 17,163
Danaher, J.W. 16,423, 16,455
Daniels, F.J., Jr. 4026, 4398, 4400
Daniels, G.S. 3924
Dantzig, G.B. 18,106
Das, Rhea S. 18,297
Davidoff, M.D. 18,317
Davidon, R.S. 16,251
Davidson, L.P. 17,099
Davis, C.G. 18,107
Davis, H. 3148, 16,494, 16,661
Davis, J.E 4037
Davis, J.M. 18,045
Davis, T.R.A. 16,065, 16,966
Davy, E. 18,216
Dawson, W.W. 18,322
Day, D.J. 15,385
Day, R.H. 16,134, 16,327
Dean, S.J. 4245
Dearnaley, E.J. 15,425, 15,426, 15,438
Decker, L.R. 15,350, 16,753, 17,066
Deese, J. 3932, 3990
deFlorez Company, Inc. 16,562
DeGroot, Sybil G. 16,370
DeHardt, Doris C. 16,129, 18,320, 18,323
DeHaven, J.C. 18,106
Deininger, R.L. 16,176, 17,002
Delhery, G.P. 16,632
Dellinger, J.H. 18,112
Dempsey, C.A. 3931
Dempster, W.T. 15,408
Dendle, H.J. 16,025
Denenberg, V.H. 250
Dennen, W. 15,371, 15,372
Dering, R.R. 16,586
Derksen, W.L. 16,632
Deuth, A.F. 2452
Deutsch, J.A. 18,305
Devoe, D.B. 16,015
Dewis, E.V.T. 17,037
Diamantides, N.D. 16,538, 16,624, 18,060
Diamond, A.L. 17,032
Dick, J.L. 17,104
Dickey, H.R. 16,856
Dickson, G.G. 18,108
Diehl, M. Joan 18,111
Ditchburn, R.W. 18,378
Dittmer, Dorothy S. 16,233
Dixon, N.F. 18,335
Dobie, Shirley, I. 13,400
Dobyns, R.M. 16,280
Documentation Incorporated 16,080
Dodson, G.W. 18,054
Doelling, N. 16,806
Dolansky, L.O. 4479
Dolch, J.P. 3921
Domey, R.G. 15,386, 16,172, 18,113
Donahoe, J.W. 17,156
Donahue, V.M. 17,001
Donaldson, R.T. 17,269
Donnell, A.M., Jr. 17,261
Dougherty, Dora 2220
Doughty, J.M. 16,135
Douvillier, J.G., Jr. 16,108
Doyle, W. 16,331
Drake, H.M. 16,464
Drazin, D.H. 16,107
Dreher, J.J. 15,390
Drenick, R.F. 17,103
Drillis, R. 16,141
Duerfeldt, C.H. 4300
Dugi, A.J. 3896
Dunham, C.L. 18,110
Dunlap and Associates, Inc. 16,036, 16,357
Dunlap, J.W. 16,294
Dunlop, J.M. 16,577
Dunning, G.M. 18,109
Duntley, S.Q. 16,723
Durkee, W.T. 16,382
Duva, J.S. 16,015, 16,719, 16,984
Duvall, D.P. 16,537
Dvorak, A. 15,387, 16,051
Dzendolet, E. 15,439

Eason, R.G. 16,119, 16,132
Eastwood, H.K. 17,146, 17,147
Eberhard, J.W. 16,423
Eckstrand, G.A. 3404, 18,379
Edgerton, H.A. 4426, 16,724, 18,309
Educational Research Corporation 16,147
Edwards, J., Jr. 4375
Egan, J.P. 15,410, 16,094, 16,095, 16,096
Eggleston, J.M. 15,440
Ehrenberg, A.S.C 18,299
Ehrsam, G.W., Jr. 16,332
Eichmeier, J. 16,805
Eiseman, B. 16,551
Eitzman, D. 16,297
Eldred, K.M. 16,243
Elkin, E.H. 15,392, 16,395
Elkind, J.I. 4136
Ellenhorn, M.J. 3935
Elliot, P.B. 15,409
Ellis, H.C. 18,310
Ellis, J.P., Jr. 15,441
Elwell, R. 17,207
Elworth, C.L. 18,061
Ely, J.H. 15,376, 18,069, 18,104
Emanuel, A.F. 16,490
Emanuel, I. 18,276
Engel, A. 17,114
Engen, T. 17,051, 17,212
Enoch, J.M. 16,014, 16,409, 16,410, 16,804, 17,316
Ercoles, Anna Maria 16,968, 18,027
Eriksen, C.W. 3959
Erlick, D.E. 18,103
Ernsting, J. 17,081
Ershoff, B.H. 4423
Erskine, D.G. 16,893
Essigmann, M.W. 4479
Estes, H.D. 17,084
Evans, R.N. 4029

Eysenck, H.J. 17,243, 17,254,
Eysenck, S.B.G. 18,324

Fairman, Jean B. 16,451
Fant, C.G.M. 16,957
Farina, A.J. 16,190
Farrington, A.D. 17,077
Fay, T.H., Jr. 16,158
Feddersen, W.E. 4464, 16,288, 18,266
Feder, C.A. 16,618
Feder, H.C. 18,102
Federman, P. 15,442, 16,034
Feinberg, M.R. 4426
Felton, W.W. 4440
Felts, W.J.L. 15,408
Fenichel, R.L. 16,189
Ferguson, H. 4133
Fernandez, C. 16,892
Ferrari, G. 16,102
Fich, S. 3913, 4470
Fields, M.E. 16,949
Fierston, S. 16,973
Fightmaster, W.J. 16,341
Fillenbaum, S. 17,023
Fine, B.J. 18,101
Finkelstein, Beatrice 16,647
Fiorentini, Adriana 18,027
First, Daphne 15,402
Firstman, S.I. 16,533, 17,282
Fisch, R.I. 17,091
Fischl, M.A. 16,004
Fisher, R.B. 18,100
Fitts, P.M. 50
Fitzgerald, J.B. 16,551
Fitzpatrick, J.T. 16,803
Flaherty, B.E. 18,090
Flanagan, J.C. 14,499
Flanagan, J.L. 16,630
Flehinger, Betty J. 17,277
Fleishman, E.A. 18,373, 18,396
Fletcher, Dorothy E. 15,406, 16,712
Fletcher, J.G. 17,173
Flight Safety Foundation, Inc. 16,452, 16,453, 16,521, 16,629
Flinn, D.E. 18,090
Flood, R. 16,824
Flores, I. 16,406
Fluhr, F.R. 16,253
Foley, P.J. 16,628, 17,037
Folger, J. 3413, 4014
Follettie, J.F. 16,408
Folley, J.D., Jr. 498, 3389, 4451, 4822, 16,333, 16,451
Forbes, A.R. 16,411
Ford, A. 18,375
Ford, T.R. 4337
Forsaith, B. 18,295
Forsyth, D.M. 16,084
Forsythe, J.B. 16,531
Fotheringham, W.C. 16,747
Fotis, S.W. 4014
Fourt, L. 18,089
Fowler, E.P., Jr. 16,158
Fox, G.A. 16,284, 16,286, 16,287
Fox, H.M. 16,725
Fox, R.E. 18,127
Fraenkel, A.S. 16,454
Frances, A.S. 15,411, 16,406
Frank, N.R. 16,698
Frank, P. 16,370, 16,951
Frankfort, M. 16,627
Franklin, G. 16,407
Frankmann, Judith P. 16,290
Franks, P.E. 16,534
Fraser, D.C. 3409
Freda, R.N. 15,370
Freedman, J.L. 17,190
Freedman, S.J. 16,050, 16,064, 16,726, 18,088
Freeman, H.F. 16,972
Freeman, M.B. 16,335
Freiberger, W.F. 16,336
Freiman, A.H. 17,144
French, R.S. 503
Frick, J.W. 16,340
Fried, C. 15,444, 16,381, 18,036
Friedman, M.P. 16,380
Fritz, E. 4440
Fritz, M.F. 3462
Fry, E.B. 16,339
Fry, G.A. 3629, 3993, 16,409, 16,410, 16,804
Fryer, D.I. 16,948
Fuch, F.L. 3919
Fuchita, K. 16,787
Fuchs, A.H. 18,087
Fuchs, L.A. 16,535
Fucigna, J.T. 4387
Fullington, R.W. 16,368
Furchtgott, E. 16,380
Furer, M. 3253
Furnish, C.W. 16,534

Gaarder, K. 16,343
Gabel, W.C. 15,408
Gabriel, K.L. 16,301
Gael, S. 16,347
Gaeth, J.H. 4010
Gagne, R.M. 2228
Gaito, J. 17,106
Galanter, E.H. 17,139
Galloway, F.T. 16,126
Ganem, G. 16,719
Gardner, B. 17,204
Gardner, J.F. 3987
Gardner, L.A., Jr. 16,379
Gardner, M.S. 18,181
Gardner, R.A. 16,531
Gardner, R.S. 16,894
Gardner, R.W. 17,089, 17,096
Gardner, W.J. 17,262
Garner, J.D. 17,260
Garner, W.R. 15,415, 16,131, 18,333
Garvey, W.D. 17,167
Gaske, M.C. 17,104
Gaskill, H.V. 16,971
Gastaut, H. 17,127, 17,129
Gaylord, R.H. 16,190
Gazis, D. 17,280
Gebel, R.K.H. 16,950
Gebhard, J.W. 16,671, 18,224
Gee, Helen H. 4482
Geldard, F.A. 17,293
Gell, C.F. 17,145
General Electric Company 16,952
George Washington University 16,293, 16,727
Gerathewohl, S.J. 16,385, 16,902, 17,124
German Science Bulletin 16,063
Gerstner, H.B. 15,375
Geschwind, N. 17,285
Gibbs, C.B. 16,386
Gibson, C. 17,127
Gibson, J.F., Jr. 16,233
Gibson, J.J. 3442, 16,650
Giesecke, A.H., Jr. 17,148
Gifford, E.C. 16,178 16,625, 16,789, 16,914
Giles, C.G. 18,034, 18,038
Gillespie, K.W. 4005
Gilley, P.F.M., Jr. 15,335
Girard, F. 16,449
Givens, M.B. 382
Glanville, W.H. 17,339, 18,042
Glanzer, M. 16,358
Glaser, R. 16,136
Glassner, H.F. 16,001, 16,047
Glenn, W.A. 16,635
Glicksman, A.S. 16,662
Glorig, A. 17,071
Gluss, B. 17,282
Godshall, J.C. 16,492

