AD 739924

Human Resources Research Organization

Bibliography of Publications

As of 30 June 1971

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20th Anniversary

September 1971

HUMAN RESOURCES RESEARCH ORGANIZATION

Human Resources Research Organization

Bibliography of Publications

As of 30 June 1971

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It is anticipated that beginning in early CY 1972, certain HumRRO publications will be available from HumRRO, Alexandria, Virginia, on a purchase basis. Other publications will continue to be available, stock levels permitting, without charge. Inquiries should be made to HumRRO, Attn: Operations Office, 300 North Washington Street, Alexandria, Virginia 22314. Desired publications should be identified by HumRRO number (e.g. TR 70-3; Professional Paper 68-9) and full title. "AD" numbers in the Bibliography identify the publication only within the document repositories of the Defense Documentation Center and the National Technical Information Services, and are not identifiable at HumRRO.

Requests for information concerning items in the Bibliography or other aspects of HumRRO work should be addressed to the Executive Office or to the Director of a research Division. The addresses are listed below.

Executive Office, Human Resources Research Organization, 300 North Washington Street, Alexandria, Va. 22314

Director, HumRRO Division No. 1 (System Operations), 300 North Washington Street, Alexandria, Va. 22314

Director, HumRRO Division No. 2, Fort Knox, Ky. 40121

Director, HumRRO Division No. 3, Post Office Box 5787, Presidio of Monterey, Calif. 93940

Director, HumRRO Division No. 4, Post Office Box 2086, Fort Benning, Ga. 31905

Director, HumRRO Division No. 5, Post Office Box 6057, Fort Bliss, Tex. 79916

Director, HumRRO Division No. 6 (Aviation), Post Office Box 428, Fort Rucker, Ala. 36360

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The contents of this publication do not necessarily represent the official opinion or policy of the sponsors of HumRRO research

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FOREWORD

The Human Resources Research Organization is a nonprofit research and development corporation whose purpose is "to improve human performance, particularly in organizational settings, through behavioral and social science research, development, and consultation."

Toward this objective, HumRRO has done research and development work on a wide range of special training and innovations in training technology. Our work is done under contracts with various departments of the Federal Government, with state or local governments, or with organizations that are involved in education or training responsibilities. HumRRO was established in 1951, under The George Washington University, to carry out an integrated program of human resources research for the Department of the Army. Research was later undertaken for other agencies, and in 1969 HumRRO separated from the University.

The chief product of HumRRO work is information; thus, reporting the results of these research efforts is a major endeavor. The *HumRRO Bibliography of Publications As of 30 June 1971* has been compiled to provide a complete accumulation of information about HumRRO research reporting up to that time. It supersedes earlier HumRRO bibliographies.

Meredith P. Crawford
President
Human Resources Research Organization

DESCRIPTION OF THE BIBLIOGRAPHY

Purpose

The *HumRRO Bibliography of Publications, As of 30 June 1971*, has been compiled to provide as complete information as is feasible about HumRRO research publications and products. This information is intended for use by research and development personnel concerned with human factors problems, and operational personnel concerned with utilization of training and other research information and products. Researchers and users of research and development in the military services, other government agencies, and elsewhere concerned with training and other human factors research and development will find the Bibliography a useful aid. It supersedes the cumulative HumRRO *Bibliography of Publications As of 30 June 1969*, and the *Bibliography of Publications and Presentations During FY 70*.

Scope

The Bibliography has been designed to serve as many reference requirements as possible. The reporting items issued during FY 1971 are listed separately as well as in the cumulative total output, so that the user may either identify new materials available or look over the total publication list for research on a particular topic. In addition to HumRRO-published reports, FY 1971 and cumulative lists include professional publications and presentations by staff members. Abstracts have been provided for most items in the cumulative list. A comprehensive and descriptive listing of research products and experimental materials has been compiled. Author, sponsor, and key word indexes are included.

Information supplied includes AD numbers, indicating items available to qualified users through the Defense Documentation Center (DDC) and, if appropriate, through the National Technical Information Service, U.S. Department of Commerce. PB numbers are included as appropriate for items listed in DDC under the Publications Board code. Some items deposited in the Educational Resources Information Center (ERIC) are identified by ED numbers.

Sponsors for all research efforts reported in this Bibliography are identified, in parentheses, under the code name or short title.

Organization

The Bibliography has been organized into three main parts, the first of which is the list of FY 1971 items. The publications are listed chronologically under the research code name (Work Unit or Research Project) or under the type of research effort other than Work Unit or Research Project (Exploratory Research, Basic Research, Technical Advisory Services) to which they relate, or under a General section if they are not directly related to a specific research effort or are related to several efforts. Part I also includes a supplementary listing of publications and presentations from earlier years that were issued in the HumRRO Professional Paper series during FY 1971.

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Part II is a cumulative listing of all material (except for a few classified items) that has been published by HumRRO since its inception, including that published in FY 1971. Part II is arranged in the same order as Part I. Work Units and Research Projects are listed alphabetically, by code name or short title. Exploratory Research and Basic Research Studies are listed sequentially by number, and Technical Advisory Service publications are arranged by date. Publications and presentations not specifically related to a single research effort, or those related to several efforts, are grouped chronologically under the General section.

Part III is a separate listing of research and development products and experimental materials. Included in this section are such items as documents, materiel, manuals, and other materials that may be suitable for adaptation for operational use. Products range from specific training programs and technical manuals to training items for new equipment. They are briefly described under the research code names or general category to which they relate; if they originate in or with a publication, it is cited.

An Appendix (A) lists HumRRO reports in the numbered series according to both the current and earlier reporting categories, and papers in the numbered Professional Paper series.

Three indexes are also included, an author index, a sponsor index, and a key-word-out-of-context (KWOC) index. The KWOC index contains bibliographic titles alphabetized on the basis of key words contained in the title. With this index the reader may locate items on topics that interest him by framing a question, extracting from it the key words, looking up the titles containing the key words or their synonyms, and using the reference code with the title to locate the citation in the Bibliography.

NOTES

Designations for the HumRRO divisions as of 30 June 1971 are used in the body of the Bibliography, without reference to name changes that have occurred over the years.

The publications of two divisions that are no longer operational are included: the Motivation, Morale, and Leadership Division, terminated in 1955, and the Psychological Warfare Division, terminated in 1956. Requests for information concerning publications of these divisions should be addressed to the Executive Office, HumRRO.

Military personnel assigned in support of a research effort occasionally appear as one of the authors of an item; no special note has been made where this is the case.

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Part I: Publications and Presentations During FY 1971

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A

WORK UNITS AND RESEARCH PROJECTS

APSTRAT (Division No. 3)
(Research for the Department of the Army)

"The Development of a Low-Cost Performance-Oriented Training Model," by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, and Brent Allred, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 32-70, 12 pp., December 1970. AD-722 273

"Utilization of Peer-Instruction in a Generalizable Performance-Oriented Training Model," by Kenneth Weingarten, paper for American Educational Research Association convention, New York City, February 1971.

The APSTRAT Instructional Model, by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, and Brent Allred, Professional Paper 6-71, 13 pp., May 1971. AD-725 567

AUTOSPAN (Division No. 7)
(Research for the Department of the Army)

Development and Evaluation of a Self-Instructional Spanish Course, by George H. Brown, Richard Beym, Thelma G. Smackey, and Angelo A. Cozzetto, Technical Report 70-14, 78 pp., September 1970 (AUTOSPAN II). AD-714 289 ED-044 996

AVTRAIN (Division No. 6)
(Research for the U.S. Coast Guard)

"Systems Engineering of Coast Guard Aviation Training," by Eugene R. Hall and Paul W. Caro, paper for Psychology in the Air Force Symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971.

CAMBCOM (Division No. 4)
(Research for the Department of the Army)

Knowledge and Skills Inventory: The Adjutant S-1, Combat Arms Maneuver Battalion, Research By-Product, 1970.

Knowledge and Skills Inventory: The Intelligence Officer S-2, Combat Arms Maneuver Battalion, Research By-Product, 1970.

Knowledge and Skills Inventory: The Operations/Training Officer S-3, Combat Arms Maneuver Battalion, Research By-Product, 1970.

Knowledge and Skills Inventory: The Logistics Officer S-4, Combat Arms Maneuver Battalion, Research By-Product, 1970

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COPE (Division No. 7)
(Research for the Department of the Army)

"Development of a Technique for Creating 'Cultural Self-Awareness'," by Alfred J. Kraemer, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970.

DRIVER EDUCATION (Division No. 1)
(Research for the Department of Transportation)

"The Development of Driver Education Objectives Through an Analysis of the Driving Task," by A. James McKnight and Bert B. Adams, paper for National Safety Congress, Chicago, October 1970; issued as Professional Paper 4-71, 14 pp., April 1971. PB 200 692

Driver Education Task Analysis, Volume I: Task Descriptions, by A. James McKnight and Bert B. Adams, (HumRRO Technical Report 70-103), U.S. Department of Transportation Technical Report HS 800 367, DOT Contract No. FH 11-7336, 356 pp., November 1970. PB-197 325

Driver Education Task Analysis, Volume II: Task Analysis Methods, by A. James McKnight and Bert B. Adams, (HumRRO Interim Report IR-D1-70-1), U.S. Department of Transportation Technical Report HS 800 368, DOT Contract No. FH 11-7336, 46 pp., November 1970. PB-197 688

Driver Education Task Analysis, Volume III: Instructional Objectives, by A. James McKnight and Alan G. Hundt, (HumRRO Technical Report 71-9), U.S. Department of Transportation Technical Report (in press), DOT Contract No. FH 11-7336, 351 pp., March 1971.

Driver Education Task Analysis, Volume IV: The Development of Instructional Objectives, by A. James McKnight and Alan G. Hundt, (HumRRO Interim Report IR-D1-71-1), Department of Transportation Technical Report (in press), DOT Contract No. 11-7336, 68 pp., March 1971.

"Needed—Goals for Driver Education," by A. James McKnight, in *Concepts*, vol. 4, no. 2, Spring—Summer 1971.

Educational Workshops (Division No. 5)
(Research for the River Rouge, Michigan School District)

Introducing Innovation in Instruction: In-Service Teacher Workshops in Classroom Management, by William H. Melching, Edward W. Frederickson, and Paul G. Whitmore, Technical Report 70-104, 45 pp., November 1970. AD-730 959 ED-048 098

"A Classroom Management Project," by Paul G. Whitmore, presentation to River Rouge Board of Education, January 1971.

"Report of In-Service Teacher Training Workshops in the Management of Classroom Behavior," by Paul G. Whitmore, Edward W. Frederickson, and William H. Melching, paper for American Educational Research Association convention New York City, February 1971.

"Individualized Instruction," by Paul G. Whitmore, William H. Melching, and Edward W. Frederickson, paper for Michigan Meeting on Individualized Instruction, Lansing, Mich., April 1971.

"Inservice Training for a New Function for School Psychologists," by Edward W Frederickson, William H. Melching, and Paul G. Whitmore, paper for Southwestern Psychological Association convention, San Antonio, Tex., April 1971.

Educational Workshops *(Continued)*

"Classroom Management," by Paul G. Whitmore, paper for Education Service Center Conference, El Paso, Tex., May 1971.

FORGE (Division No. 4)
(Research for the Department of the Army)

"Factors in Organizational Effectiveness," by Joseph A. Olmstead, paper for meeting of Southeastern Psychological Association, Miami, Fla., April 1971.

Leadership Actions as Evaluated by Experienced Company-Grade Officers, by Joseph A. Olmstead, Larry L. Lackey, and Harold E. Christensen, Technical Report 71-11, 37 pp., June 1971. AD-729 380

IMPACT (Division No. 1)
(Research for the Department of the Army) (see also NSF-IDM)

Project IMPACT Computer-Administered Instruction Description of the Hardware/Software Subsystem, by The IMPACT Staff, Technical Report 70-22, 56 pp., December 1970. AD-721 159 ED-047 528

JOBTEST (Division No. 2)
(Research for the Department of the Army)

Development of a Work Sample Criterion for General Vehicle Mechanic, by John D. Engel, Technical Report 70-11, 32 pp., July 1970 (JOBTEST I). AD-714 212

A Comparison of Correlated Job and Work-Sample Measures for General Vehicle Repairman, by John D. Engel and Robert J. Rehder, Technical Report 70-16, 26 pp., October 1970 (JOBTEST II). AD-714 842

JOBTRAIN (Division No. 1)
(Research for the Department of the Army)

Development of a Training Program and Job Aids for Maintenance of Electronic Communication Equipment, by Richard M. Gebhard, Technical Report 70-19, 75 pp., December 1970 (JOBTRAIN IV). AD-718 025

LEADREVIEW (Division No. 4)
(Research for the Office of Naval Research)

Leadership and Exchange in Formal Organizations, by T.O. Jacobs, HumRRO Final Report to the Office of Naval Research, Group Psychology Programs, Contract No. N00014-70-C-0091, NR 171-118/9-1469 (1452), 353 pp., December 1970. AD-725 584

LISTEN (Division No. 3)
(Research for the Department of the Army)

"Factors Affecting Learning by Listening," by Thomas G. Sticht, paper for National Research Council Conference on Language Acquisition and Comprehension, Durham, N.C., April 1971.