Goffard, S.J. 16,891
Gold, J. 16,976
Goldbeck, R.A. 18,086
Goldberg, B. 18,019
Goldberg, M.N. 15,326
Goldberger, L. 16,120
Goldiamond, I. 16,383, 16,412
Goldman, D.E. 16,378
Goldman, M. 18,314
Goldman, R.F. 16,203
Goldstein, M.H., Jr. 16,890
Goldstein, R. 16,494
Gollin, E.S. 17,201
Goodall, McC. 18,283
Goodman, S.L. 3446
Goodson, J.E. 17,149, 18,085
Goodyear Aircraft Corp. 4438
Gordon, B.B. 16,384
Gordon, D.A. 3420
Gordon, H.C. 16,638
Gordon, J.J. 16,834, 16,889, 16,978
Gordon, N.B. 3438
Gottsdanker, R.M. 16,013
Graham, C.H. 16,847
Grant, D.A. 2178, 3436, 3998, 3999
Grant, G. 16,075, 16,637, 16,799, 17,209
Grave, C., II. 15,378, 16,888
Graveline, D.E. 16,469
Gray, R.F. 16,802, 16,807, 16,887, 17,108
Graybiel, A. 4310, 16,461, 16,462, 16,463, 17,138
Greek, D.C. 18,084
Green, B.F., Jr. 17,102, 18,341
Green, Christine R. 16,830
Green, D.M. 16,142, 16,782, 16,996
Green, H.C. 17,259
Green, I.D. 17,081
Green, N.E. 16,530
Greenberg, B.G. 16,640
Greenberg, G.Z. 15,410, 16,094, 16,096
Greenblatt, M. 16,064
Greene, J.W. 16,975
Greenhill, L.P. 16,537
Greenlee, J.A. 3462
Gregg, L.W. 18,242
Gregson, R.A.M. 18,300
Greider, H.R. 15,396
Grier, G.W., Jr. 4440
Grim, H.L. 16,279
Grime, G. 18,037, 18,038
Grings, W.W. 452, 3356, 3367, 3371, 4255
Griswold, Victoria S. 16,044, 16,048
Grunebaum, H.U. 16,064
Grunzke, M.E. 16,615, 16,757, 18,057
Grutzmacher, Dr. 16,816, 16,817, 16,840
Gschwind, R.T. 15,327
Gualtierotti, T. 16,295
Guedry, F.E., Jr. 16,461, 16,529
Guerre, C.L. 16,263
Guignard, J.C. 15,328, 17,231
Guilford, J.P. 2183, 16,340
Gulledge, Irene S. 18,227
Gulliksen, H. 16,450, 16,585
Gustafson, C.E. 16,377
Gutberlet, C. 18,153
Guttman, N. 15,384
Gyr, J.W. 18,339

Haase, R.H. 16,661
Hagensick, P.W. 18,340
Hahn, W.H. 16,925
Hahn, W.W. 16,146
Haight, F.A. 15,365, 15,366, 15,367, 15,368, 15,369
Hainsworth, T.E. 16,062
Hale, F.C. 15,329
Hale, H.B. 17,110
Hale, J.K. 16,387
Hall, A.L. 17,142
Hall, F.G. 4039
Hall, J.F., Jr. 4375, 18,083
Hall, N.B. 18,104
Halverson, R.C. 17,148
Hammel, H.T. 18,082
Hanes, L.F. 16,061, 16,062
Hanes, R.M. 3932, 16,671
Hanna, T.D. 16,783, 17,106
Hanson, J.A. 16,513, 16,514, 16,515, 16,516, 17,211
Hanson, S.W.F. 17,237
Harabedian, A. 16,018, 16,021, 16,026, 16,903
Harac, S. 16,691, 16,928, 16,929
Harashima, O. 16,787
Harbold, G.J. 15,364
Harcum, E.R. 16,009, 16,886
Harding, F.D. 18,124
Hardt, H.D. 16,282, 16,287, 18,284
Hardy, D. 17,087
Hardy, J.D. 3253, 16,636, 16,802, 16,883, 16,884, 16,885
Harford, E.R. 15,334, 16,371, 18,151
Harker, G.S. 15,416
Harley, W. 16,613
Harootunian, B. 18,329
Harper, R.B. 16,499
Harris, A.J. 16,237
Harris, B. 16,810, 16,897, 16,898, 16,899
Harris, J.D. 732, 16,882, 18,080
Harris, J.L. 16,007, 16,446
Harris, S.J. 18,307
Harris, W. 16,639
Harris, W.P. 18,081
Harrison, J.O., Jr. 16,784
Harrison, S. 16,877
Hart, H.C. 17,160
Hart, W.M. 16,127, 16,199
Hartenberg, R.S. 108
Harter, H.L. 18,079
Hartline, H.K. 18,076, 18,077, 18,196
Hartman, B. 16,469
Hartshorne, F.A. 16,801, 18,031
Hartwig, Q.L. 16,367
Harvey, O.J. 16,447
Harvey, S. 15,403
Harvey, W.J. 4685
Hasler, S.G. 2220
Hatton, R. 15,398, 16,686
Haugen, Ruth 16,696
Hauptschein, A. 16,810, 16,897, 16,898, 16,899
Hauser, H.F. 16,003
Hauty, G.T. 4144, 4147, 4392, 4393, 15,419, 17,047, 18,090
Haverland, E.M. 16,341
Hawkes, G.R. 16,187, 16,518, 16,519, 16,880, 18,211, 18,239, 18,319, 18,321
Hawley, M.E. 16,826
Hawrylewicz, E.J. 18,078
Hayes, J.R. 16,022
Hayes, R.E. 16,647
Haynam, G.E. 16,547
Hays, E.L. 16,512
Headle, H.W. 16,278
Headley, R.N. 16,988, 18,161
Healy, J.W. 18,160
Heathcote, C.R. 17,291
Hebb, D.O. 17,035
Heermann, E. 17,021, 18,028
Hegenwald, J.R., Jr. 16,785
Heim, H.C. 16,471
Heimstra, N.W. 16,891, 18,331
Heinemann, E.G. 16,130
Heinle, D.R. 16,108
Heinz, J.M. 16,466