LOWENTRY (Division No. 6)
(Research for the Department of the Army)

Survey of Factors Influencing Army Low Level Navigation, by Robert H. Wright and Warren P. Pauley, Technical Report 71-10, 118 pp., June 1971.

MANICON (Division No. 5)
(Research for the Department of the Army)

"Man in Control," by Harry L. Ammerman and William H. Melching, paper for 16th Annual Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970; issued as Professional Paper 7-71, under the title *Man in Control of Highly Automated Systems*, 14 pp., May 1971.

MAP (Division No. 7)
(Research for the Department of the Army)

Military Advisors and Counterparts in Korea: 2. A Study of Personal Traits and Role Behaviors, by Dean K. Froehlich, Technical Report 70-13, 101 pp., September 1970 (MAP II). AD-876 926

Military Advisors and Counterparts in Korea: 3. An Experimental Criterion of Proficiency, by Dean K. Froehlich, Technical Report 71-2, 110 pp., February 1971 (MAP II). AD-883 238

MARKSMAN (Division No. 4)
(Research for the Department of the Army)

An Experimental Review of Basic Combat Rifle Marksmanship: MARKSMAN, Phase 1, by James W. Dees, George J. Magner, and Michael R. McCluskey, Technical Report 71-4, 142 pp., March 1971. AD-722 394

MEDIA (Division No. 2)
(Research for the Department of the Army)

"Procedure Learning and Display Motion," by Ronald W. Spangenberg, paper for Association for Educational Communication Technology meeting, Philadelphia, March 1971. ED-047 537

NIGHTSIGHTS (Division No. 2)
(Research for the Department of the Army)

"Hardware Parameters Related to Operator Training Capabilities," by Harold P. Bishop, paper for 16th Annual Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970; issued as Professional Paper 9-71, 8 pp., June 1971.

Preliminary Lesson Plans for Operators of the Far Infrared Target Indicator (FIRTI), Surveillance Set Infrared AN/VAS-1-( )-(V), by William L. Warnick, Research By-Product, December 1970.

NSF–IDM (Division No. 1)
(Research for the National Science Foundation and the James McKeen Cattell Fund) (see also IMPACT)

"Theories and Strategies Related to Measurement in Individualized Instruction," by Robert J. Seidel, paper for American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 2-71, 15 pp., March 1971. AD-725 566

"Who Should Develop Instructional Materials for CAI?" by Robert J. Seidel, paper for Computers in Instruction Conference, University of California, Los Angeles, October 1970.

OC LEADER (Division No. 4)
(Research for the Department of the Army)

An Analysis of First-Tour Duty Positions for Infantry Officer Candidate Graduates, by James A. Caviness, Technical Report 70-15, 28 pp., October 1970. AD-714 463

PACE (Division No. 7)
(Research for the Air Force)

Army "New Standards" Personnel: Relationships Between Literacy Level and Indices of Military Performance, by Allan H. Fisher, Jr., (HumRRO Technical Report 71-6), Technical Report MD-TR-71-12 (in press), Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 30 pp., April 1971.

Army "New Standards" Personnel: Effect of Remedial Literacy Training on Performance in Military Service, by Allan H. Fisher, Jr., (HumRRO Technical Report 71-7), Technical Report MD-TR-71-13 (in press), Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 33 pp., April 1971.

PREP MPC (Division No. 3)
(Research for the Monterey Peninsula College)

"The PREP Program at Monterey Peninsula College," by Hilton M. Bialek, paper for American Association of Junior Colleges Convention, Washington, March 1971; issued as Professional Paper 10-71, 7 pp., June 1971.

REALISTIC (Division No. 3)
(Research for the Department of the Army)

"Project REALISTIC: Determining Literacy Demands of Jobs," by Thomas G. Sticht and Richard P. Kern, *Journal of Reading Behavior*, vol. 2, no. 2, Summer 1970; issued as Professional Paper 3-71, 22 pp., April 1971.

Literacy Demands of Publications in Selected Military Occupational Specialties, by Thomas G. Sticht, Professional Paper 25-70, 20 pp., October 1970. ED-044 615 AD-715 640

"Effects of Speech Rate, Selection Difficulty, Association Strength and Mental Aptitude on Learning by Listening," by Thomas G. Sticht and Douglas R. Glasnapp, paper for American Educational Research Association meeting, New York City, February 1971.

"Project REALISTIC: Identifying Vocational Literacy Requirements as Targeted Skill Levels for Adult Basic Education," by Thomas G. Sticht and John S. Caylor, paper for Adult Educational Research Conference, New York City February 1971.

REALISTIC *(Continued)*

Effects of Aptitude (AFQT), Job Experience, and Literacy on Job Performance: Summary of HumRRO Work Units UTILITY and REALISTIC, by Robert Vineberg, Thomas G. Sticht, Elaine N. Taylor, and John S. Caylor, Technical Report 71-1, 82 pp., February 1971. AD-722 392 (see also UTILITY)

Learning by Listening in Relation to Aptitude, Reading, and Rate-Controlled Speech: Additional Studies, by Thomas G. Sticht, Technical Report 71-5, 45 pp., April 1971. AD-722 480

RELAY (Division No. 7)
(Research for the Air Force)

A Descriptive Analysis of the Classification, Assignment, and Separation Systems of the Armed Services, by Francis D. Harding and John A. Richards, Phase 1 of Contract Number F 41609-70-C-0037, (HumRRO Technical Report 71-8), Technical Report AFHRL-TR-71-15, (in press), Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 39 pp., May 1971.

ROTOR (Division No. 6)
(Research for the Department of the Army)

Functional Requirements for Ground-Based Trainers: Helicopter Response Characteristics, by W.G. Matheney and L.E. Wilkerson, Technical Report 70-17, 115 pp., October 1970 (ROTOR I). (Subcontractor: Life Sciences, Inc.) AD-714 954

Analysis of Visual Discrimination in Helicopter Control, by J.R. Thielges and W.G. Matheny, Technical Report 71-13, 159 pp., June 1971 (ROTOR I). (Subcontractor: Life Sciences, Inc.)

School Bus Safety (Division No. 1)
(Research for the Department of Transportation)

The Selection and Training of School Bus Drivers, by A. James McKnight, Carolyn M. McClelland, and Mary E. Berry, (HumRRO Technical Report 71-3), Department of Transportation Technical Report, DOT Contract FH 11-7339, 251 pp., February 1971.

SIAF (Division No. 4)
(Research for the Advanced Research Projects Agency)

Selection and Training for Small Independent Action Forces: System Analysis and Development of Early Training, by Joseph A. Olmstead and Theodore R. Powers, HumRRO Technical Report 70-102, U.S. Army Missile Command Advanced Research Projects Agency Contract Nr. DAAH01-70-C-0488, 43 pp., September 1970. AD-875 453

SIMULATE (Division No. 2)
(Research for the Department of the Army)

Combat Job Requirements for Principal Staff Personnel: Division, Brigade, and Battalion, by Robert A. Baker, Technical Report 70-23, 134 pp., December 1970 (SIMULATE II). AD-722 248

SKYFIRE (Division No. 5)
(Research for the Department of the Army)

Aircraft Recognition Performance of Crew Chiefs With and Without Forward Observers, by Robert D. Baldwin, Edward W. Frederickson, and Edward C. Hackerson, Technical Report 70-12, 32 pp., August 1970. AD-714 213

SKYGUARD (Division No. 5)
(Research for the Department of the Army)

"Work Unit SKYGUARD: Air Defense Officer Course," by Paul G. Whitmore and Harry L. Ammerman, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970.

SPECTRUM (Division No. 3)
(Research for the Department of the Army)

"The Interrelationships of Ability Level, Instructional System, and Skill Acquisition," by John E. Taylor, Ernest K. Montague, and Robert Hauke, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 29-70, 8 pp., December 1970. AD-717 256

SYNTRAIN (Division No. 6)
(Research for the Department of the Army)

Device-Task Fidelity and Transfer of Training: Aircraft Cockpit Procedures Training, by Wallace W. Prophet and H. Alton Boyd, Technical Report 70-10, 49 pp., July 1970 (SYNTRAIN II). AD-713 433 ED-047 264

"Some Considerations for the Design of Aircraft Simulators for Training," by Paul W. Caro and Wallace W. Prophet, paper for Psychology in the Air Force symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971.

"An Innovative Instrument Flight Training Program," by Paul W. Caro, paper for Society of Automotive Engineers meeting, Atlanta, Ga., May 1971.

TRAINMAN (Division No. 2)
(Research for the Department of the Army)

"An Approach to the Development of Synthetic Performance Tests for Use in Training Evaluation," by William C. Osborn, paper for 12th Annual Military Testing Association Conference, French Lick, Ind., September 1970; issued as Professional Paper 30-70, 9 pp., December 1970. AD-719 265

UTILITY (Division No. 3)
(Research for the Department of the Army)

"Performance in Four Jobs: The Role of Mental Ability and Experience," by Robert Vineberg and Elaine N. Taylor, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 31-70, 17 pp., December 1970. AD-722 272

UTILITY *(Continued)*

"Marginal Manpower: Job Capability as a Joint Function of Aptitude and Experience," by Elaine N. Taylor and Robert Vineberg, paper for 26th Military Operations Research Symposium, Monterey, Calif., November 1970.

Performance in Five Army Jobs by Men at Different Aptitude (AFQT) Levels: 1. Purpose and Design of Study, by Robert Vineberg, Elaine N. Taylor, and John S. Caylor, Technical Report 70-18, 38 pp., November 1970. AD-715 641

Performance in Five Army Jobs by Men at Different Aptitude (AFQT) Levels: 2. Development and Descriptions of Instruments, by Robert Vineberg, Elaine N. Taylor, and Thomas G. Sticht, Technical Report 70-20, 284 pp., November 1970.

Effects of Aptitude (AFQT), Job Experience, and Literacy on Job Performance: Summary of HumRRO Work Units UTILITY and REALISTIC, by Robert Vineberg, Thomas G. Sticht, Elaine N. Taylor, and John S. Caylor, Technical Report 71-1, 83 pp., February 1971. AD-722 392 (see also REALISTIC)

VOC TAX (Division No. 3)
(Research for the Office of Education, Department of Health, Education, and Welfare)

The Design and Evaluation of Vocational Technical Education Curricula Through Functional Job Analysis, by Kan Yagi, Hilton M. Bialek, John E. Taylor, and Marcia Garman, Final Report to Sponsor, August 1968, ERIC number ED 023 913; published as HumRRO Technical Report 71-15, 86 pp., June 1971.

Exploratory Research
(Research for the Department of the Army)

Exploratory Research 72 (Division No. 1)

Analyses of U.S. Army Accident Data, by Clifford P. Hahn, Technical Report 71-14, 68 pp., June 1971. (Subcontractor: American Institutes for Research) AD-730 881

Basic Research Studies
(Research for the Department of the Army)

Basic Research 14 (Division No. 2)

Prompting and Guessing in Tank Identification, by Elmo E. Miller, Technical Report 70-21, 25 pp., December 1970. AD-720 892

Comparison of Pictorial Techniques for Guiding Performance During Training, by Elmo E. Miller, Technical Report 71-12, 37 pp., June 1971.

Basic Research 16 (Division No. 5)

Shape Perception Judgments as a Function of Stimulus Orientation, Stimulus Background, and Perceptual Style, by Edward W. Frederickson, Technical Report 70-24, 66 pp., December 1970. AD-722 479

Technical Advisory Service

"Implementation of Sytems Engineering Concepts in Army Training," by Darwin S. Ricketson, Robert H. Wright, and Russel E. Schulz, paper for 11th Institute of Electrical and Electronics Engineers Symposium on Man-Machine Systems, Winter Park, Fla., November 1970; issued as Professional Paper 11-71, 13 pp., June 1971. (Div. 6)

A Study Manual for the Drill Sergeant Candidate, Research Product, January 1971. (Div. 2)

General[1]

"Do Personality and Social Psychologists Study Men More Than Women?" by Douglas S. Holmes and Bruce W. Jorgensen, *Representative Research in Social Psychology*, Spring 1970, issued as Professional Paper 8-71, 7 pp., June 1971. (Div. 4)

HmRRO Research on Officer Training, briefings at Headquarters, U.S. Continental Army Command, Fort Monroe, Va., July 1970; issued as Professional Paper 24-70, 44 pp., September 1970 (Exec. Off.) AD-714 211

"HumRRO Research on Officer Training and Education: The Leader, the Manager, the Technical Specialist," by William A. McClelland, paper for CONARC briefing, Fort Monroe, Va., July 1970, included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970. (Exec. Off.)

"Overview and Summary of Work Units OC LEADER, CAMBCOM, FORCE, and INGROUP," by T.O. Jacobs, paper for CONARC briefing, Fort Monroe, Va., July 1970, included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970 (Div. 4)

"The Military Mind Probes Tomorrow's Corporate Leaders," by Joseph A. Olmstead, *Business Management*, vol. 39, no. 5, February 1971.

"HumRRO Research and Project 100,000," by Howard H. McFann, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970, issued as Professional Paper 33-70, 7 pp., December 1970. (Div. 3) AD-722 274

"A Military-Industrial Perspective on Psychotechnology Today and Ten Years Hence," by W.A. McClelland, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970. (Exec. Off.)

"Command and Control in the Army's Human Factor System," by Donald F. Haggard, paper for 16th Annual Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970 (Div. 2)

[1] Items in this section either are not directly related to specific elements of the research program or are related to several elements.

"A Framework for Viewing Quality Control in Training," by Eugene A. Cogan, Arthur J. Hoehn, and Robert G. Smith, Jr., *Educational Technology*, vol. 10, no. 11, November 1970; issued as Professional Paper 28-70, November 1970. (Exec. Off.) AD-720 003

"The Human Resources Research Organization's Aviation Psychology Research Program: Past, Present, and Future," by Wallace W. Prophet and Paul W. Caro, paper for Psychology in the Air Force Symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971. (Div. 6)

"The Media Manufacturer and the Educator," by Robert G. Smith, Jr., in *To Improve Learning, An Evaluation of Instructional Technology*, Academy for Educational Development, Inc., 1971; issued as Professional Paper 13-71, 12 pp., June 1971.

"Systems Analysis and the Introduction of Educational Technology in Schools," by Eugene A. Cogan, in *To Improve Learning, An Evaluation of Educational Technology*, Academy for Educational Development, Inc., 1971; issued as Professional Paper 14-71, 16 pp., June 1971.

In addition to the preceding items that were published or presented during FY 1971 for the first time, a number of presentations and articles listed in the Bibliography in previous years were published during FY 1971 in the form of HumRRO Professional Papers. This was done to make these items more readily available, in view of their continuing interest and relevance to research or operations.

The Application of Theoretical Factors in Teaching Problem-Solving by Programed Instruction, Professional Paper 23-70, August 1970; previously listed as abbreviated version of Technical Report 68-4, April 1968, by Robert J. Seidel and Harold G. Hunter; in *International Review of Applied Psychology*, vol. 19, no. 1, April 1970. (Div. 1) (see METHOD) AD-715 569 ED-047 525

"*An Approach to Standardizing Human Performance Assessment*, by John D. Engel, Professional Paper 26-70, 12 pp., October 1970; previously listed as paper for THEMIS conference, Texas Technological University, Lubbock, Tex., March 1970. (Div. 2) (see JOBTEST) AD-717 258

Collected Papers Prepared Under Work Unit REPAIR: Training of Electronics Maintenance Personnel, Presentations and Papers, 1957–1960, Professional Paper 27-70, 39 pp., November 1970. (Div. 1) (see REPAIR) AD-717 257

Collected Papers Prepared Under Work Unit TEXTRUCT: Methods of Instruction in Technical Training, Presentations and Papers, 1958-64, Professional Paper 34-70, 96 pp., December 1970. (Div. 5) (see TEXTRUCT) AD-722 128

Peer Ratings as Predictors of Success in Military Aviation, by James L. Wahlberg, Wiley R. Boyles, and H. Alton Boyd, Professional Paper 1-71, 17 pp., March 1971; previously listed as paper for annual meeting of Alabama Psychological Association, Destin, Fla., May 1970. (Div. 6) AD-724 695 (see PREDICT)

Prediction of Army Aviator Performance: Description of a Developing System, by Wiley R. Boyles and James L. Wahlberg, Professional Paper 5-71, 12 pp., April 1971; previously listed as paper for annual meeting of Alabama Psychological Association, Destin, Fla., May 1970. (Div. 6) (see PREDICT) AD-724 696

Training Strategies and Individual Differences, by Howard H. McFann, Professional Paper 12-71, 16 pp., June 1971; previously listed as paper for Adult Basic Education Research Conference, University of Chicago, March 1969.

"The Process of Developing and Improving Course Content for Military Technical Training," by Harold G. Hunter, J. Daniel Lyons, Eugene F. MacCaslin, Robert G. Smith, Jr., and Harold Wagner, *Educational Technology*, April 1970 and May 1971; issued as Professional Paper 15-71, 14 pp., June 1971; previously listed, in unabbreviated form, as Technical Report 69-9, 72 pp., May 1969.

Part II: Cumulative Listing of Publications and Presentations

WORK UNITS AND RESEARCH PROJECTS

AAA–Division No. 3

Factors Affecting Efficiency and Morale in Antiaircraft[1] Artillery Batteries (Research for the Department of the Army)

"Battery Effectiveness: Assessment of Comparative Performance," by Francis H. Palmer and Thomas I. Myers, *Antiaircraft Journal*, November-December 1954.

*This article describes the development of realistic measures to identify highly efficient and less efficient antiaircraft batteries and discusses the extent to which the several measures of performance are related. Under specific discussion are range of radar pickup, firing range scores, radar maintenance, artillery maintenance, defense commander's rating, and adverse personnel actions.

"Crew Description Dimensions and Radar Crew Effectiveness," by Thomar I. Meyers and Francis H. Palmer, paper for American Psychological Association convention, September 1955.

*This paper presents results pertaining to the group dimensions variables Harmony, Intimacy, Procedural Clarity, and Stratification of the Ohio State University's Crew Dimensions Description Questionnaire. It was shown that the four CDDQ scales are generally reliable; that with one exception the dimensions were empirically independent; and that leader and follower agreement was high on Procedural Clarity and Stratification but not on Harmony and Intimacy. The leader's stratification rating of the crew correlated highly with group effectiveness.

"Sociometric Choices and Group Productivity Among Radar Crews," by Francis H. Palmer and Thomas I. Myers, paper for American Psychological Association convention, September 1955.

*Radar crews of 8 to 13 men, from 40 antiaircraft batteries, were studied. Each crew consisted of three status individuals and subordinate members whose primary roles were operation of the equipment. The complex team process of identifying, acquiring, and locking-on an aerial target is the crucial point in battery effectiveness. The measure of productivity was the average range of pickup for each of the 40 crews over a three-month period of locking-on targets during 104 air strikes. Sociometric scores determined for each unit were a total score, a score for status individuals, and a score for subordinates. As measured in this study, social interaction was negatively related to group productivity.

"Human Factors Affecting the Performance of Antiaircraft Batteries," by Francis Palmer, Thomas Myers, Bertram Gold, and Paul Metzger, summary task paper, March 1956.

*Operational performance in Range of Radar Pickup and Radar Maintenance measures by antiaircraft batteries and the Defense Commander's Rating practices in 40 on-site defense organizations were studied. Leadership techniques, battery practices, and interpersonal relationships were studied to determine the extent to which human factors served to discriminate between high and low efficiency units. Implications for personnel assignment and for training are given.

"Leadership and Group Achievement," by Francis H. Palmer, *Adult Leadership*, vol. 5, no. 2, June 1956.

*This article discusses research on leadership and leader training as related to multiple group goals and performance in the achievement of those goals. Although relating research in a military setting, some implications for nonmilitary contexts are included.

[1] A star at the beginning of the abstract indicates that the item is one of the AAA papers or presentations included in *Collected Papers Prepared Under Work Unit AAA Factors Affecting Efficiency and Morale in Antiaircraft Artillery Batteries*, Professional Paper 33-69, November 1969.

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AAA *(Cont.)*

Collected Papers Prepared Under Work Unit AAA: Factors Affecting Efficiency and Morale in Antiaircraft Artillery Batteries, Professional Paper 33-69, 41 pp., November 1969. AD-699 490

(AAA items included in this Professional Paper are indicated with a star in the left margin of the abstract.)

Research conducted in 1954-55 to determine the contribution of certain human factors to the effective performance of crew members of antiaircraft artillery batteries is described in this series of papers. The collection includes two presentations at professional meetings, two professional journal articles, and a task paper summarizing the research program.

ACCIDENT–Motivation, Morale, and Leadership Division

Studies of Morale and Motivation Factors Influencing Effectiveness of Individual Soldiers: Off-Duty Driver Accidents
(Research for the Department of the Army)

Army Accident Reporting: Results of Some Exploratory Interviews, by Berton Winograd, interim report, September 1954. AD-488 404

Safety personnel at eight Army installations were interviewed in 1954 to determine the reasons for inaccuracies in accident reports received by the Safety Branch, Department of the Army. While reporting completeness varied among the installations, it was found that serious accidents were generally reported more fully than trivial accidents; that the usefulness of reports is adversely affected by supervisors who desire to protect their men from punishment and to protect their safety records; and that safety directors encounter indirect pressures from military commanders to under-enumerate accidents. Reports were more complete from installations where civilian personnel outnumbered military personnel.

ACHILLES–Division No. 5

An Evaluation of the Maintenance Proficiency of Fire Control System Technicians
(Research for the Department of the Army)

"On the Relationship Between Electronics Maintenance Proficiency and the Retention of Theory Oriented Electronic Information," by P.G. Whitmore, Jr., and W.L. Williams, Jr., paper for American Psychological Association convention, Washington, 1958.

A job sample performance test and a written test covering the Nike-Ajax IFC technicians' course were administered to 91 technicians immediately after graduation and to 98 with experience beyond graduation. Performance test scores increased as experience increased while written (theory oriented) test scores decreased. This decrease and the low correlations between written and performance test scores (for both groups) suggest that a portion of course content is irrelevant to the job. A drop in the electronic aptitude-maintenance proficiency correlation from the inexperienced to the experienced group suggests the need for job validated rather than training validated aptitude measures.

The Development and Use of a Performance Test as a Basis for Comparing Technicians With and Without Field Experience: The NIKE AJAX IFC Maintenance Technician, by W.L. Williams, Jr., and Paul G. Whitmore, Jr., Technical Report 52, January 1959. PB-139666 AD-212 663

To evaluate technical training courses given Nike-Ajax IFC maintenance technicians, two tests were developed: (a) a performance test, including troubleshooting and adjustment operations on a Nike-Ajax IFC system, and removal and replacement of a soldered-in component; (b) a written test, measuring retention of knowledges acquired by the technicians during school training. The tests were administered to 91 inexperienced and 18 package-trained technicians, and to 98 technicians with field experience (average, 39 months). The groups were compared on performance and on knowledge retained, using the inexperienced group's scores as baselines. With more field experience, performance scores increased and written scores decreased. The written and performance total scores and subscores showed little relationship, although the subtests of each test were highly interrelated. Most technicians at all experience levels failed to use good soldering techniques.

A General Note on the Development and Use of Job Performance Tests and a Detailed Description of Performance Tests for NIKE IFC Technicians, by W.L. Williams, Jr., and Paul G. Whitmore, Jr., Research Memorandum, March 1959. AD-478 735

The development and utilization of performance tests within the context of technical training, and the content and administrative procedures of a series of performance tests developed for Nike IFC maintenance technicians are described.

Research By-Products resulting from this research effort are listed in Part III.

ACROSS-RETURN–Psychological Warfare Division

Evaluation of Effects of Intercultural Contact Between U.S. Army Personnel and Their Dependents and Foreign Nationals
(Research for the Department of the Army)

Some Effects of Overseas Duty on the Attitudes of American Troops Toward Host Populations, by Milton Jacobs and Louis Schatz, Staff Memorandum, June 1954. AD-480 317

A preliminary study of the attitudes of American troops stationed abroad and residents of their host countries was made by interviewing troops several times during their foreign stay and again just before departure. It was found that favorable attitudes related positively to the amount and intimacy of contact with the host population, and that preconceptions were related to attitude change. Personal background of the troops was found not to be related to attitudes and attitude change.

ACTION—Division No. 4

Research for Improvement of Infantry Stability Operations Training
(Research for the Department of the Army)

"A Second Look at Vietnam," by LTC George J. Magner (USA Ret.), *Infantry*, vol. 59, no. 3, May-June 1967.