Hekhuis, G.L. 17,117
Held, R. 16,726
Helson, H. 17,058
Henderhan, R.C. 16,747
Henderson, P. 16,825
Hendler, E. 16,520
Henneman, R.H. 3968, 16,010, 16,376, 18,159
Henry, E. 16,407
Henry, F.G. 18,158
Henschel, A. 4146a, 4146b
Heriot, J. 15,392
Herman, I.L. 2226
Herman, R. 17,280
Heron, A. 18,301
Heron, W. 17,035
Herrick, R.M. 16,189
Hershgold, E.J. 15,417, 17,150
Hertzman, A.B. 3468, 15,397
Hickish, D.E. 17,271, 17,326
Hicks, S.A. 15,383, 16,254, 18,208
Higham, T.M. 18,296
Hildreth, K.M. 16,298
Hill, A.V. 17,283
Hill, E.B. 18,157
Hill, J.F. 17,148
Hill, J.H. 3926, 16,375
Hillix, W.A. 17,053
Hilton, D.A. 16,786
Hirai, S. 16,787, 16,788, 16,822
Hirao, T. 18,388
Hirsch, R.S. 281
Hiss, R.G. 17,083
Hitch, C. 17,281
Hitchcock, F.A. 17,269
Hitt, W.D. 16,384, 17,297, 18,156
Hoban, C.F. 16,824
Hobbs, C.F. 16,823
Hochberg, J. 17,087, 17,248
Hock, R.J. 17,137
Hodge, J.W., Jr. 16,342 18,192
Hoffman, D. 16,627, 16,810, 16,897, 16,898
Hofstetter, E. 18,238
Hofstetter, H.W. 4080
Hogan Laboratories, Inc. 4436
Hoger, D.T. 16,188
Holcomb, G.A. 16,510, 16,511, 17,126
Holden, G.R. 16,775
Holland, H. 17,243, 17,254
Holland, H.H., Jr. 16,374
Holland, J. 16,448
Holleman, E.C. 16,910
Holmes, D.W. 4037
Holmquist, S. 16,012
Holstein, D. 17,166
Holt, R.R. 16,120
Hoover, G.W. 17,235
Hopkins, C.O. 16,206
Hopkinson, R.G. 17,175
Hori, S. 16,255
Hornbaker, D.R. 16,517
Horne, E.P. 16,002, 17,160
Horrocks, J.E. 18,028
Horst, P. 15,418, 16,023, 16,052
Horvath, W.J. 18,198
Hosford, J.E. 17,278
House, A.S. 16,466, 16,866
House, H.A. 4298
Hovland, C.I. 17,101, 18,349
Howat, R. 16,646
Howe, R.M. 18,155
Howell, W.C. 16,099, 16,338, 18,243
Howes, D.H. 4383
Howland, D. 15,420, 16,098
Hsia, Y. 16,847
Hsieh, H.C. 16,505
Hubbard, H.H. 16,786
Huebner, D.L. 18,213
Huff, W.W., Jr. 16,715
Huffman, Lois L. 16,457, 16,703
Hufford, L.E. 16,577
Huggins, W.H. 4330
Hughes Aircraft Company 18,021
Hughes, T.L. 18,066
Humphrey, J.E. 3462
Humphreys, C.M. 18,153
Humphreys, L.G. 17,026
Humphries, M. 16,670, 17,088
Hunka, S. 18,372
Hunt, E.B. 17,101
Hunter, L. 17,279
Hurvich, L.M. 18,225, 18,234
Hurwitz, H.M.B. 18,022
Hussman, T.A., Jr. 18,055
Huston, R.H. 18,097
Hutchins, B.S. 16,535
Hutchison, G. 16,537
Hyde, A.S. 18,017
Hyland, J.J. 4297
Hyler, J.H. 18,206
Hyman, A. 16,346, 16,373
Hynek, J.A. 16,879
Iampietro, P.F. 15,338, 15,347, 16,029, 16,979
IBM Data Processing Division 16,053
IBM Research Center 16,256, 16,257
Ihrig, N. 3993
Ikai, M. 16,586
Imalis, O. 18,153
Imber, B.M. 4378
Imus, H. 50
Indow, T. 17,049, 17,050
Ingram, W.T. 16,998
Inoue, S. 17,064
International Business Machines Corporation 16,222
Iocca, L.J. 16,856
Ireland, R.G. 18,129
Ireson, W.G. 16,444
Irvin, H.D. 16,165
Irvine, T.F., Jr. 16,522
Isaac, G.J. 16,559, 16,911
Itek Corporation 16,445
Ittelson, W. 16,989
ITTL Avionics Laboratory 16,221
Iwanski, E.C. 16,878
Jackson, K.F. 17,234
Jackson, Margaret M. 16,507
Jacobius, A.J. 16,728
Jacobs, Edith 17,113
Jacobs, G.J. 16,729
Jacobs, H.I. 17,135
Jacobs, H.L. 16,506, 17,207, 17,227
Jacobson, H. 15,332
Jacobson, J.E. 18,152
Jacobson, S.L. 17,105
Jacoby, Joan E. 16,877
Jainski, P. 16,704, 16,818, 16,819, 16,820, 16,821
Jameson, Dorothea 18,225, 18,234
Jampolsky, A. 18,168, 18,169
Jarrard, L.E. 17,044
Jeffress, L.A. 4464
Jeffrey, T.E. 16,186
Jenkins, G.M. 16,524, 16,669
Jenkins, J.J. 4017
Jenkins, J.P. 16,174
Jenkins, W.L. 3984
Jenkins, W.O. 15,331
Jensen, B.T. 17,318
Jensen, G.D. 17,200

Jensen, R. 16,834, 16,889, 16,978
Jerger, J.F. 15,333, 15,334, 16,371, 16,525, 17,070, 18,151
Johannsen, Dorothea E. 18,357
Johansson, G. 16,033
John I. Thompson & Company 16,509
Johnson, E.A. 17,276
Johnson, E.S. 15,330
Johnson, G.E. 16,388
Johnson, H.I. 16,111, 16,714
Johnson, J. 18,205
Johnson, R.E. 16,958
Johnson, R.H. 4142, 16,526
Johnson, S.M. 18,106
Johnson, W.H. 16,461, 17,120
Jones, E.I. 2186
Jones, Edna M. 16,451
Jones, E.R. 16,527
Jones, F.N. 16,587, 18,241
Jones, F.P. 15,335, 17,211
Jones, G.M. 16,138, 17,136
Jones, L.V. 15,330, 16,186, 16,876
Jones, M.B. 16,875, 18,085
Joseph, R.D. 16,523
Jowdy, F.J. 18,281
Joyce, W. 16,874
Judd, D.B. 18,235
Jurtshuk, P., Jr. 17,116
Jutila, S. 16,684
J.W. Fecker, Inc. 16,532

Kaehler, R.C. 16,730
Kaess, W. 17,043
Kaiser, H.F. 17,031
Kalaba, R. 18,063
Kallenbach, W. 16,816, 16,817
Kalustyan, B.C. 16,651, 16,653, 16,689, 16,691, 16,857, 16,928, 16,929
Kamen, J.M. 16,668, 18,164
Kamiya, S. 16,997
Kanareff, Vera T. 16,981
Kanazawa, K. 17,050
Kaplan, I.T. 17,191, 18,374
Karlin, L. 16,389
Karpovich, P.V. 16,586, 16,731
Karr, A.C. 3984
Kasparek, Catherine F. 16,369
Kaufman, H.M. 16,539
Kaufmann, M.I. 17,275
Kaufmann, R.A. 17,275
Kaune, H. 16,862
Kause, R.H. 16,258
Kawabata, H. 15,373
Kay, E. 18,086
Keating, D.A. 16,543, 18,149
Keatinge, W.R. 16,259
Keesey, U.T. 16,541
Kekcheev, N.Kh. 16,980
Kelley, C.R. 15,376, 16,000, 16,370, 18,069, 18,148
Kelley, R.L. 4375
Kelly, E.L. 16,124
Kelly, J. 15,371, 15,372
Kelly, P.J. 16,181
Kelly, R.B. 16,148, 17,001
Kelsey, Patricia A. 741
Kemler, Dorothy K. 16,422
Kempthorne, O. 16,210
Kendler, H.H. 4035, 15,234
Kenk, R. 16,728
Kennedy, O.W., Jr. 16,544
Kennedy, R. 16,461
Kenneway, A.J. 18,120
Kenshalo, D.R. 18,322
Kent, D.C. 16,698
Kereiakes, J.G. 18,015
Kerle, R.H. 18,107
Kerslake, D.McK. 5876, 18,067, 18,068
Keys, A. 4146a, 4146b
Kidera, G.J. 16,736, 17,138
Kiehl, P.F. 16,542
Kiessling, R.J. 16,733
Kiley, L.A., Jr. 17,104
Kilmer, W.L. 16,508
Kimble, G.A. 3445
Kimeldorf, D.J. 16,438
Kimmel, H.D. 17,055
Kincaid, W.M. 18,146
King, B.G. 16,676
King, G.F. 17,226, 17,249
King-Ellison, Patricia 4017
Kinney, M.S. 18,145
Kirsch, H.A. 11,176
Kitzes, G. 16,308
Kleeman, C.R. 3916
Klein, S.J. 15,370, 15,396, 17,139
Klem, Laura 16,855
Klemmer, E.T. 17,219, 18,134
Klingberg, C.L. 18,061
Kliphardt, R.A. 108
Klumpp, R.G. 18,144, 18,269
Knapp, R.R. 16,734
Knauf, G.M. 17,152
Knight, J.J. 17,060, 17,264
Knoll, H.A. 18,231
Kobayashi, M. 16,787
Kobrick, J.L. 3645, 15,377
Kohler, H.M. 18,000
Kolers, P.A. 16,028
Konecci, E.B. 18,143
Koomen, M.J. 18,227
Kopra, L.L. 16,368
Kopstein, F.F. 18,379
Korbel, H. 16,489
Korotkin, A. 16,589
Koski, T.H. 16,735
Kossuth, L.C. 17,084
Kountz, J.C. 18,142
Kraft, J.A. 16,260
Krasno, L.R. 16,736
Kraus, R.N. 17,270
Krauskopf, J. 3857, 16,540
Kreider, M.B. 15,338, 15,347, 16,979
Krendel, E.S. 18,358
Kresse, F.H. 18,141
Kristal, J. 16,330
Krug, R.E. 18,028
Kruglak, H. 81
Kryter, K.D. 16,220, 16,345, 17,062, 18,140
Krzywicki, H.J. 16,276, 16,911
Kubzansky, P. 16,043
Kudrna, J. 17,272
Kuehnel, H.A. 15,337
Kuhns, Margaret P. 3989
Kulp, C.M. 15,357
Kunze, A.A. 16,999
Kupferberg, S. 16,815
Kydd, G.H. 16,189
Kyrazis, D.T. 16,243

Laboratory for Electronics, Inc. 16,486
Laboureur, P. 17,129
Lacey, O.L. 18,316
Lacey, R.J. 3987, 4388
Lamb, L.E. 16,476, 17,083, 17,138, 17,259
Lamphiear, D.E. 16,443
Landahl, H.D. 16,185
Landau, M. 16,989
Landis, C. 18,356
Lane, J.C. 16,134, 16,327, 16,459
Laner, S. 18,298
Laney, S.G. 15,378
Langevin, R.W. 16,943, 17,145
Langham, W.H. 16,200
Lansberg, M.P. 17,229
Lanzetta, J.T. 16,981
LaPorte, H.R., Jr. 16,790, 18,209
Larson, L.V. 18,139