ADCIVA—Motivation, Morale, and Leadership Division

Studies of Psychological Adjustment to the Requirements of Military Life: Factors in Recruits' Adjustment
(Research for the Department of the Army)

An Experimental Study of Modifications in Factors Influencing Recruits' Adjustment to the Army, by Richard Christie, Richard Maisel, Wallace Mandell, Irving A. Taylor, and Harold E. Yuker, Subcontractor's report, 1954 (Subcontractor: Research Center for Human Relations, New York University). AD-479 345

Transition From Civilian to Army Life, by Richard Christie, summarized by H.G. Osburn, Technical Report 13, October 1954 (Subcontractor: Research Center for Human Relations, New York University). PB-116803 AD-58 040

A group of 555 men was chosen at random from among inductees at Fort Dix to study whether the success of transition from civilian to Army life is influenced by (a) reduced contact with family and civilian friends, (b) assignment to squads of high cohesiveness, (c) participation in positions of responsibility and leadership, and (d) instruction in techniques of adjustment to Army life. The results of the study confirm the hypothesis that (for single men) training far from home increases likelihood of successful adjustment to Army life. Hypotheses concerning the other three factors were not confirmed.

ANSCALE—Division No. 1 (System Operations)
Development of an Anxiety Scale for Use in Army Training Research
(Research for the Department of the Army)

Anxiety Scales for Use in Army Training Research, by Joseph C. Hammock, Staff Memorandum, June 1954. AD-480 314

The adaption for military use of two forms of the A-Scale—the original true-false version of the Taylor Anxiety Scale, and a forced-choice modification constructed by Heineman—is described, and the procedure used in adapting them is presented. Data are then provided concerning some characteristics of the new scales, including norms for a basic training sample and reliability and "susceptibility to biased responding" for groups of different general aptitude. Copies of the revised scales are included.

APSTRAT—Division No. 3
Training Strategies and Incentives Appropriate to Different Aptitude Levels for Selected Army Training Courses
(Research for the Department of the Army)

"Functional Context Training in an Operational System," by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, Brent Allred, and Martin Pollyea, briefing for Department of Defense Manpower Research Planning Group, Washington, October 1969; issued as Professional Paper 8—70, 12 pp., March 1970. AD-706 337

This paper describes the work plan for the development of a complete training model suitable for multi-aptitude training populations and stressing individualized, self-paced learning in an operational functional context. Progress through the curriculum is determined by proficiency in task performance. The training model generates novel management problems and provides for techniques for their solution.

"The Development of a Low-Cost Performance-Oriented Training Model," by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, and Brent Allred, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 32-70, 12 pp., December 1970.

This paper describes a training model featuring peer instruction in a functional job-simulated context, as well as the objectives and practical constraints that led to its development.

"Utilization of Peer-Instruction in a Generalizable Performance-Oriented Training Model," by Kenneth Weingarten, paper for American Educational Research Association convention, New York City, February 1971.

The APSTRAT Instructional Model, by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, and Brent Allred, Professional Paper 6-71, 13 pp., May 1971. AD-725 567

This paper describes a low-cost instructional model suitable for multi-aptitude training populations, stressing individualized, self-paced learning in an operational functional context and utilization of peer instruction. The model, developed in pilot studies involving the Army's Field Wireman Course (MOS 36K), is designed as a generalizable instructional system.

APTITUDE—Division No. 2

Basic Training Achievement in Infantry Squads With Controlled Aptitude (Research for the Department of the Army)

Training Achievement in Basic Combat Squads With Controlled Aptitude, by Donald C. Findlay, Seymour M. Matyas, and Hermann Rogge III, Technical Report 16, January 1955. PB-118877 AD-73 777

This study was designed to test (a) a method of raising the performance of basic trainees of below average intelligence, and (b) a method of raising the motivation-to-learn of trainees of all aptitudes. Low-aptitude men appeared not to benefit from training with high-aptitude men; their performance varied little, regardless of the number of high-aptitude men in the squad. However, squad competition and rewards decidedly increased the motivation-to-learn of trainees of all aptitudes, bringing low-aptitude men above the proficiency of average men in squads lacking incentive.

"Ability Grouping in Army Basic Combat Training," by Donald C. Findlay, Seymour M. Matyas, and Hermann Rogge III, *Journal of Applied Psychology*, vol. 40, no. 6, December 1956.

This study investigated the effectiveness of heterogeneous ability grouping as a method of increasing proficiency in Army Basic Combat Training. In each of two companies, low-ability trainees were trained under three conditions of ability grouping. One group of low-ability men trained in squads containing only low-ability men (low), one group in squads containing high- and medium-ability men also (low-medium-high), and one group in squads containing high men also (low-high). In spite of a system of competition that made privileges dependent on squad performance, a proficiency test given at the end of eight weeks of training failed to show a significant difference between the learning of low-ability men who had high-aptitude men in their squads and those who did not. Achievement at all ability levels was unusually high, but low men who were trained in squads by themselves were just as proficient as low men who were trained in squads with higher ability men.

AREA—Division No. 7 (Social Science)

Development of Concepts and Techniques for Area Training (Research for the Department of the Army).

Cross-Cultural Problems of U.S. Army Personnel in Laos and Their Implications for Area Training, by Alfred J. Kraemer and Edward C. Stewart, Research Memorandum, 20 pp., September 1964 (For Official Use Only)(AREA I). AD-450 364

"American Advisors Overseas," by Edward C. Stewart, *Military Review*, vol. XLV, no. 2, February 1965. AD-623 040

Examples of Cross-Cultural Problems Encountered by Americans Working Overseas: An Instructor's Handbook, by Robert J. Foster, 111 pp., May 1965 (AREA I). AD-465 043

This handbook is designed to aid instructors in area training programs to give meaning and impact to their lectures by presenting real-life examples drawn from published and unpublished sources such as textbooks, case studies, and interviews. The examples are classified into seven categories of cross-cultural problems, and as an additional breakdown, cross-indexed by technical specialty, geographic location, and American values critical to effectiveness overseas. An extensive list of references is included to provide additional source and background material as well as to enable the reader to examine an illustration in context. For ease of handling and rearranging, the examples are printed for cutting into 5 x 7 cards.

"Simulation Exercises in Area Training," by Edward C. Stewart, paper for 11th Annual Army Human Factors Research and Development Conference, Fort Bragg, N.C., October 1965; issued as Professional Paper 39-67, 14 pp., September 1967. AD-660 012 ED-016 938

Special techniques and content are being developed to supplement current area training programs. Simulation was chosen as the technique, and exercises were developed whose content emphasized the American culture and the foreign, host culture. These evolved as a confrontation between American cultural assumptions and values and a contrasting set, conceived for training and research purposes only, called contrast-American assumptions and values. When accompanied by appropriate introduction and critique, these exercises hold promise of achieving their training objectives.

"The Simulation of Cross-Cultural Communication," by Edward C. Stewart, paper for symposium of the German Development Institute, Berlin, Germany, March 1966; issued as Professional Paper 50-67, 26 pp., December 1967 (AREA II). AD-665 053

This paper describes the development of a cross-cultural simulation, the idea of the "contrast American", and the conceptualization of cultural differences in terms of dimensions. The theories behind these concepts are discussed in depth. Excerpts are given of recordings made of two simulation encounters between an American advisor and the contrast American. The intent of the work in simulation is to (a) increase the American's cultural self-understanding; (b) provide him with concepts that will aid him in the observation and classification of other cultures; and (c) present to him cluture and cultural differences at an interpersonal, rather than an abstract, level.

"New Perspectives in Training and Assessment of Overseas Personnel," by Jack Danielian and Edward C. Stewart, paper for First Counterinsurgency Research and Development Symposium, Institute for Defense Analyses, Arlington, Va., June 1966; issued as Professional Paper 6-67, 14 pp., February 1967 (AREA II). AD-649 865

Lack of knowledge of what constitutes successful performance in paramilitary roles abroad is a major barrier to developing valid selection procedures or appropriate training techniques. One approach to the problem is to focus on and attempt to cultivate individual qualities of personnel as elicited in a live simulated advisory situation. Using trained foreign participants in prepared role-playing scripts, a simulated cross-cultural encounter was constructed which provided a realistic face-to-face encounter with a counterpart. In addition, the simulation permitted the conceptualization of a number of interrelated intervening criteria susceptible to measurement and useful to assessing the performance of the trainee. It is concluded that the specific discovery potential and heuristic value of the technique are distinct assets in this new area of research.

An Analysis of Human Relations Training and Its Implications for Overseas Performance, by Robert J. Foster and Jack Danielian, Technical Report 66-15, 40 pp., August 1966 (AREA I). AD-639 611

Evidence indicates that the nature of overseas work requires an increased emphasis on the people-related functions of job performance. The importance of these functions is further accentuated by the contrast between American and non-American values, assumptions, and perceptions, upon which effective communications and interpersonal behavior depend. Existing knowledge and experience in human relations training is reviewed in order to determine its relevance to preparing personnel for the cross-cultural aspects of overseas assignments. The training techniques of training groups (T-groups), role-playing, and case study are examined. Each is treated with respect to (a) a general description, (b) evidence as to its effectiveness, (c) its applications in area training, and (d) possible modifications for its use in training people for overseas work.

"An Approach to Cultural Self-Awareness," by Edward C. Stewart and John B. Pryle, paper for American Psychological Association convention, New York, September 1966; issued as Professional Paper 14-66, 11 pp., December 1966. AD-646 980

An approach for training Americans to work overseas is outlined. It is very important that the American understand himself as well as the people in another culture since communication between them invokes the personal and cultural predispositions of both. Various concepts for constructing a schemata of American culture with which trainees could identify as individuals are discussed. Role-playing exercises may be used to simulate cross-cultural communication between Americans and the idealized type of Contrast American.

"The Simulation of Cultural Differences," by Edward C. Stewart, *Journal of Communication*, vol. XVI, no. 4, December 1966; issued as Professional Paper 19-67, 16 pp., April 1967 (AREA II). AD-652 084

This paper describes aspects of work in area studies—the development of simulation, the concept of the "contrast American," and the conceptualization of culture and cultural differences in terms of dimensions. The intent of the work is three-fold: (a) to increase the American's understanding of himself as a cultural being; (b) to provide him with concepts facilitating observations and classifications of any other culture to which he may go; and (c) to present to him culture and cultural differences at the interpersonal level rather than at an exotic or abstract level. These techniques have been tested in cross-cultural training and in the training for cross-cultural interaction.

"The Need for Innovative Approaches for Training in Cross-Cultural Interaction," by Arthur J. Hoehn, paper for American Psychological Association convention, Washington, September 1967; revised version under the title, *The Need for Innovative Approaches for Training in Inter-Cultural Interaction*, issued as Professional Paper 9-68, 10 pp., March 1968. AD-667 821

There is growing acceptance of the view that personnel being assigned overseas require some special preparation for the inter-cultural aspects of such assignments. At present such training generally takes the form of short pre-departure orientation programs designed to provide a fund of relevant information. This paper points to the limitations of such an approach, suggests some of the alternative objectives of inter-cultural training, describes some current efforts toward new techniques, and points to the need for empirical assessment of the training value of the new approaches and techniques.

Some Resources for Area Training, by Robert J. Foster and David T. O'Nan, Technical Report 67-11, 119 pp., September 1967 (AREA I). AD-660 057 ED-016 939

This report lists resources that may be useful to individuals responsible for area training programs, especially if the trainees are being sent to developing nations. Part I gives descriptions, source data, and evaluative information about films likely to be of more than average value in area training. It also contains items concerned with technical assistance, development, social change, and cross-cultural communication. Part II lists some novels that capture the attitudes, feelings and aspirations of other cultures. The first two parts are classified primarily by cultural-geographic areas and by country. Part III is an annotated list of readings which describe and analyze American values in ways that may enable the reader to become more sensitive to the values and assumptions which determine his behavior. Part IV describes several organizations and publications other than novels or movies which provide information about sources of area training materials.

AREA *(Cont.)*

"Live Simulation of Affect-Laden Cultural Cognitions," by Jack Danielian, *Journal of Conflict Resolution*, vol. 11, no. 3, September 1967; issued as Professional Paper 49-67, 15 pp., November 1967 (AREA II). AD-665 035

As part of a research study to develop new concepts and techniques for area training, the construction of cross-cultural simulation exercises was guided by a model using culturally derived values and assumptions as the significant variables. The model is cognitive-functional and the overall perspective sociopsychological. Excerpts from live simulated cross-cultural encounters involving Americans and "Contrast Americans" provide examples of how basic cultural assumptions and core values can be effectively contrasted under controlled conditions. Implications for training are discussed.