Lathrop, R.G. 15,378, 16,032, 16,305
Lauer, J.M. 16,337
Laug, E.P. 18,138
Laurent, A.G. 16,946
Lauver, L.S. 16,529
Lavery, J.J. 15,361
Lawley, D.N. 18,337
Lawrence, K.A. 16,430, 16,440, 16,441, 16,916
Lawton, J.G. 16,995
Layman, R.S. 16,056
Laymon, R.S. 16,157
Lazo, J. 16,162, 16,914
Leach, W.G. 17,109
Lederer, L.G. 17,138
Ledley, R.S. 17,274
Lee, E.M. 16,784
Lee, Marilyn C. 17,129
Lee, W.A. 3964, 3967
Leffingwell, T.P. 16,367
Legget, R.F. 17,073
Lehmann, W.P. 16,667
Leiderman, P.H. 16,043
Leininger, H.V. 18,138
Lenger, V.J. 17,272
Leonard, J.L. 18,050
Leondes, C.T. 16,505
Leone, F.C. 16,547
Lerner, R.M. 16,868
Lesiw, W. 4362
Letts, M.H. 16,896
Levenspiel, O. 17,207, 17,227
Levin, W.C. 15,375
Levine, R.B. 16,546
Levy, E.Z. 16,388
Levy, L.H. 17,196
Lewandowski, L.J. 16,076
Lewis, D. 505
Lewis, H.E. 17,173
Lewis, J.S. 16,215
Lewis, J.T., III. 17,197
Lewis, W.G. 16,265
Lichte, W.H. 16,304, 18,008
Licklider, J.C.R. 2029, 15,384, 17,000, 17,262
Lieberman, B. 18,347
Lieberman, P. 17,065
Lightfoot, C. 3894, 4010
Lind, A.R. 17,332
Lindberg, E.F. 16,988
Lindberg, R.G. 16,545
Lindblom, C.W. 18,201
Lindquist, S.E. 18,137
Lindsay, J.R. 16,892, 18,136
Lindsley, D.B. 18,135
Lipman, R.S. 17,210
Lippold, O.C.J. 17,181
Lit, A. 15,380, 16,183, 16,738, 17,052
Litterer, J.A. 18,336
Little, E.A.J. 16,153, 18,371
Livingstone, R.E. 16,184
Llewellyn-Thomas, E. 16,113, 16,548
Lloyd, K.E. 16,945
Lloyd, V.V. 18,356
Lockhead, G.R. 18,134
Loeb, M. 15,381, 15,382
Logan, R.K. 16,477
Logie, L.C. 15,379, 18,074
Loh, Z.N. 18,133
Lokatos, G. 18,161
Lomax, M.A. 17,327
Long, E.R. 3964, 3967, 3968
Long, R.I. 4458, 4459, 17,089, 17,096
Losee, J.E. 16,292
Louttit, R.T. 16,008
Lovell, F.W. 16,267, 16,755, 17,115
Lovell, G. 5880
Lowi, B.H. 15,370
Lowrey, A. 18,130
Lubin, A. 16,745, 17,009
Luce, R.D. 1857, 4517
Lucier, R.O. 16,739, 16,824
Ludvigh, E. 2243, 18,132, 18,232
Luebbert, W.F. 16,740
Luff, Ruth K. 339
Luft, U.C. 3415
Luria, S.M. 15,339, 18,363
Lusted, L.B. 17,274
Lyman, J. 4400, 15,340, 16,442, 16,593, 18,264

MacCanon, D.M. 16,297
Macdonald, H.E. 18,130
Macek, A.J. 17,090
Machol, R.E. 16,555
Mack, J.D. 15,423
MacKenzie, B. 17,102
Mackie, R.R. 3923
Mackworth, N.H. 16,012, 16,113, 16,548, 16,646, 18,287, 18,389
Macneilage, P.F. 16,397
Madden, J.M. 16,261, 16,262, 16,281, 16,550, 16,961, 18,124, 18,294
Madden, W.F. 18,282
Maddon, J.F. 16,785
Maddox, R.L. 16,741
Madison, R.L. 3462
Madson, R.A. 16,296
Magid, E.B. 17,258
Magwire, C. 3946
Malcolm, D.G. 17,335
Malette, W.G. 16,551
Maliszewski, T.F. 3916
Mallett, F. 16,874
Mallick, D.L. 15,428, 16,465
Malmo, R.B. 16,742
Managan, R.F. 18,161
Mancinelli, D.A. 16,556
Mann, H.B. 18,289
Mann, I. 18,292
Maradudin, A. 17,280
Marchbanks, V.H., Jr. 17,121
Marcus, N.D. 16,722
Marg, E. 18,168, 18,169
Margaria, R. 16,295
Marill, T. 16,130
Marko, A.R. 16,549
Marks, M.R. 16,430, 16,439, 16,440, 16,441, 16,915, 16,916
Marks, R.L. 16,999
Marrow, E. 16,728
Marshall, H.W. 16,988
Marshall, L.M. 17,099
Martel, R. 15,371, 15,372
Martin, R.J. 17,142
Mason, L.J. 16,457, 16,703
Massachusetts Institute of Technology 4003, 16,072
Mast, G.M. 4009
Masterson, J.E. 16,718
Matheny, W.G. 2220, 16,282, 16,284, 16,287, 16,919, 18,001, 18,267, 18,284
Matlin, A.H. 16,743
Matsuo, T. 16,944
Mattson, R.L. 18,291
Mauch, H.A. 16,490, 16,666
Maue, E. 16,417
Mayeda, W. 16,831
Mayer, Sylvia R. 4522
Mayes, W.H. 16,786
Mayo, A.M. 16,554
McAbee, W.H. 16,032
McBride, Patricia I. 15,401, 18,357
McBride, W. 16,417
McCaffrey, J.A. 16,675
McCleary, R.A. 4142, 5385
McColgin, F.H. 18,360
McCollom, I.N. 15,341 16,674
McConnaughey, W.E. 16,193
McConnell, D. 17,048
McConnell, H.J. 18,138
McCormack, P.D. 16,133, 18,286

McCormick, E.J. 16,959, 16,960, 17,011, 18,288
McCourt, F.P. 18,217
McCourt, W.F. 18,045
McCrary, J.W. 16,603
McDermid, C.D. 16,611
McDonald, D.G. 16,146, 16,925
McDonald, J.E. 16,830
McElroy, Jane 16,310
McFadden, E.B. 17,260, 17,317
McFarland, R.A. 15,386, 16,172, 16,642, 17,163, 18,113
McFarland, R.L. 17,205, 17,223
McGeary, I.D. 3895
McGill, T.E. 17,251
McGill, W.J. 16,006
McGinn, J.W. 18,290
McGrath, J.E. 16,027, 16,167, 16,174
McGrath, J.J. 16,018, 16,021, 16,026, 18,051, 18,052
McGreevy, J.M. 16,632
McGuigan, F.J. 17,158
McHugh, P.G. 16,811
McIntosh, B.B. 3986, 4126
McKendry, J.M. 16,075, 16,637, 16,799, 17,209
McKenzie, R.E. 16,469
McKinzie, P.S.L. 16,718
McLaughlin, J.T. 16,439, 16,915
McLean, J.D. 16,108
McMahan, C.A. 4014
McMaster, R.C. 4037
McMichael, H. 17,115
McNamara, H.J. 17,091
McNaughtan, I.I. 15,385
McNutt, D.C. 17,112, 18,065
McReynolds, Jane 2199
McRuer, D.T. 16,117, 16,263, 16,583
Mead, L.C. 18,215
Meade, F. 17,180
Mednick, S.A. 17,190
Meehan, J.P. 16,730, 16,829, 17,113, 17,151
Meister, D. 16,077
Melton, A.W. 16,066
Meltzer, H. 15,343, 15,344, 17,224
Melville, G.S., Jr. 16,367
Mendelson, E.S. 17,114
Mendelson, J. 16,043
Merenda, P.F. 17,077
Merlock, N. 18,119
Merrifield, P.R. 16,340
Merrow, C.M. 18,158
Messick, S. 16,450
Meyer, D.L. 18,328
Meyer, D.R. 17,194
Meyer, L.M. 18,126, 18,130
Meyers, H.C., Jr. 3924
Michael, W.B. 18,372
Michaels, R.M. 18,318
Michel, E.L. 16,366, 16,943, 17,145
Mickelsen, O. 4146a
Middleton, D. 5881
Mikaelian, H. 17,094
Milano, J.E. 4515
Milch, L.J. 3896
Miles, S. 17,334
Miles, W.R. 3148
Miller, A.J. 16,828
Miller, A.W., Jr. 16,393
Miller, C.C. 16,499
Miller, Caryl-Ann 17,051
Miller, G.A. 16,054
Miller, I. 16,365
Miller, J.G. 3353, 17,213, 17,225, 18,008
Miller, J.W. 17,149, 18,132
Miller, Norma D. 3970
Miller, R.B. 364, 498, 2418, 3338, 3389, 4451, 4822, 16,553
Miller, W.H. 18,196
Mills, A.W. 15,388
Mills, B.J. 16,827
Mills, R.A. 15,326
Milton, J.L. 3986
Minas, J.S. 18,173
Minor, F.J. 15,349
Minot, O.N. 16,420
Minsky, M. 16,392
Miskolczy-Fodor, F. 17,067, 17,068
Misrahy, G.A. 16,298
Mitoma, C. 16,473
Moler, C.G. 16,182
Mollenkopf, W.G. 4254
Molony, D.A. 3913, 4470
Momiyama, T.S. 16,942
Monahan, T.I. 16,632
Montague, R. 16,953
Montague, W.E. 16,202
Monroney, R. 16,544
Montana, D.M. 18,002
Monty, R.A. 16,941
Moody, D.J. 16,836
Mooney, C.M. 16,683, 16,744
Moore, F. 6557
Moore, J.V. 661
Moore, R.L. 16,238, 16,264
Morant, R.B. 17,092, 17,094
Morgan, K. 16,899
Morgan, R.L. 3404, 3631, 18,379
Mori, F. 16,990
Mori, Gina F. 16,616, 16,982, 16,991
Morin, R.E. 2178, 3436, 18,315
Morrill, C.S. 17,010
Morris, Ailene, 16,002, 16,265, 16,390, 16,391
Morris, D.F. 17,313
Morris, G.O. 16,745
Morrison, Nina K. 16,663
Morse, H., III. 16,544
Morton, A.S. 16,149
Moser, H.M. 15,390, 16,746, 16,747, 16,993
Mosley, J.D. 16,573
Mowbray, G.H. 18,224, 18,306
Muckler, F.A. 15,342, 16,672
Mudd, S.A. 17,011, 18,288
Mueller, G.C.E. 17,257
Mueller, H.F. 17,218
Mueser, Gayle E. 16,848, 17,041, 17,042
Muhlick, L. 15,387
Mukherjee, B.N. 17,080, 17,215
Muller, K. 18,174
Mullin, A.A. 16,424
Mungall, R.G. 16,111
Murch, K.R. 16,927
Murdock, B.B., Jr. 17,034
Murdock, R. 18,120
Murnin, J.A. 16,537
Murphy, D.B. 16,941
Murrell, K.F.H. 17,179, 17,187, 18,295
Myers, J.L. 17,193
Myers, R. 17,194
Myers, T.I. 16,941

Naas, D.W. 16,217
Nachman, M. 4048
Nadel, A.B. 3460
Nafe, J.P. 18,322
Nagle, R.E. 17,081
Naka, F.R. 18,000
Nall, M.L. 15,345, 15,346, 18,202
Namikas, G. 17,057
Nanni, L.F. 3913, 4470

Nareff, M.J. 16,437
Nash, Myrtle C. 17,058
National Science Foundation 16,320
Naval Research Reviews 13,441 16,074
Nawratzki, I. 18,168
Neel, R.G. 4492
Neely, K.K. 4528, 4791, 16,843
Neff, W.D. 3148, 18,137, 18,177
Nehrich, R.B., Jr. 16,477
Neil, C.McK. 16,833
Neisser, U. 16,218, 16,344
Nelms, J.D. 16,268
Nelson, R. 15,392
Nelson, R.T. 16,685
Nelson, T.M. 17,085, 18,320, 18,323
Newell, A. 16,163, 16,213
Newell, H.E., Jr. 17,017
Newman, E.B. 16,054, 16,055
Newman, M.M. 16,698
Newman, R.B. 3467
Newman, R.W. 4399
Newquist, E.A. 18,201
Newsom, B.D. 16,438
Newton, G. 18,331
Newton, J.M. 17,315
Nichols, I.A. 2199
Nicholson, J.F. 16,217
Nicholson, Marjorie A. 4310
Nickerson, J.F. 16,393
Nickerson, R.S. 16,984
Nickson, J.J. 16,662
Nicoletti, I. 16,231, 16,232
Niehl, Elizabeth W. 16,591
Nieset, R.T. 16,299
Nims, R.M. 16,276
Noble, C.E. 370
Noble, Rosalie 16,625
Noiseux, D. 18,140
Nordlie, P.G. 16,027
Nordø, J. 18,280
Noriega, V. 18,281
Norman, P.S. 15,347
Norman, R.D. 18,007
Northrop, D.S. 546
Northwood, T.D. 17,073
Norton, C.P. 17,261
Norton, J.R. 16,661
Notterman, J.M. 17,015, 18,200
Novick, Lee 18,073
Nowak, Elaine 18,157
Nowlis, V. 16,436
Nutt, A.B. 4686
Nyrop, D.W. 2182, 2190, 2234, 2251
Nystrom, C.O. 2178, 3998, 3999

Oberg, W. 18,326
Obermayer, R.W. 16,672
Oberst, F.W. 4409
O'Brien, B. 3898, 3970
O'Clair, F.R. 18,024
O'Connell, M.H. 16,472
O'Connor, W.F. 18,199
Odell, T.T., Jr. 16,216
Ogawa, J. 16,660
O'Hare, J.E. 4673
Oldfield, R.C. 18,303
Olds, E.G. 16,215
O'Neill, J.J. 15,390
Onley, Judith W. 18,061
Openshaw, J.W. 16,891
Ormond, Elizabeth 3990
Ornea, J.C. 17,290
Ornstein, G.N. 18,373
Orr, K.D. 3935
Osburn, H.G. 17,009
Ostwald, P.F. 18,332
Oswald, I. 17,159
Otis, L. 16,473
Overall, J.E. 15,379
Owen, D.B. 16,557
Oyama, T. 16,421, 17,192
Oyer, H.J. 16,747

Page, C.M., Jr. 18,097
Page, D.E. 17,015
Page, J.K. 17,182
Palevsky, G. 16,954
Palmer, J.M. 18,281
Paolucci, D.J. 4515
Parducci, A. 17,099
Parentoau, W.A. 16,838
Paris, J. 16,272
Parke, Carol 16,468
Parker, E.J. 16,739
Parker, J.F., Jr. 16,181, 18,055, 18,396
Parkes, A.S. 17,239
Parsons, H.M. 18,395
Parton, L.R. 16,337
Pasternack, B.S. 16,660
Pasternak, Rowena 17,218
Pastore, N. 17,328
Pate, J.L. 18,316
Pattishall, E.G. 16,621, 16,837, 16,844, 16,867
Paul, L.E. 16,364
Payne, R.B. 4144, 4392, 4393
Pearson, R.G. 17,047
Pearsons, K.S. 16,806
Peckham, R.H. 16,127, 16,199
Pecoraro, J.N. 16,192
Peiss, C.N. 3468
Peistrup, C.F. 16,750
Peltz, F.D. 16,918
Pendleton, Catherine 16,250
Penrod, P.R. 16,785
Pepinsky, H.B. 15,349
Pepinsky, Pauline N. 15,349
Pepler, R.D. 4012, 17,178
Pericone, C. 16,417
Perry, D. 4482
Peryam, D.R. 18,095, 18,164
Peters, G.A. 14,812, 16,001, 16,024, 16,025, 16,047, 16,201
Peters, R.W. 16,140
Peterson, J.L. 17,070
Peterson, L.V. 3443
Peterson, R.O. 16,076, 16,315
Petrie, A. 16,751, 17,022
Petrovich, D.V. 17,221
Petry, P. 16,710
Pfaffmann, C. 16,428, 16,429
Phares, L. 15,406, 16,712
Philips, W.D. 16,893
Phillips, N.E. 15,359, 16,907
Phillips, P.B. 16,528, 17,122
Pickering, J.E. 15,441, 16,200
Pickering, W.H. 16,031, 16,042
Pickett, J.M. 15,350, 18,094
Pierce, B.F. 17,165
Pierce, J.R. 18,330
Pierce, L.H., Jr. 18,097
Pierson, W.R. 17,171
Pikler, A.G. 18,080
Pipes, W.O., Jr. 16,983
Pizzuto, J.S. 15,379
Plankeel, F.H. 16,067
Plant, Jane 16,363
Plath, D.W. 18,059, 18,093
Platz, A. 17,213, 17,225
Plavnieks, Ilga M. 16,728
Pletcher, K.E. 16,659, 16,843
Plomp, R. 15,351
Plotnikoff, N. 16,473

Plough, I.C. 16,559
Plutchik, R. 15,353
Plutzrath, F.L. 16,188
Polis, B.D. 16,752
Pollack, I. 15,352, 16,093, 16,753, 17,046, 17,059, 17,066
Polte, J.W. 4375, 18,083
Pool, E.T. 16,181
Posner, J.B. 16,570
Postley, J.A. 16,658
Poulton, E.C. 17,188
Powe, W.E. 16,869
Powell, M. 17,327
Powell, T.J. 17,141
Powers, W.R. 17,205
Powers, W.T. 17,223
Prakash, A. 3348
Pratt, J.J., Jr. 18,029
Pratt, R.L. 16,155
Price, A.C. 17,244
Prichard, A.C. 16,842
Pride, A.M. 4296
Pritchard, R.M. 17,035, 18,378
Pritsker, A.A.B. 16,561, 16,602
Projector, T.H. 16,754
Proscia, P.A. 4291
Proshansky, H. 16,989
Pruieras, J. 16,797, 16,798
Pruitt, D.G. 16,228, 17,189
Prysiazniuk, A. 18,275
Psychological Research Associates, Inc. 16,159, 16,940
Pugh, L.G.C.E. 17,238
Pullen, K.A., Jr. 16,841
Purdy, W.C. 16,560
Putnam, V.K. 16,987
Putnam, W.B. 4359