Simulating Intercultural Communication Through Role-Playing, by Edward C. Stewart, Jack Danielian, and Robert J. Foster, Technical Report 69-7, 62 pp., May 1969 (AREA II). AD-688 698 ED-041 226

This report describes the design and development of training to increase cultural awareness. Significant aspects of intercultural interaction were simulated in a series of role-playing exercises. Typical American values and assumptions were demonstrably elicited from a trainee as he interacted with a "foreign" auxiliary. The auxiliary was trained to reflect a mirror image of American values and assumptions judged important to overseas performance. These values and assumptions were derived from an analysis of American "middle-class" culture. Several paper-and-pencil tests were developed as interim estimates of training objectives. Preliminary data bearing on the efficacy of the technique are presented. Possible variations in training format are suggested and some conclusions drawn for use of the simulation exercises in conjunction with other approaches and techniques.

Dimensions of Training for Overseas Assignment, by Robert J. Foster, Technical Report 69-11, 28 pp., June 1969 (AREA IV).

This report presents a conceptual framework for looking at the problem of training personnel for overseas assignment. Characteristics of the overseas situation that are unique, prevalent, and likely to affect performance significantly are briefly described and classified. Two types of goals for training are formulated: Objectives in terms of kind of learning and objectives in terms of content. Within each a conceptual breakdown of types of objectives is presented as a general analytical framework for deriving goals for specific training programs. The report represents an interpretative summary of much of the research and writing on training for overseas but does not attempt to survey the literature.

Research By-Products resulting from this research effort are listed in Part III.

ARMORCOM–Division No. 2
Improvement of the Communications Proficiency of Armor Personnel (Research for the Department of the Army)

Simplification of the Panel Layout on Standard Series Tank Radios, by Boyd L. Mathers, Special Report 9, July 1957 (ARMORCOM I). PB-132401 AD-139 056

The control panel of the standard series tank radio was modified in certain minor ways to evaluate the effect on operator performance. Armor trainees were trained and tested on sets with the eight most important controls coded in one of three ways: (a) painted a single distinctive color, (b) painted three different colors according to their function, or (c) numbered according to their order of use. Performance of these trainees was compared with that of control groups trained and tested on standard sets. Recommendation is made for coding the controls on tank radios.

Research By-Products resulting from this research effort are listed in Part III.

ARMORNITE–Division No. 2

Human Factors in Armor Operations Under Conditions of Limited Visibility[1] (Research for the Department of the Army)

"Test-Retest Reliability of an Experimental Model of a Vision Tester for Armed Forces Use," by Howard C. Olson, paper for 34th meeting of the Armed Forces-National Research Council, Vision Committee, April 1954.

*** Two groups of enlisted men, totaling 178 subjects and comparable with respect to age and intelligence, were tested and retested for nine visual skills on two types of testers. In general, the Armed Forces Vision Tester measured the skills with more consistency than did the experimental instrument. The two testers were essentially the same in ease of administration and in amount of testing time required.**

A Survey of Human Factors in Military Night Operations (With Special Application to Armor), by Donald A. Gordon, Special Report 11, 66 pp., November 1957. PB-132528 AD-149 357

Scientific and technical literature dealing with human factors in night military operations was reviewed, primarily for its applicability to problems of night Armor operations. Although the formulation of research problems in Armor night training is dependent upon the further stabilization of night operations doctrine, a number of studies are presently required, especially in (a) effectiveness of and countermeasures against various illuminants and (b) the development of proficiency measures for Armor units and personnel in performance of night operations.

Illumination and Terrain As Factors Affecting the Speed of Tank Travel, by C.J. Bailey and Howard C. Olson, Special Report 12, 40 pp., March 1958 (ARMORNITE I). AD-156 766

This study was conducted to obtain data on the travel time of tanks under various combinations of terrain and illumination conditions. Conditions included (a) five different kinds of terrain, (b) four different levels of natural illumination, and (c) five different kinds of artificial illumination. Two hundred tank commander-driver teams (drawn from six medium tank battalions at Fort Knox) drove M48 tanks over a test course; each team drove under only one level of natural illumination and one condition of artificial illumination. Tank speeds were most affected by terrain, followed by the position of the driver's hatch (open or closed), and the artificial illuminant employed; the effects of varying nighttime natural illumination were less marked.

Recognition of Vehicles by Observers Looking Into a Searchlight Beam, by Howard C. Olson, Albert E. Goss, and William D. Voiers, Technical Report 19, 13 pp., July 1958 (ARMORNITE II) PB-135955 AD-200 848

Information useful for night combat tactics was gathered on how soon average observers facing a searchlight recognized tank-size vehicles approaching from the light. Variables included observer distance and position, and vehicle path and type. Similar recognition data were collected under conditions of darkness. When vehicle path and observer were near beam center, recognition generally occurred about 250 yards sooner than it did when vehicle path was across the beam from the observer; under the latter condition recognition generally did not occur until the vehicle neared or entered the beam (or almost as long as in darkness). Recognition range was 75 yards greater for tank than for truck; a masking noise had little effect on recognition range.

Model Simulator Studies of the Visibility of Military Targets at Night, by Charles E. Hamilton, Subcontractor's report, 84 pp., August 1958 (Subcontractor: Engineering Research Institute, Vision Research Laboratories, University of Michigan) (ARMORNITE VI). AD-679 197

The report summarizes experimental studies using a scale model simulator to determine visibility distances of military targets under certain nighttime illumination conditions. The experiments concerned both detection and identification of targets, which were observed along ground paths under simulated natural and artificial nighttime illumination. The studies were intended to provide a basis for better understanding and specifying the stimulus factors that influence target visibility under such conditions. Photometric data were used to relate the simulator conditions to actual field conditions.

[1] A star at the beginning of the abstract indicates that the item is one of the ARMORNITE papers or presentations included in *Collected Papers Prepared Under Work Unit ARMORNITE–Human Factors in Armor Operations Under Conditions of Limited Visibility*, Professional Paper 12-68, May 1968.

The Effectiveness of 90mm Tank Gun Fire Against the 18-Inch Searchlight, Technical Report 56, by Alfred J. Kraemer, June 1959 (ARMORNITE III). AD-309 249

To estimate probable effectiveness of fire from main guns of enemy tanks against 18-inch tank-mounted searchlights used to illuminate targets at night, experienced gunners fired at the mirrored image of a searchlight using main guns of M48 tanks. Ranges were 800 and 1500 yd. and firing positions were in beam center and 10° off beam center. First- and cumulative-round hit probabilities were derived from dispersion data collected by using large target panels and color-coded rounds of ammunition. Time needed for tanks to obtain a hit after light was turned on, and sensing capabilities for in-beam and out-of-beam firing positions were determined.

"Victory Before Dawn," by Marvin Parrott, *Armor*, vol. LXVIII, no. 4, July-August 1959.

The Effects of Practice on the Performance of Basic Armor Skills at Night, by Robert A. DeBurger, Research Memorandum, 43 pp., January 1961 (ARMORNITE VIII). AD-477 648

Performance in ten basic armor skills was studied under reduced visibility. Illumination ranged from full red lighting to complete darkness inside the turret, and from high to very low natural light outside. Some skills acquired in daytime training transferred readily to nighttime, but others would require additional training. The implication is that a training program with a certain proportion of night training may overtrain in some skills and undertrain in others.

"Localization of Peripheral Light Flashes," by Alfred J. Kraemer, David L. Easley, and Meredith J. Hall, paper for Midwestern Psychological Association meeting, Chicago, May 1961 (ARMORNITE XI).

The purpose was to determine what kind of constant errors occur when observers are required to localize flashes in a nearly empty visual field. Stimulus positions varying in both the radial and eccentric dimensions were used; observers localized the flashes by pinpointing their positions. In two groups of 12 enlisted men there was a large constant error toward the center of the field. This error increased as a linear function of the distance of the flash location from the center.

Absolute Identification of Munsell Hues Under Red Illumination, by Kliem R. Miller, Research Memorandum, 10 pp., July 1961 (ARMORNITE IX). AD-632 690

Nine surface colors which are identifiable on an absolute basis in daylight were viewed under red light. Observers received practice in identifying them by number. Three different neutral gray masks were used to preclude identification on the basis of contrast. It was found that no more than four of these surface colors could be used together for coding under red light when absolute identification is required. Three groupings of four colors each can be used.

An Evaluation of Flash Localization Performance With the Fire Control System of the M48 Tank, by Alfred J. Kraemer, Technical Report 78, 30 pp., June 1962 (ARMORNITE X). AD-277 388

The object of this study was to evaluate the nighttime performance of tank gunners in localizing gun flashes with the fire control system of the M48 tank. Two night-simulated tests were conducted with 11 experienced and 20 inexperienced gunners, with these results: (a) In localizing 40 flash positions in a simulated periscope field of view, accuracy was fair within the reticle area but dropped off sharply outside it; (b) in laying the main tank gun against those flashes, accuracy was very poor. Error both in flash localization and in moving the gun controls contributed substantially to gun-laying error. It is concluded that the reticle of the M20 series periscopes (and presumably other periscopes and telescopes in which the reticle design covers only a small part of the field of view) is inadequate for localizing enemy gun flashes at night, and that the fire control system of the M48 series tank is inadequate for rapid laying of the main gun against nighttime targets that can be localized only by gun flashes.

Flash Localization and Reticle Design, by Alfred J. Kraemer, David L. Easley, and Meredith J. Hall, Research Memorandum, 13 pp., October 1962; presented under the title, "Gun Flash Localization as a Function of Reticle Design," at American Psychological Association convention, New York, September 1961 (ARMORNITE XI). AD-287 639

The purpose of this study was to determine the accuracy with which simulated gun flashes could be localized in the field of view of a tank periscope with the aid of four different grid-type reticles. Each of four groups of enlisted men localized 48 single flashes using one of the four reticles. For three of the reticles data were also obtained from three groups of officers.

Localizations were made by reading the azimuth and elevation of the perceived flash positions. No differences of consequence in performance were obtained between groups using different reticles. Enlisted men performed best with Reticle 4. Officers were found to localize more accurately than enlisted men, and it was suggested that the difference might be attributed to motivational factors.

The Effects of Two Types of Coordinate Systems on Localization of Peripheral Light Flashes, by Alfred J. Kraemer and David L. Easley, Research Memorandum, 15 pp., April 1963; paper for American Psychological Association convention, New York, September 1961 (ARMORNITE XI). AD-404 478

Ten groups of subjects localized single flashes, viewing monocularly, and responding with a projection pointer. Flash sources were located within a 64-degree circular field in a blacked-out room. One group saw only a fixation point. For another group only a cross was projected. Four groups were shown Cartesian coordinates, and four groups were shown polar coordinates. The density of the coordinate lines for the respective groups was increased by successive rectangular or polar bisection of the coordinate units, beginning with the cross. There were no appreciable differences in localization error between the groups which used one type of coordinate system and those which used the other. Introduction of the coordinate cross and the bisection of the cross, led to successively smaller errors in localization, but further increases in line density did not. All groups made constant errors of localizing flashes closer to the visual axis than they actually were.

"The Effect of Flash Duration on the Localization of Peripheral Light Flashes," by David L. Easley and Myles A. Jackson, paper for Southeastern Psychological Association meeting, Miami Beach, Fla., April 1963.

*Four Groups of 12 subjects each were used in localizing two dimensions of a brief stimulus in a large visual field. Each subject localized 48 single flashes under four conditions of flash duration. Although overall localization accuracy improved with increasing flash duration, this effect did not hold for all radial and eccentric positions.

Operator Proficiency in Interpreting Ground Surveillance Radar Signals (AN/TPS-33), by Alfred J. Kraemer, David L. Easley, Arthur L. Miller, and Paul H. Stevenson, Technical Report 90, June 1964 (For Official Use Only) (ARMORNITE XIII). AD-442 607

To measure operator proficiency in identifying audio signals from the AN/TPS-33 ground surveillance radar, a test of 120 tape-recorded signals generated by representative military targets was administered to 43 trained operators. It was found that they could discriminate between personnel and vehicle targets. An experiment was run to determine whether operators can be trained to identify vehicles on the basis of signal characteristics unique to each vehicle type. After two days' training, 10 naive officer subjects learned to discriminate reliably between tracked and wheeled vehicles, although there were marked differences in operator aptitude. (U)

The Effects of Observer Location and Viewing Method on Target Detection With the 18-Inch Tank-Mounted Searchlight, by Nicholas B. Louis, Technical Report 91, 43 pp., June 1964 (ARMORNITE V). AD-445 050

An experiment was designed to determine the effects on target detection of observer location and method of viewing in relation to several types of targets at selected distances. Data were collected from 336 observers stationed at the searchlight source and at various distances up to 160 yards from the light, along a line at approximately a right angle to the axis of the beam. Using the tank range finder, periscope, binoculars, or unaided vision, observers tried to detect and identify a jeep, tank, and APC at each of four distances. Observers farther away from the light source detected and identified more targets than observers close to the searchlight. Binoculars and, for the first 30 seconds, unaided vision were more effective than the range finder or periscope in detecting and identifying targets.