Quade, D. 16,657
Quinn, M. 3916

Raben, Margaret W. 16,017
Rabin, A.I. 17,027
Rademacher, H.J. 16,840
Radliff, M.H. 16,579
Rahn, H. 16,361
Raifsnider, M.H. 18,092
Rambach, W.A. 15,441, 16,200
Ramo, S. 16,091
Ramo-Woolridge Corporation 16,433
Randall, W.C. 3468
Rao, M.M. 18,091
Rapin, Isabelle 15,403
Rapoport, A. 18,198
Rappaport, M. 16,037
Rarity, J. 16,627
Rasch, P.J. 17,171
Ratliff, F. 18,196
Raven, B.H. 16,362
Rawlins, J.S.P. 17,112, 18,065
Rawnsley, Anita I. 741
Ray, H.W. 16,170, 16,384, 17,297, 18,156
Ray, W.S. 18,195
Ray-Chaudhuri, D.K. 16,906
Reap, C.J. 15,320
Redfearn, J.W.T. 17,172, 17,181
Redmond, R.F. 4145
Reed, I.S. 16,656
Reeder, J.P. 16,465
Rees, D.W. 18,194
Reese, H.C. 16,618
Reese, T.S. 16,654
Regan, J.J. 18,311
Regan, R.A. 16,136
Rehman, I. 15,355
Reid, L.S. 3968
Reiss, R.F. 17,157
Reitman, W.R. 17,155
Reitzel, W.A. 18,193
Renaud, G. 16,938
Rennilson, J.J. 16,723
Resnikoff, G.J. 16,444
Retterer, B.L. 18,119
Rettig, S. 17,021
Reveal, R., Jr. 16,307
Reynolds, E.L. 17,153
Reynolds, G.S. 16,655, 17,008
Reynolds, M.A. 16,580
Reza, F.M. 16,306, 16,684
Rheinstein, J. 16,805
Rhodes, H.J. 17,207, 17,227
Riblett, V.T. 16,342, 18,192
Rice, E.A. 15,356
Richards, D.L. 4021, 4022, 4670
Richards, W.J. 3883
Richardson, R.E. 18,000
Richlin, M. 16,034
Richter, D.L. 16,681
Riecken, H.W. 18,003
Rigal, R.D. 16,267
Rigby, Lynn V. 16,567
Riggs, Lorin A. 16,540, 16,591
Rigney, J.W. 3356, 4255, 16,339, 16,790, 17,143
Riguet, J. 18,025
Riley, D.E. 16,499
Riley, M.B. 15,417
Rimland, B. 17,169
Rinehart, R.F. 16,935
Ring, F., Jr. 18,191
Ripps, H. 17,191, 18,374
Ritchie, M.L. 16,061, 16,062
Ritter, O.L. 17,125
Robbin, J.S. 17,054
Robie, R.R. 16,755
Robin, S.S. 15,349
Robinette, Joan C. 16,756
Robinson, D.W. 17,325
Robinson, E.A. 18,190
Roby, T.B. 2236, 18,346
Rockway, M.R. 18,379
Rodman, I.L. 3923
Rogers, T.F. 18,006
Rohles, F.H., Jr. 16,615, 16,617, 16,757, 18,057
Rohrer, J.H. 18,189
Ronchi, Lucia 16,616, 16,965, 16,969, 16,982, 16,985, 16,986, 16,990, 16,991, 16,992, 18,027
Roscoe, S.N. 16,696
Rose, A.M. 18,369
Rosenbaum, G. 13,400
Rosenberg, I. 16,275, 16,972
Rosenblatt, F. 16,839
Rosenblatt, M. 16,934
Rosenblith, W.A. 3884
Rositani, Lucia R. 16,232
Roush, R.G. 4006
Rovner, D.R. 18,074
Rowen, B. 16,400
Rowland, G.E. 15,357
Ruben, H. 16,864
Rubenstein, H. 16,758, 17,066, 18,094
Rubin, H. 16,682
Rubinoff, M. 4666
Rubinstein, S. 16,382
Ruch, F.L. 3920, 16,307
Rudner, R.S. 18,005
Ruppersberg, H. 16,759
Rushton, W.A.H. 18,233
Russell, R.W. 18,187
Rutledge, C.O. 16,678
Ryan, T.A. 17,029

Sackler, A.M. 17,116
Sadacca, R. 18,220
Sadler, E. 17,193
Sakai, T. 17,064
Salaman, R.G. 16,633
Saltz, E. 661
Sammons, H. 4325

Sampson, H. 16,396, 16,397, 16,398, 16,399
Sampson, P.B. 15,392, 16,395
Sandel, T.T. 4464
Sanders, A.F. 16,102
Sansom, Wilma 18,275
SantaMaria, L.J. 15,396, 16,520
Saporta, L. 16,627
Sargent, F., II. 16,958
Sargent, M.C. 16,044, 16,048
Sargent, Virginia W. 16,958
Sarhan, A.E. 16,640
Sauer, B.P. 18,023
Sauer, Shirley C. 3646
Savage, I.R. 16,679
Savage, L.J. 16,394
Schaefer, H.J. 4311
Schaeffer, K.H. 16,037
Scharf, B. 18,182, 18,183
Schermerhorn, J.G. 16,999
Schetzer, J.D. 18,155
Schlosberg, H. 18,184
Schloss, H.S. 16,690
Schmidt, E.A. 15,382
Schmidt, I. 4390
Schneider, M. 15,375
Schock, G.J.D. 16,313, 17,128
Schoenfeld, W.H. 16,862
Schohan, B. 3459
Schreuder, O.B. 17,131
Schroeder, A.C. 18,362
Schroeder, H.J. 16,816, 16,817
Schueller, O. 16,607
Schuknecht, H.F. 16,762, 18,137, 18,177
Schulman, A.I. 15,410, 16,094, 16,096
Schuster, D.H. 16,501
Schutz, H.G. 16,170, 18,156, 18,210
Schwab, R.S. 18,176
Schwam, W.J. 16,416
Schwartz, I. 15,339, 18,363
Schwartz, L.S. 16,933
Schwartz, R. 18,238
Schwedes, J.C. 16,638
Science 17,014
Scodel, A. 18,173
Scott, J.W. 17,141
Sears, R.T. 18,120
Seaton, R.W. 16,687
Segal, J.R. 17,285
Seibel, R. 18,111
Seidenstein, S. 16,609, 17,003, 18,178
Selfridge, O.G. 16,344, 16,392
Sell, R.G. 18,298
Sellers, E.A. 17,120
Selters, W. 17,071
Seltzer, L.J. 16,117
Seminara, J.L. 14,812, 17,078, 17,177
Sem-Jacobsen, C.W. 16,688
Senay, L.C., Jr. 15,397
Senders, J.W. 3400
Senders, Virginia L. 3929, 4371
Sendroy, J., Jr. 18,175
Serrano, J., Jr. 16,388
Seymour, R.B. 18,365
Shagass, C. 18,174
Shambaugh, G.F. 18,029
Shanker, P. 15,387
Shannon, R.H. 16,861
Shapero, A. 16,037
Shapiro, R. 16,718
Shapley, L.S. 18,292
Sharma, H.S. 16,579
Sharp, E.D. 16,576
Shaw, L. 16,407
Shearme, J.N. 4021, 4022
Shedd, Joyce L. 18,151
Sheehe, P.R. 17,154
Shelanski, M.V. 16,301
Sheldon, M.S. 18,367
Shelley, H.P. 108
Shelly, M.W., II. 17,045, 17,048
Sheridan, T.B. 16,214, 16,932
Sherrick, C.E., Jr. 18,245
Shewan, J.M. 18,299
Shewchuk, L.A. 17,038
Shideman, F.E. 16,611
Shinabarger, E.W. 16,298
Shmavonian, B.M. 18,118
Shock, N.W. 16,860
Shuford, E.H. 3883, 15,330, 16,876, 16,931
Shpiner, L. 16,930
Shriver, E.L. 16,086
Shyne, N.A. 16,393
Sidorsky, R.C. 17,315
Siebens, A.A. 16,698
Siebert, W.M. 16,763
Siegel, A.I. 15,398, 15,442, 16,034, 16,686, 18,121, 18,180
Sierracin Corporation 15,393
Silberman, H.F. 18,343
Silver, C.A. 18,179
Silverman, A.J. 18,118
Silverman, R.A. 16,859
Silverman, R.E. 16,504, 18,334
Silvestro, A.W. 18,107
Simmonds, D.C.V. 17,208
Simmons, C.F. 4374
Simmons, R.F. 3923
Simon, C.W. 16,696
Simon, G.B. 16,365, 16,772
Simon, H.A. 16,163, 16,213
Simon, J.R. 17,185
Simonnard, M.A. 16,858
Simons, D.G. 16,173, 16,480
Simons, J.C. 18,181
Simonson, E. 18,355
Sinaiko, H.W. 16,930
Sipple, W. 16,834, 16,889, 16,978
Skandera, D., Jr. 16,869
Skinner, I.D. 16,467
Sklodowski, V.A. 16,208
Slade, J.J., Jr. 3913, 4470
Slamecka, N.J. 17,056
Slater, L.E. 16,764
Slodki, C.J. 16,065
Slote, L. 16,141, 18,030
Smedal, H.A. 16,568, 16,774 16,775, 17,256
Smeed, R.J. 18,040, 18,041
Smith, A.G. 16,776
Smith, Audrey U. 17,239
Smith, B.E. 16,444
Smith, C.P. 16,957
Smith, D.E.P. 17,203
Smith, D.L. 16,337
Smith, E.C. 16,022
Smith, E.K. 16,651, 16,653, 16,689, 16,691, 16,857, 16,928, 16,929
Smith, F.W. 16,927
Smith, G.B. 17,083
Smith, G.P. 16,856
Smith, H. 18,031
Smith, H.T.U. 16,926
Smith, J.E. 17,118
Smith, J.E.K. 16,855
Smith, J.R., Jr. 16,775
Smith, K.U. 16,171, 16,603, 16,611, 16,612, 16,613
Smith, L.J. 4029
Smith, O.W. 16,648, 16,649, 16,650
Smith, P.R. 498, 3389, 4451, 4822
Smith, S.L. 16,205
Smith, S.W. 16,008
Smith, W.M. 16,603, 16,613
Smoke, W.H. 18,014
Snyder, R.B. 16,651, 16,653, 16,689, 16,857
Solomon, P. 17,022, 18,045
Soloyanis, G. 4007
Sorenson, A.G. 18,367
Spector, P. 16,190

Sperling, G. 17,294
Sperling, H.G. 18,354
Sperry, C.J., Jr. 4458, 4459
Speth, A. 16,684
Spickard, W.A. 16,567
Spiegel, F.S. 18,039
Spieth, W. 505
Spinelli, D. 16,295
Spitz, H.H. 17,210
Spragg, S.D.S. 3983
Sprague, Linda T. 17,010
Squires, R. 16,889
Stacey, J.M. 18,000
Stackfleth, E.D. 16,347
Standfast, Susan 15,403
Stange, F. 3393
Stanley, J.R. 16,302
Stanley, R. 16,613
Stapp, J.P. 16,191
Stave, A.M. 16,402
Stavid Engineering, Inc. 16,692
Steedman, W.C. 16,035, 17,313
Stein, J.J. 2748
Steiner, S.H. 15,395, 17,257
Steinkamp, G.R. 18,090
Stern, I.D. 4378
Stern, J.A. 16,146, 16,426, 16,675, 16,925
Stern, T.S. 16,435
Stevens, J.C. 15,423, 16,680, 16,845, 18,182, 18,183
Stevens, K.N. 3884, 16,466, 16,957, 17,074, 18,185
Stevens, M.E. 18,033
Stevens, P.J. 16,778
Stevens, S.S. 50, 15,423, 16,045, 16,046, 16,266, 16,318, 16,654, 16,655, 16,664, 16,680, 16,793, 16,845, 18,186
Stewart, G.M. 16,779
Stiassny, S. 16,068
Stillson, P. 17,290
Stilson, D.W. 16,471
Stopher, D.R. 17,084
Story, Anne W. 16,116
Stoudt, H.W. 17,163
Strasel, H.C. 16,136
Strauss, W.J. 16,606, 17,292
Strickland, B.A. 3895, 17,074
Strickland, L.E. 16,368
Strughold, H. 17,125
Stubbs, H.L. 4479
Stump, N.E. 3410
Sturrock, P.E. 16,308
Stutman, L.J. 17,123
Suci, G.J. 18,317
Sukemune, S. 17,194
Sukhatme, S. 16,924
Sullivan, P.J. 18,201
Summerall, C.P., Jr. 16,918
Summers, S.A. 3356, 4255
Sunderland, J.E. 16,955
Sunkes, J.A. 18,100
Suppes, P. 16,309
Surwillo, W.W. 16,742, 18,317
Susskind, C. 16,697
Sutow, W.W. 18,126
Sutterer, W.F. 16,988
Sutton, Marcella A. 2183
Sutton, S. 15,402, 16,158
Swain, A.D. 4451
Swanson, R.A. 2225
Swartz, W.F. 16,672
Swearingen, J.J. 17,260, 17,317
Swenson, W.A. 16,382
Swets, J.A. 4063
Sykehus, G. 16,688
Sylvania Electronic Systems 18,236

Tabory, L. 4379
Talbot, S.A. 16,311
Talkin, W.H. 16,765
Tamas, A. 16,310
Tamblyn, W.E. 4673
Tamler, E.V. 18,168, 18,169
Tang, P.C. 17,130
Tanner, W.P., Jr. 4063, 16,087, 16,089, 16,432, 16,699
Tasaki, I. 16,494
Tate, Merle W. 18,329
Taylor, A.A. 16,647
Taylor, C.L. 16,661
Taylor, C.W. 16,273, 18,171
Taylor, E.R. 17,134
Taylor, F.V. 16,609, 18,178, 18,348
Taylor, H.L. 4146a, 4146b
Taylor, I.M. 16,212
Taylor, J.H. 16,723, 18,170
Taylor, J.L., Jr. 17,257
Taylor, R.C. 16,766
Taylor, W.J.R. 17,120
Teas, D.C. 4464
Teichner, W.H. 3645
Terauds, Anita 16,167, 16,250, 18,075
Thomas, E.L. 16,012, 16,646
Thomas, R.E. 16,561, 16,602
Thomasian, A.J. 18,172
Thompson, G.L. 16,405
Thompson, R.W. 16,128
Tidmarsh, H.A. 18,221
Tiffin, J. 4042, 16,121, 18,327
Tillisch, J.H. 16,272, 17,119
Tillman, T.W. 15,333, 17,070
Tilton, J.R. 17,318
Timberlake, P.W. 4342, 4343
Tindle, E.R. 16,601
Tinker, M.A. 16,122, 16,123, 18,308
Toch, H.H. 17,217
Tolcott, M.A. 1140
Tolhurst, G.C. 16,975
Tolles, W.E. 17,144
Tomashefski, J.F. 16,956
Tombrink, K.B. 16,959
Tonndorf, J. 16,360, 16,762, 16,780
Toothman, H.L. 16,115
Topp, C.W. 16,547
Toraldo di Francia, G. 16,985
Torgersen, P.E. 15,399
Torrance, E.P. 3945
Touger, M.L. 16,826, 17,072
Tousey, R. 18,227
Townsend, C.A. 16,804
Townsend, F.M. 16,267, 16,755, 17,115
Townsend, R.L. 16,921
Trabold, F.W., Jr. 16,208
Travers, P.R. 15,328
Tregerman, L. 16,417
Trinkl, F.H. 18,010
Truax, D.R. 3943
Truax, S. 16,645
Trumbo, D.A. 17,168
Trumbull, R. 18,200
Tryon, L.E. 16,595
Tucker, E.F. 16,019
Tucker, J.A., Jr. 502
Tucker, L.R. 4139
Tucker, W.A. 17,179
Tufts University 16,105, 16,496
Tukey, J.W. 16,211
Turnblade, R.C. 16,499
Turner, H.L. 16,108
Turner, W.F. 16,853, 18,167

Uchizono, T. 17,049
Uhlaner, J.E. 16,478
Uhr, L. 17,213, 17,225, 18,344
Uhrig, R.A. 15,320

Unger, H.R. 16,853, 18,167
University of California 15,422
University of Oregon 18,098
University of Pennsylvania 4473, 4474
Upton, A.C. 16,216
US Armed Services Technical Information Agency 18,387
US Government Printing Office 16,092
US Office of Civil and Defense Mobilization 18,165
US Technical Information Service 18,162, 18,166
USA Analysis & Research Division 18,163
USA Arctic Test Board 16,224, 16,483
USA Electronic Proving Ground 16,271
USA Food Acceptance Branch 16,643, 16,705
USAF Aerospace Medical Laboratory 18,122
USAF Rome Air Development Center 16,614
USCG Civil Engineering Division 16,922
Useller, J.W. 17,241
USN Air Development Center 4292
USN Air Test Center 4118
USN Aviation Safety Center 16,427, 16,920
USN Chief of Naval Operations 4290
USN Office of Naval Research 16,057
USN Physiological Psychology Branch 15,348
USN Special Devices Center 16,835
USSR Hydrographic Service of the Navy 16,871, 16,872, 16,873
Uttal, W.R. 17,039, 17,040, 18,240

Vaccaro, J., Jr. 16,196
Valentine, G.A. 16,598
Vallance, T.R. 18,218
Van Albert, C.E. 18,104
Vandenberg, S.G. 17,102, 18,342
Vanderbie, J.H. 4026, 4398, 4400
Vanderplas, J.M. 4378, 17,019
Van Horn, J.M. 16,918
van Laer, J. 17,139
van Oosterom, T. 16,852
Vaughan, J.A. 16,029
Velasquez, T. 15,421
Vernon, J.A. 17,251
Videan, E.N. 16,464
Vincent, N.L. 18,327
Viterbi, A.J. 16,404
Voegtlen, H.D. 18,119
Vogelman, J.H. 18,012
Voit, E.A. 16,716
Volkmann, J. 16,005
Von Beckh, H.J. 16,313, 16,314, 16,588, 16,600
von Bekesy, G. 16,321, 16,322, 16,323, 16,706, 18,385
Von Gierke, H.E. 16,243, 16,378
Vos, J.J. 16,599
Vuco, J. 17,181