An Evaluation of a New Reticle Design System for Gunlaying Against Flashes, by David L. Easley, Research Memorandum, 22 pp., November 1964 (Technical Advisory Service); portions of this material were presented at the American Psychological Association convention, Philadelphia, September 1963 (ARMORNITE X). AD-455 070

The purpose of the research was to determine the effectiveness of utilizing a grid-type reticle, graduated in turns of the azimuth and elevation controls of the M60 tank, for gunlaying against enemy gun fire at night. Using the experimental reticle in a simulated firing situation, six experienced and seven inexperienced gunners localized and laid an M60 tank gun on each of 40 flashes. Though no group differences were significant, these two groups of gunners performed somewhat more accurately, but laid less quickly on the average, than a third group, which used the standard reticle. In the simulated situation, performance was better than it was in a field study. Factors which may have operated in the field study to degrade performance are discussed.

Collected Papers Prepared Under Work Unit ARMORNITE: Human Factors in Armor Operations Under Conditions of Limited Visibility, Professional Paper 12-68, 33 pp., May 1968.

(ARMORNITE Items included in the Professional Paper are indicated with a star at the beginning of the abstract.)

Results of studies to identify and solve auditory and visual training problems peculiar to Armor operations of the Army, under conditions of limited visibility, are discussed in this publication. The research reported includes a study of constant errors that occur when observers localized peripheral light flashes; an experiment on the effects of increasing flash duration on localization accuracy of peripheral light flashes; and a test of the reliability of an experimental vision tester for armed forces use.

Research By-Products resulting from this research effort are listed in Part III.

ARSUR–Division No. 2
A Survey of Training Problems in Armor
(Research for the Department of the Army)

Technical Supplement to the Report on a Survey of Armor Training Problems, by Howard C. Olson, Boyd L. Mathers, Norman Willard, Jr., and Norman E. Willmorth, Staff Memorandum, April 1955. AD-480 320

To help determine subject matter priorities in Armor training, experienced Armor personnel and students were asked to rank subject areas in their order of importance and in the order that proficiency is achieved. While officers and enlisted men differed consistently in their rankings of importance, both groups agreed that fire control equipment was most in need of greater training emphasis or more training time, and that dismounted drill, ceremonies, inspections, and command conferences need less training time than they currently received.

A Survey of Training Problems in Armor, by Edward J. Green, Boyd L. Mathers, Howard C. Olson, Norman Willard, Jr., and Norman E. Willmorth, interim report, June 1956. AD-480 319

Qualified Armor personnel (officers, training personnel, students, and trainees) indicated in interviews and questionnaires that the problem areas in Armor training were communications, driving and maintenance, gunnery, tactics, and administrative planning. The wide range of problems cited suggested that new training methods are needed in each problem area, with the emphasis in instruction changed in some areas from one subject to another.

AUTOSPAN–Division No. 7 (Social Science)

Development of a Generalized Method for Preparing Self-Instructional Foreign Language Courses (Research for the Department of the Army)

"Providing Communication Experiences in Programmed Foreign Language Instruction," by George H. Brown, paper for Defense Language Institute Language Conference, Carlisle Barracks, Penn., October 1968; based on paper for American Psychological Association convention, San Francisco, September 1968; issued as Professional Paper 35-68, 8 pp., November 1968. AD-679 916

This paper describes two techniques in programed instruction designed to offer a student genuine communication experiences in a foreign language. In "simulated tutoring," a recording is made of only the tutor's voice while he tutors a live subject in the correct pronunciation of a short dialogue. Students subsequently responding to the pre-recorded utterances experience the illusion that a live teacher is tutoring them. In "simulated conversation," the student is given information relevant to a communication situation (e.g., making a purchase) which is then simulated for him on tape in the foreign language. On the tape he is confronted with a relatively unpredictable set of questions and comments, to which he must generate appropriate responses.

Development and Evaluation of a Self-Instructional Spanish Course, by George H. Brown, Richard Beym, Thelma R. Smackey, and Angelo A. Cozzetto, Technical Report 70-14, 78 pp., September 1970 (AUTOSPAN II). AD-714 289 ED-044 996

This report describes the development and evaluation of a self-instructional Spanish course that was designed to produce an elementary communication skill, sufficient to enable a visitor in a Spanish-speaking country to cope with routine situations he is likely to encounter. The course consists of 106 lessons (text and tapes). The tapes are playable on any conventional tape device. The course involves what are believed to be the best features from the fields of modern classroom teaching, tutorial instruction, and programed instruction. A group of nine military personnel with no prior Spanish training completed the course in an average of 73.7 hours. Average scores on the three parts of the final examination were 73%, 85%, and 78%. Results were interpreted as establishing the feasibility of building self-instructional foreign language courses which teach a useful, although elementary, communication skill.

AVTRAIN–Division No. 6 (Aviation)

A Study of U.S. Coast Guard Aviator Training and Training Device Requirements (Research for the U.S. Coast Guard)

A Study of U.S. Coast Guard Aviator Training Requirements, by Eugene R. Hall, Paul W. Caro, Jr., and Oran B. Jolley, HumRRO Division No. 6 (Aviation) and Commander Gilbert E. Brown, Jr., United States Coast Guard, Technical Report 69-102, 89 pp., December 1969. AD-707 677

This report is concerned with relevant training methods for Coast Guard aviation. To meet this objective, a comprehensive study of aviator requirements during search and rescue missions was chosen for analysis in each of the four aircraft used by the Coast Guard. Interview data were used as the basis for a description of aviator performance and for a tabular listing of specific tasks involved. The report shows desirable functional characteristics for synthetic devices and provides a basis for subsequent development of specific operationally oriented training programs.

Design and Procurement Bases for Coast Guard Aircraft Simulators, by Paul W. Caro and Eugene R. Hall, HumRRO Division No. 6 (Aviation) and Commander Gilbert E. Brown, Jr., United States Coast Guard, Technical Report 69-103, 56 pp., December 1969. AD-708 209

In this exploratory study of the potential role of flight training devices in Coast Guard aviation training programs, the characteristics of the required synthetic training equipment, and development of plans for its funding and procurement are discussed. The magnitude of the synthetic flight training requirement and the cost-effectiveness benefits to be realized from use of such equipment are also examined. It is concluded that substantial training cost savings can be realized as a consequence of Variable Cockpit Training System (VCTS) utilization.

"Systems Engineering of Coast Guard Aviation Training," by Eugene R. Hall and Paul W. Caro, paper for Psychology in the Air Force symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971.

This paper describes a total-program application of the systems-engineering concept, including: (a) the techniques used to develop job-relevant terminal behavioral objectives (the Coast Guard search and rescue flight mission provides the operational context); (b) the assignment of objectives to academic, synthetic, and flight training; (c) the integration of these components into a systems-engineered training program; (d) the development of relatively objective proficiency assessment techniques; (e) the development of a flying training quality control system for maintaining and enhancing instructional efficiency and for management of the training system.

BASICTRAIN–Division No. 4[1]

Improved Training Procedures for Basic Combat Training (ATP 21-114) (Research for the Department of the Army)

§*Some Problems of Basic Training Effectiveness*, by Richard Snyder, interim report, September 1954 (BASICTRAIN I). AD-479 107

This report presents questionnaire data from 272 trainees representing five first-cycle training companies. Major findings of the survey, which are considered within the context of the new soldier's first Army training, indicated that the soldiers felt there was (a) lack of sleep and of time for their personal affairs, (b) poor coordination resulting in wasted time, (c) harsh treatment and harrassment, (d) ineffective leadership, and (e) lack of communication between trainees and cadre. The findings were interpreted as indicating organizational rather than individual problems.

§*Achievement in Basic Training*, by George D. Greer and Benjamin W. White, Staff Memorandum, July 1955 (BASICTRAIN I). AD-479 069

This report describes what was learned in eight weeks of basic combat training by a sample of Sixth Infantry Division trainees. Performance and written test results are reported and levels of knowledge at the outset of basic training are compared with those attained by the end of eight weeks. There was a gain of training in a Military Information Test (included in the report) consisting of 147 multiple-choice items. In-the-field performance test results indicate that some skills are learned by the vast majority of trainees during the course, while others are learned by only a small minority of men. Suggestions regarding the use of this information in the planning and revising of the curriculum are made.

§*Basic Military Information and Combat Effectiveness*, by George D. Greer, Jr., and Martha Myers, Staff Memorandum, July 1955 (BASICTRAIN I). AD-478 558

Over 300 combat infantrymen in Korea, identified as fighters or non-fighters, were given a 300-item written Military Information Test covering combat-relevant information taught in Basic Combat and Advanced Individual Training. Sixty-four fighter/non-fighter pairs were matched on Aptitude Area I scores. Fighters were superior to non-fighters on the total test and on the operation, maintenance, and mechanics of weapons; preparation for and behavior during defense; and behavior during imminent or actual contact with the enemy. On more than 15% of the items, neither group possessed accurate relevant information. For the combined group, the highest level of information was in tactics; next highest, weapons; lowest, general subjects.

§*Basic Infantry Skills Performance Test, ATP 21-114*, by George D. Greer, Jr., Finis W. Wilson, and Morton G. Wolpert, Staff Memorandum, March 1956. AD-479 070

This research by-product is a performance achievement test of military skills and knowledge used as a criterion measure in a broad survey of Basic Training. For a detailed presentation of the total test station and item scores, and the test's reliability, refer to *Achievement in Basic Training*, Staff Memorandum by George Greer and Benjamin White, July 1955.

§"An Analysis of Certain Determinants, Characteristics, and Covariates of Basic Trainee Leadership Sociometric Datsa," by Darwin Palmer and George D. Greer, Jr., paper for Western Psychological Association meeting, 1956.

This study was an attempt to determine the correlates of peer evaluations of existing and potential trainee squad leaders in the Army. Between 200 and 250 men in each of 40 Basic Training companies were given batteries of tests at several points during training. It was found that trainee evaluation of their fellows was reliable; between the fourth and eighth week of Basic Training the average correlation for positive votes was .85, and for negative votes, .77. There were significant and consistent relationships of background and descriptive variables. It appeared that a sociometric test might be useful as a criterion in developing other squad leader selection instruments.

[1] This Work Unit was initiated at Division No. 3. The symbol § indicated an item prepared at Division No. 3.

§"Predictors, Descriptions and Correlates of Basic Training Delinquents," by George D. Greer, Jr., paper for Western Psychological Association meeting, Spring 1956.

This study deals with the personal, as distinguished from situational, variables related to delinquent behavior during the eight weeks of Basic Training. Over a six-month period nearly 10,000 trainees were categorized into four groups: three delinquent and one "normal." Members of all three delinquent groups had a history of lower socioeconomic associations, more civilian arrests, less formal education, and a greater frequency of "hooky playing" and running away from home as children. On the Army Aptitude Area I score, the mean score of the normal group was 108 and the average scores of the three delinquent groups were 101, 97, and 89. The findings of this study closely paralleled results of research on juvenile delinquents.

§"Evaluation of Four and Eight Weeks Basic Training for Men of Various Intelligence Levels," by Victor B. Cline, Alan Beals, and Dennis Seidman, paper for American Psychological Association convention, Chicago, September 1956 (BASICTRAIN II).

Army inductees who received the usual eight weeks basic training course were compared with other trainees who received a condensed four weeks training cycle. On tests of a paper-pencil type, four-week trainees and eight-week trainees performed equally well. When tests involving performance-type activities such as assembling weapons and operating communications equipment were compared, high intelligence soldiers learned as much in four weeks as in eight but middle and low intelligence men did profit by the additional training. Soldiers of high intelligence learned just as much when trained alongside men of middle and low intelligence as when trained in special companies by themselves.

§*Evaluation of Four-Week and Eight-Week Basic Training for Men of Various Intelligence Levels*, by Victor B. Cline, Alan Beals, and Dennis Seidman, Technical Report 32, November 1956 (BASICTRAIN II). PB-124722 AD-114 111

This study was designed (a) to determine the effects on trainee performance of substitution of an accelerated four-week for the conventional eight-week basic training program, and (b) to examine the possibilities for more efficient utilization of high-aptitude personnel. Results indicated that, with regard to military information, all aptitude levels learned as much in the four-week course as in the standard eight-week course. On performance-type tests, middle- and low-aptitude men benefited from the full eight weeks' training. With respect to rifle marksmanship and physical fitness, the full eight weeks' training yielded better results at all intelligence levels. The high-aptitude personnel in the four-week training program acquired as much military information, and did as well on performance tests, as high-aptitude personnel in the eight-week course, and were superior to the normal-input eight-week trainees.

§*Basic Training Effectiveness: A Discussion of Instruction Centralization, The Training Curriculum and Achievement Evaluation*, by George D. Greer, Jr., Staff Memorandum, June 1957 (BASICTRAIN I). AD-482 180

This paper is a discussion of three factors important to Basic Training in the Army: the organizational structure within which the training occurs, the curriculum, and the evaluation procedures necessary for affording indication of training effectiveness. The discussion is based on personal observations and on a survey in which 10,000 trainees, 40 officers, and 200 NCO cadre from 40 training companies were tested at three periods in a Basic Training cycle.

Content Outline and Reference Data, ATP 21-114 (14 November 1958), Research Memorandum, August 1959. AD-482 181

The Development of a List of Minimal Training Goals for Basic Combat Training, by Albert Elkin, Technical Report 67, December 1960 (BASICTRAIN I). PB-153865 AD-248 634

The Basic Combat Training Program (ATP 21-114, Nov 58) was analyzed in relation to each of 17 supporting Army Subject Schedules. Discrepancies between the ATP and referenced subject schedules were noted and revisions suggested. On the basis of this analysis, a list of minimum training goals was devised for each subject presented in the report. These suggested training goals cover the minimum knowledge and skills needed by the individual basic combat trainee.

BASICTRAIN *(Cont.)*

Effects of Training Response Mode, Test Form, and Measure on Acquisition of Semi-Ordered Factual Materials, by Joseph F. Follettie, Research Memorandum, April 1961 (BASICTRAIN II). AD-632 189

This report presents findings from the assessment of various programed materials that suggest no difference between live and taped lecture, a significant advantage of read material over heard material, a significant advantage of self-paced reading over class-paced reading, and a significant advantage of the plain book format over the scrambled book format. Results also suggest that recognition form tests based on neo-rote contents might be used in lieu of recall form tests in that there is a generally stable relationship between the two test forms.

Programmed Instruction: A Plan of Research, by Thomas J. McCrystal, Research Memorandum, May 1961 (BASICTRAIN II). AD-632 568

Research By-Products resulting from this research effort are listed in Part III.

CAMBCOM–Division No. 4

Knowledges, Skills, and Thought Processes of the Battalion Commander and Primary Staff (Research for the Department of the Army)

"Work Unit CAMBCOM–Knowledges, Skills, and Thought Processes of the Battalion Commander and Primary Staff," by Theodore R. Powers, briefing to U.S. Continental Army Command, Fort Monroe, Va., October 1968; included in *Use of Job and Task Analysis in Training*, Professional Paper 1-69, 42 pp., January 1969. AD-688 810

Knowledge and Skills Inventory, Combat Arms Maneuver Battalion.

A tentative task inventory for each of the principal staff officers of the six types of maneuver battalion was developed and commented on by the U.S. Army Infantry School, revised, then submitted to selected maneuver battalion staffs for comments by job incumbents. Based on this survey, a final inventory was developed and submitted to the staffs of more than 80% of all maneuver battalions. Results of this survey are reported in these Research By-Products.

The Adjutant S-1, Research By-Product, 1970.

The Intelligence Officer S-2, Research By-Product, 1970.

The Operations/Training Officer S-3, Research By-Product, 1970.

The Logistics Officer S-4, Research By-Product, 1970.

CAREER–Division No. 3

The Army as a Career for Existing and Potential Qualified Personnel[1] (Research for the Department of the Army)

"A Bibliography on Military Career Attractiveness," material developed in connection with briefing to Army Personnel and Training Research Advisory Committee, June 1958 (CAREER I).

★In most of the categories, reports are listed alphabetically by title under the military agency which produced them. The list includes items read or abstracted by the researchers and other relevant items listed in annotated bibliographies.

"Some Problems in the Retention of Army Enlisted Personnel," by Richard Snyder, paper for symposium at American Psychological Association convention, Washington, D.C., September 1958 (CAREER I).

★This paper deals with the recruitment and retention aspects of military manpower problems, especially those concerning retention of personnel having technical skills and leadership potential. Research on possible techniques to be used in the differential training of volunteers and drafted soldiers is discussed.

[1] A star at the beginning of the abstract indicates that the item is one of the CAREER papers or presentations included in *Collected Papers Prepared Under Work Unit CAREER The Army as a Career for Existing and Potential Qualified Personnel*, Professional Paper 11-69, April 1969

"The Effect of Avoidance of Conflict on Decisions About Continuing in an Activity," by Judson Mills and Richard Snyder, paper for Western Psychological Association meeting, Spring 1959 (CAREER III).

*On the basic assumption that persons faced with a difficult important decision will tend to avoid positive action, 80 Army recruits were studied to determine the frequency with which they might make a request either to change or continue an assigned activity. The results supported the prediction that persons in conflict about changing from one activity to another will change less frequently when they must make a request to change, than when they must make a request to continue.

"Effects of Uncertainty About Original Enlistment on Reported Change in Opinion Toward the Army," by Richard Snyder and Harry A. Burdick, paper for American Psychological Association convention, New York City, 1961.

*From dissonance theory it was predicted that recruit opinions about the Army will tend to become more favorable following initial exposure to service as a function of the uncertainty about the original enlistment decision, and the importance of the decision. Subjects were 635 volunteer recruits. Uncertainty was inferred from responses to the question: "Would you have enlisted in the Army if there had been no draft?" Importance was inferred from expressed career interest. Results confirmed both predictions. The curvilinear relationship between reported opinion change and responses from which uncertainty was inferred is difficult to interpret plausibly by alternative theories.

Avoidance of Commitment and Need for Closure as Determinants of Behavior in Decision Situations, by Richard Snyder and Judson Mills, Research Report 12, June 1963 (CAREER III). AD-478 519

Investigation was made of behavior in decision situations involving choice among mutually exclusive alternatives, in which action did not necessarily have to be taken. Three hypotheses were tested which concerned the influence of certain variables upon the tendency to avoid commitment to a specific course of action. Choices were recorded by subjects in a four-part questionnaire. Results were analyzed in terms of several variables and their experimental manipulations. It was concluded that a subject, in a situation in which he does not need to take action in order to know the outcome, will not be likely to express his real preference unless that preference is strong.

Collected Papers Prepared Under Work Unit CAREER. The Army as a Career for Existing and Potential Qualified Personnel, Professional Paper 11-69, 26 pp., April 1969. AD-688 814

(CAREER items included in this Professional Paper are indicated with a star at the beginning of the abstract.)

Research in the area of developing specific measures for increasing the attractiveness of Army careers and for improving the retention of high caliber personnel, with particular emphasis on careers in the combat and "hard" skills, is reported in this series of papers. The collection includes a bibliography on military career attractiveness as an appendix item.

CENTER–Division No. 3

Improvement of Effectiveness of Basic Combat Training Graduates (Research for the Department of the Army)

A Study of Category IV Personnel in Basic Training, by S. James Goffard, Morris Showel, and Hilton M. Bialek, Technical Report 66-2, 36 pp., April 1966. AD-481 737

Samples of men in Mental Category IV and men in categories of higher mental ability (I, II, III), who were matched according to their Army component, were selected from companies in Basic Combat Training (BCT). Information about their backgrounds, aspirations, attitudes, aptitudes, and performances during and at the end of BCT was gathered from individual interviews, ratings, and Army records. The differences between the men in Category IV and those in Categories I, II, and III on most of these measures were small but statistically stable. The socioeconomic backgrounds of Category IV personnel tended to be poorer, and their performances in BCT were only slightly less adequate, and their attitudes toward military service were more favorable. Overlapping between the two groups was very extensive on almost every measure and on MOS assignment.

The Corrective Action Questionnaire Development and Administration to Officers and NCOs, by Morris Showel, Technical Report 66-5, 11 pp., May 1966. AD-637 789

This study was undertaken to develop a research instrument that would assess the degree of severity with which NCOs and company grade officers react to various types of situations in which trainees fail to perform properly. A preliminary version of a Corrective Action Questionnaire was developed, and it was administered to 131 subjects in order to develop information to revise the research instrument. Results of the trial administration suggested that: (a) more severe corrective action would be taken by older cadre who had spent more time in the Army, served longer in a training company, and had not attended college; (b) officers consistently proposed less severe corrective action than NCOs; (c) First Sergeants and those NCOs rated by their superiors as above average tended to be more severe than those NCOs rated as below average; and (d) officers and NCOs showed a high degree of agreement as to the relative seriousness of trainee performance failures. The Corrective Action Questionnaire as revised, may be expected to be an effective research instrument.

Preliminary Study of Motivation and Incentives in Basic Combat Training, by Hilton Bialek and Michael McNeil, Technical Report 68-6, 12 pp., May 1968. AD-670 744

In an effort to get a useful measure of subjective reward values for Basic Combat Training personnel, 43 possible incentives were rated by two groups of trainees on a 7-point scale, from most attractive to least attractive. Nineteen incentives were identified as being reliable and of low variability. Of these, the 10 most attractive incentives were categorized into one of three classes: Recognition (Peer and/or Social), Material Reward, or Autonomy (Freedom). It was concluded that the 10 specific incentives identified and the categories of Recognition and Autonomy might be controlled and varied to measure the effectiveness of variations in BCT.

CHATTER—Psychological Warfare Division

Factors Contributing to the Gaining of Attention, Understanding, and Credibility in Communications
(Research for the Department of the Army)

Factors Affecting Credibility in Psychological Warfare Communications, by Earl R. Carlson and Herbert I. Abelson. Special Report 5, July 1956. PB-132400 AD-122 564

This report summarizes a survey of the factors that contribute to achieving credibility for a propaganda message. It is designed specifically for Army psychological warfare personnel and is intended to serve as a "primer on credibility" for the basic indoctrination of (a) the students and faculty at the Psychological Warfare School, (b) officers assigned to the staff of the Chief of Psychological Warfare, and (c) personnel in operational psywar units. As a primer, it provides only a starting point for more specialized inquiry in the field of communications credibility.

CINCO—Division No. 1 (System Operations)

Procurement, Classification, and Training Problems at the Army Intelligence School
(Research for the Department of the Army)

Procurement of Counter Intelligence Corps Trainees, by Roy J. Jones and Berton Winograd, Special Report 10, October 1957 (CINCO I). PB-134601 AD-145 273

This study investigated two problems of procurement of trainees for the Counter Intelligence Corps: the setting of quotas for the basic training centers and the feasibility of extending the enlistment program to three years. Quotas as presently based on estimates of future strength of the training centers were compared with quotas based on actual input and on the number of men eligible for CIC training; quota-setting procedure based on the number of eligible men at each training center would be somewhat more accurate than the other methods. The proportion of recommended eligibles who were willing to extend their enlistment to three years indicates that a three-year enlistment requirement could be instituted without reducing the current quality standards.

CIVIC—Division No. 7 (Social Science)
Guidelines for Civic Action Advisors
(Research for the Department of the Army)

Human Factors in Civic Action: A Selected Annotated Bibliography, by Robert J. Foster, with the technical assistance of J. Charnel Anderson, Robert D. Nye, and Sheldon Smith, Research Memorandum, 92 pp., June 1963. AD-412 657

This bibliography is designed to aid in educating and training United States personnel who will assist the military personnel of developing nations to play an active role in the socioeconomic advancement of their countries. It should also be of interest to personnel of agencies that are concerned with providing technical assistance to the developing nations. The chief goal of the compilation is to provide a selected list of items which a busy officer could reasonably expect to read in entirety within a few weeks before going overseas. Priority has been given to items that are nontechnical and thought-provoking, have relevance to most underdeveloped areas, are of article rather than book length, and emphasize the problems of working across cultural barriers. Basic divisions of the bibliography are—Philosophy of Civic Action and Foreign Aid, The Nature of Underdeveloped Countries, The Techniques of Planned Change, and Individual Effectiveness.

"The Process of Cross-Cultural Innovation," by Arthur H. Niehoff and J. Charnel Anderson, *International Development Review*, vol. VI, no. 2, June 1964; issued as Professional Paper 36-67, 18 pp., August 1967 (CIVIC II). AS-659 038

This paper explores cross-cultural innovation by analyzing data based on actual field studies. The primary criterion for case selection was that the characteristics of the innovator and the recipient groups be described. The country where the innovation was attempted is listed, along with the specific type of innovation proposed and specific description of the change effort. The cases are then evaluated in terms of success and failure, and the most important factors, positive or negative, influencing the outcome are analyzed. The emerging pattern of the total process is discussed.