Wade, E.A. 4127, 16,498
Waggoner, J.N. 16,584
Wagner, P.R. 17,081
Waite, J.V. 16,245, 16,316
Waitz, C.R. 18,131
Wald, G. 18,359
Walker, P.G. 16,181
Wall, G.F. 18,013
Wall, P.D. 16,917
Wallace, H.L., Jr. 18,255
Wallace, M. 17,027
Wallace, W.H. 16,455, 18,107
Wallis, D. 16,152
Wallis, R.A. 17,076, 17,164
Walls, G.L. 17,024
Walraven, P.L. 18,272, 18,361
Waltrip, O.H. 3895
Wand, Barbara 4254
Wang, C.C. 16,233
Wang, R.I.H. 18,015
Warburton, F.W. 17,216
Warburton, G.B., Jr. 16,430, 16,440, 16,916
Ward, D.C. 15,386
Ward, H.O. 4094
Ward, W.D. 17,069, 17,071, 17,075
Warm, J.S. 16,519, 16,880, 18,319
Warren, A.B. 15,386
Warren, N.D. 3923
Wathen-Dunn, W. 16,677
Watson, J.F. 18,263
Wayne-George Corporation 16,644
Webb, M.G. 16,887
Webb, W.B. 17,097
Webber, C.E. 16,597
Webster, J.C. 2029, 18,144, 18,269
Weckroth, J. 18,279
Weems, B.F. 16,184
Wehrkamp, R.F. 3645
Weigle, Joyce M. 339
Weiner, H. 18,270
Weinfeld, F.D. 16,915
Weinrauch, H. 16,867
Weinreb, L. 16,270, 17,072
Weiswurm, K. 18,149
Weisz, A.Z. 17,262
Welford, A.T. 17,186
Welter, N.E. 18,266
Weltman, A.S. 17,116
Weltman, G. 18,264
Wendt, G.R. 15,419
Wentz, A.E. 17,118
Wenzel, D.G. 16,678
West, J.C. 16,970
Westen, R.J. 16,315
Westheimer, G. 16,125, 16,479, 18,226
Wetherbee, J.K. 16,384
Wever, E.G. 18,035
Wexler, D. 16,043
Weybrew, B.B. 16,673
Weygandt, C.N. 4666
Wheeler, L. 16,963
Wherry, R.J., Jr. 16,079, 17,097, 17,133
White, B.W. 17,041, 18,046
White, C.E. 4166
White, C.T. 16,132, 18,375
White, Helen L. 17,244
White, J.C. 18,268
White, R.O. 16,517
White, W.J. 3646, 16,403
Whittenburg, J.A. 4495
Wholey, J. 18,238
Wiedermann, A. 16,878
Wiener, F.M. 16,851
Wiener, N. 17,013
Wiesen, R.A. 16,931
Wilcox, R.H. 16,269
Wilcox, R.S. 16,803
Wilcox, W.J., Jr. 18,271
Wilkerson, L.E. 16,283, 16,284, 16,919, 18,267
Wilkie, D.R. 17,170, 17,173
Wilkinson, R.T. 16,151, 18,304
Wilks, S.S. 16,956
Willey, C.L. 339
Williams, A.C., Jr. 2220, 16,696

Williams, C.M. 16,557
Williams, H.L. 16,745
Williams, R.L. 4000
Williams, S.B. 4016
Wilson, C.L. 16,596, 17,082
Wilson, G.R.S. 17,341
Wilson, W.S. 16,100
Winder, C.L. 484, 4243
Wingrove, R.C. 16,568, 16,774, 17,256
Winsmann, F.R. 4398
Winterberg, R.P. 16,514, 16,515, 16,963
Winzen Research, Inc. 16,694
Wishart, D.M.G. 17,289
Wissler, E.H. 16,359
Witkin, H.A. 18,273
Wobig, W.H. 16,595
Wodinsky, J. 18,358
Wohlwill, J.F. 17,028
Wokoun, W. 15,400
Wolf, E. 16,850, 18,377
Wolfe, D.M. 16,317
Wolfson, R.J. 18,005
Wolin, B.R. 16,197, 16,700
Wolowicz, C.H. 16,464
Woodcock, A.H. 3928, 16,155, 16,203
Woodling, C.H. 16,493
Woodruff, M.W. 18,278
Woodward, D.P. 16,258
Worrall, Sheryl H. 3924
Worth, W.S. 16,276
Wright, B. 17,204
Wright, C.E. 16,051
Wright, G.O. 16,030
Wrigley, C. 17,102, 18,345
Wuerffel, H.L. 18,031
Wuest, F.J. 18,265
Wulfeck, J.W. 3983, 15,401, 16,516, 16,963, 18,357
Wulff, J.J. 3445
Wurtz, K.R. 4243
Wyckoff, L.B. 3997, 4379

Xhignesse, L.V. 17,195

Yeager, C.L. 15,363, 16,274
Yeager, P.B. 16,575
Yngve, V.H. 16,578
Yntema, D.B. 16,848, 17,042
Young, D.R. 18,274
Young, D.T. 16,212
Young, M.P. 18,013
Young, Phyllis 16,326
Yudkofsky, P.L. 18,016

Zabelicky, R. 16,834, 16,978
Zagorski, H.J. 3420
Zajonc, R.B. 18,014
Zalkind, S.S. 4426
Zander, A. 16,317
Zeaman, D. 17,043
Zechman, F.W., Jr. 18,017, 18,263
Zeidner, J. 3420, 18,219
Zeigen, R.S. 18,276
Ziedman, K. 16,592, 16,593
Ziegenruecker, G.H. 17,258
Ziegler, R.B. 16,161, 16,162, 16,178, 16,180, 16,625, 16,914
Zigler, E. 17,220
Zigler, M.J. 18,377
Zinn, M.B. 17,082
Zubek, J.P. 17,038, 18,275
Zwislocki, J. 16,594
Zyskind, G. 16,210

Office of Naval Research. Report ACR-69. HUMAN ENGINEERING BIBLIOGRAPHY (1959-1960), by the Project Staff, Human Engineering Information and Analysis Service, Institute for Psychological Research, Tufts University. 348 pp., October 1961. Personnel responsible for the human factors considerations in the design and development of equipment have a major need for rapid and easy access to the literature pertinent to their work. The fact that the literature associated with human engineering derives from many different journals and periodicals as well as a host of publications from governmental, industrial, and academic laboratories presents a compelling requirement for the development of useful bibliographic aids. This bibliography is one of a planned series of annual bibliographies of literature pertinent to human engineering which has been designed to meet this requirement. (Over)	1. Human engineering - Bibliography 2. Bibliography - Human engineering 3. Nonr 494(13)	Office of Naval Research. Report ACR-69. HUMAN ENGINEERING BIBLIOGRAPHY (1959-1960), by the Project Staff, Human Engineering Information and Analysis Service, Institute for Psychological Research, Tufts University. 348 pp., October 1961. Personnel responsible for the human factors considerations in the design and development of equipment have a major need for rapid and easy access to the literature pertinent to their work. The fact that the literature associated with human engineering derives from many different journals and periodicals as well as a host of publications from governmental, industrial, and academic laboratories presents a compelling requirement for the development of useful bibliographic aids. This bibliography is one of a planned series of annual bibliographies of literature pertinent to human engineering which has been designed to meet this requirement. (Over)	1. Human engineering - Bibliography 2. Bibliography - Human engineering 3. Nonr 494(13)
Office of Naval Research. Report ACR-69. HUMAN ENGINEERING BIBLIOGRAPHY (1959-1960), by the Project Staff, Human Engineering Information and Analysis Service, Institute for Psychological Research, Tufts University. 348 pp., October 1961. Personnel responsible for the human factors considerations in the design and development of equipment have a major need for rapid and easy access to the literature pertinent to their work. The fact that the literature associated with human engineering derives from many different journals and periodicals as well as a host of publications from government, industrial, and academic laboratories presents a compelling requirement for the development of useful bibliographic aids. This bibliography is one of a planned series of annual bibliographies of literature pertinent to human engineering which has been designed to meet this requirement. (Over)	1. Human engineering - Bibliography 2. Bibliography - Human engineering 3. Nonr 494(13)	Office of Naval Research. Report ACR-69. HUMAN ENGINEERING BIBLIOGRAPHY (1959-1960), by the Project Staff, Human Engineering Information and Analysis Service, Institute for Psychological Research, Tufts University. 348 pp., October 1961. Personnel responsible for the human factors considerations in the design and development of equipment have a major need for rapid and easy access to the literature pertinent to their work. The fact that the literature associated with human engineering derives from many different journals and periodicals as well as a host of publications from governmental, industrial, and academic laboratories presents a compelling requirement for the development of useful bibliographic aids. This bibliography is one of a planned series of annual bibliographies of literature pertinent to human engineering which has been designed to meet this requirement. (Over)	1. Human engineering - Bibliography 2. Bibliography - Human engineering 3. Nonr 494(13)

Two major considerations – ease of use and appropriate selections of material – strongly influenced this bibliography. As a result, five main parts exist: (1) a topical outline which defines over 300 topic headings established for this bibliography, (2) an index which associates the approximately 1900 bibliographic entries with the topic headings, (3) an alphabetic index of the common search terms which would aid those using this bibliography but who are unfamiliar with the topic headings, (4) an annotated bibliography of some 1900 citations, and (5) an index of the authors of these citations.

Two major considerations – ease of use and appropriate selections of material – strongly influenced this bibliography. As a result, five main parts exist: (1) a topical outline which defines over 300 topic headings established for this bibliography, (2) an index which associates the approximately 1900 bibliographic entries with the topic headings, (3) an alphabetic index of the common search terms which would aid those using this bibliography but who are unfamiliar with the topic headings, (4) an annotated bibliography of some 1900 citations, and (5) an index of the authors of these citations.

Two major considerations – ease of use and appropriate selections of material – strongly influenced this bibliography. As a result, five main parts exist: (1) a topical outline which defines over 300 topic headings established for this bibliography, (2) an index which associates the approximately 1900 bibliographic entries with the topic headings, (3) an alphabetic index of the common search terms which would aid those using this bibliography but who are unfamiliar with the topic headings, (4) an annotated bibliography of some 1900 citations, and (5) an index of the authors of these citations.

Two major considerations – ease of use and appropriate selections of material – strongly influenced this bibliography. As a result, five main parts exist: (1) a topical outline which defines over 300 topic headings established for this bibliography, (2) an index which associates the approximately 1900 bibliographic entries with the topic headings, (3) an alphabetic index of the common search terms which would aid those using this bibliography but who are unfamiliar with the topic headings, (4) an annotated bibliography of some 1900 citations, and (5) an index of the authors of these citations.