"A Quantitative Approach to the Study of Directed Cross-Cultural Change," by Arthur H. Niehoff, *American Anthropological Association Newsletter*, vol. 5, no. 7, September 1964; issued as Professional Paper 40-68, 6 pp., December 1968 (CIVIC II). AD-682 347

A comparative method for analyzing efforts of induced change in cross-cultural situations is described. Case histories of efforts to introduce innovations to local communities of the developing nations were separated into "success" and "failure" groups. The behavioral components that influenced such outcomes were categorized according to whether they provided positive or negative influence. Two major influence types emerged: change agent techniques and recipient responses. By analyzing a sizable number of such case histories, quantified statements should be possible as to the most important influences.

A Selected Bibliography of Cross-Cultural Change Projects, by Arthur H. Niehoff and J. Charnel Anderson, Research Memorandum, 32 pp., October 1964 (CIVIC II). AD-608 740

This report is a bibliography of case histories each of which describes an effort by a change agent, or agents, to introduce a new idea or technique into a culture other than his own. In compiling this selection, the normal range of technical aid projects was included, such as community development, agricultural extension, education, public health, and so forth. The cases are grouped by country or political unit in alphabetical order. Each citation is followed by a statement of the goal of the innovator and, when available, the size and time period of the project.

"The Primary Variables in Directed Cross-Cultural Change," by Arthur H. Niehoff and J. Charnel Anderson, paper for American Anthropological Association meeting, Detroit, November 1964; issued as Professional Paper 36-68, 28 pp., November 1968 (CIVIC II). AD-679 917

From comparative analyses of 171 cases, the principal factors that acted as sanctions or barriers in the introduction of innovations were extracted. They divide themselves into three types of behavior: (a) the techniques, such as communication, demonstration, and flexibility, of the innovator; (b) the motivation—in the form of felt need, practical economic benefit, novelty—for acceptance or rejection by the recipients; and (c) the reaction, such as leadership, theological beliefs, and economic patterns, produced by the traditional cultural patterns.

"Peasant Fatalism and Socioeconomic Innovation," by Arthur Niehoff, paper for American Anthropological Association meeting, Denver, November 1965; revised version by Authur H. Niehoff and J. Charnel Anderson in *Human Organization*, vol. 25, no. 4, Winter 1966; also issued as Professional Paper 33-67, 13 pp., June 1967 (CIVIC II). AD-637 001

An examination of the nature of negativism in developing countries resulted in isolation of three main types—supernatural, situational, and project negativism. Although all these forces are significant in sociotechnical change, they do not constitute a critical influence nearly as often as do other characteristics of traditional society such as leadership patterns, social structure, and economic patterns. They are still less significant in the total change process than communication techniques, type of participation obtained, or degree of utilization of traditional culture.

"Food Habits and the Introduction of New Foods," by Arthur H. Niehoff, paper for American Association for the Advancement of Science meeting, Washington, December 1966; published in *Journal of the Washington Academy of Sciences*, vol. 57, [illegible]ay 1967; also issued as Professional Paper 9-67, 10 pp., March 1967. AD-650 448

Normal resistances to new foods being introduced in local communities, based chiefly on traditional habits and beliefs, can be overcome by selecting proper innovations and using proper techniques. The innovation most likely to be successful is one that adapts to local habits and beliefs, is based on needs recognized by the local people, and provides a clearly perceived practical benefit to them. This means that a minimum understanding of the local culture is needed for new ideas to be successfully introduced. The primary requirements for introducing the idea are efficient communication channels for transferring the knowledge of it (most critical being the creation of feedback channels from the grass-roots level), and obtaining the sanction of local leaders.

"Intra-Group Communication and Induced Change," by Arthur H. Niehoff, paper for Society for Applied Anthropology meeting, Washington, May 1967; issued as Professional Paper 25-67, 10 pp., June 1967. AD-654 124

This paper discusses the major technique that influences the process of introducing socio-economic innovations in local communities of non-industrial countries: the establishment of effective communication. Positive gossip is shown to be an index of efficient information flow, and the author describes several case histories in which this is the most important factor in a project's success. Other innovation techniques used by change agents to bring about innovations in a local community, as noted in the case histories, include adaptation to local cultural patterns, utilization of local leadership, and utilization of positive motivation.

CIVIC *(Cont.)*

Promoting Civic Action in Less Developed Nations: A Conceptualization of the U.S. Military Mission Role, by Alfred J. Kraemer, Technical Report 68-10, 31 pp., July 1968 (CIVIC I). AD-673 672

In its efforts to promote innovations among the host-country military in the less developed nations, the U.S. military mission may not be able to function effectively in the role of expert advisor because the military system of the host country may lack many of the characteristics necessary for adopting innovations. Under such conditions it is more fruitful to think of the mission's role as helping develop the conditions under which the innovations will be adopted. This role is particularly appropriate for the mission's efforts to promote civic action (conceived as the development of people's capacities) in countries where the military's acceptance of civic action as one of their main functions constitutes a radical social innovation. Mission responsibilities in the performance of this role are outlined and some implications of the concepts proposed are offered.

Planned Change in Agrarian Countries, by Arthur H. Niehoff, Technical Report 69-21, 152 pp., December 1969 (CIVIC II). AD-701 167 ED-040 349

The report is concerned with guidelines for relevant development projects in agrarian countries. Case studies of past projects, which were used for analysis, show that factors of special importance to success in development projects are: cooperation of local leaders; degree and immediacy of practical benefits; innovator skill in communication processes; and participation of recipients in implementing the change, and in maintaining the innovations.

Research By Products resulting from this research effort are listed in Part III.

CLASSIC–Division No. 1 (System Operations)[1]

A Program of Research on the Activities and Training of Guided Missiles Personnel (Research for the Department of the Army)

A Study of Human Factors in the Operation of the Nike Ajax System, Part I: Training Problems and Requirements, Part II: The "Shooting Team" Recommended Operating Procedures, by Randall M. Hanes and Robert A. Goldbeck, Technical Report 51, November 1958 (For Official Use Only) (Subcontractor: American Institute for Research) (CLASSIC I). AD-207 097

As an initial step in standardizing training procedures and developing proficiency measures for guided missile personnel, a survey of training problems and an analysis of Nike-Ajax team procedures were undertaken. Data on school and on-site training were obtained from various Nike-Ajax installations and from the AAA & GM School. Operating procedures were analyzed through summarization and integration of the procedures which are followed by a number of Nike-Ajax batteries in the Pittsburgh, Chicago, and New York Areas. Training modifications are recommended, and a new set of standardized alert procedures was developed and is presented. (U)

A Study of Human Factors in the Operation of the Nike Ajax System, Part III: Technical Appendices, by Randall M. Hanes and Robert A. Goldbeck, Research Memorandum, November 1958 (For Official Use Only) (Subcontractor: American Institute for Research) (CLASSIC I) AD-482 186

Research By-Products resulting from this research effort are listed in Part III.

[1] This Work Unit terminated at Division No. 5

COLDSPOT–Division No. 1 (System Operations)[1]
Human Factors in Military Performance in Extreme Cold Weather
(Research for the Department of the Army)

§*A Survey of Human Factors in Military Performance in Extreme Cold Weather*, by Norman F Washburne, Research Memorandum, June 1960 (COLDSPOT I) AD-477 [illegible]

"Command Decision Making in the Far North," by Norman F Washburne, paper for American Sociological Association meeting, September 1960 (COLDSPOT II)

Cold Weather Operational Training of Infantry Forces in the Strategic Army Corps, by Norman F Washburne, Technical Report 86, February 1964 (For Official Use Only) (COLDSPOT III) AD-432 095

This research was undertaken to study the training problems of infantry forces in the Strategic Army Corps during cold-weather operations. A research team was attached to CINCPAC forces to observe troop performance during the training and maneuver phases of Exercise LITTLE BEAR in Alaska during the winter of 1960. The data indicated areas of training content needing greater emphasis, and included suggestions regarding the context in which certain portions of the training should be given. (U)

COMSERVE–Division No. 7 (Social Science)
Development of a Manual for Community Service Volunteers
(Research for the Department of the Army)

Handbook on Volunteers in Army Community Service, by Stanley Levin, Neal T Parsons, and Daniel Thursz, 126 pp., October 1969. (Subcontractor: Center for the Study of Voluntarism, School of Social Work, University of Maryland). AD-701 463

This handbook offers comprehensive information on developing and administering a volunteer program for Army Community Service (ACS). The handbook stresses the encouragement of innovation, flexibility, and individual initiative both in personnel and programs. Since ACS Centers differ in many ways, the handbook discusses general guidelines and suggestions rather than detailed specifications in order that the information can be adapted and interpreted according to local circumstances. Among the topics covered are recruiting volunteers, interviewing, preparing job descriptions and facilities, supervision, and training design.

[1]This Work Unit was initiated in the Executive Office. The symbol § indicates an item prepared at the Executive Office.

COMTAC–Division No. 4[1]

Tactual Communication as a Medium for Increasing Control in Small-Unit Operations (Research for the Department of the Army)

"Recognition Thresholds and Accuracy for Differing Body Regions as a Function of Electrode Number and Spacing," by R.L. Brown, R.A. Spern, K. Schmitt, and A. Solomon, *Perceptual and Motor Skills*, vol. 23, no. 3, December 1966; issued as Professional Paper 3-67, 10 pp., January 1967 (COMTAC I). AD-649 318

Recognition thresholds and maximum accuracy levels were established on 12 subjects as a function of number of electrodes (2, 3, 4, and 5) and inter-electrode distance for various body regions (chest, abdomen, and back). There was little systematic difference among body regions with respect to the threshold and accuracy data; however, the number of electrodes proved to be significant. The abdomen appeared to be a slightly more favorable electrode site with a 5-electrode array.

"Stimulus Parameter Considerations and Individual Differences in Cutaneous Sensitivity to Electropulse Stimulation," by R.L. Brown, R.A. Spern, K. Schmitt, and A. Solomon, *Perceptual and Motor Skills*, vol. 23, no. 3, December 1966; issued as Professional Paper 4-67, 10 pp., January 1967 (COMTAC I). AD-649 319

The two experiments described were concerned with defining the optimal parameter values for an electropulse stimulus and the extent of subject differences. In the first experiment, touch and pain threshold variations were established on 12 subjects as a function of pulse number (1, 4, 8) and pulse duration (0.5, 1.0 msec.). Significant support was obtained for use of a single pulse of 0.5-msec. duration. In the second experiment, touch and pain thresholds were obtained on 20 subjects coincident with body region and session variation. The abdomen and chest appear to be ideal electrode sites. Subject differences over time were discussed.

"Electropulse Responsivity to Changes in Skin Moisture," by R.L. Brown, R.A. Spern, and A. Solomon, *Perceptual and Motor Skills*, vol. 24, no. 1, February 1967; issued as Professional Paper 16-67, 8 pp., April 1967 (COMTAC I). AD-651 053

Twelve subjects were exposed to electropulse stimulation under three moisture treatments: dry, water immersion, and a fluid approximation of sweat. Touch threshold data were obtained under these conditions during the first half of the experiment and electropulse recognition responses during the second half. A significant threshold rise occurred with increased amounts of moisture on the skin. Similarly, recognition accuracy decreased but remained with a 90 to 100% range. Human engineering implications pertinent to a tactual communication are discussed.

"A Differential Comparison of Two Types of Electropulse Alphabets Based on Locus of Stimulation," by R.L. Brown, D. Nihinger, G. Ollie, and A. Solomon, *Perceptual and Motor Skills*, vol. 24, no. 3, June 1967; issued as Professional Paper 32-67, 8 pp., June 1967 (COMTAC I). AD-655 746

Recognition accuracy was observed on 25 subjects with variation in the type placement (single- and multi-body regions) when varying numbers (1, 2, 3, 5, and 7) of electrode sites were pulsed simultaneously from among a 10-electrode array. Accuracy dropped drastically with increased number of sites pulsed and was most pronounced when the electrode array was restricted to a single region of the body. The accumulated data appear to cast serious doubt on the use of patterning of simultaneous electropulses as a fruitful approach to tactual communication. An alternative approach was proposed.

[1] For earlier work in this area, see Exploratory Study 30

COMTAC *(Cont.)*

A Content Analysis of Communications Within Army Small-Unit Patrolling Operations, by Ronald L. Brown, Technical Report 67-7, 45 pp., June 1967 (COMTAC I). AD-817 795

The study presents the results of a content analysis of communications within Army small-unit patrolling operations. Field observations and recordings were made of all communication acts which occurred during the course of seven Ranger patrols at both the jungle and mountain training sites. For each communication act the following details were recorded: (a) time of transmission, (b) content of message, (c) means of transmission, (d) designation of sender and receiver, and (e) nature of communication failures. This information provided: (a) a view of the informational flow within the organizational structure of a patrol, and (b) the basis for developing a set of brief codes suitable for use both with the proposed tactual communication system and existing signal techniques.

"Determinants of Tactual Perception of Finger-Drawn Symbols: Reappraisal," by Douglas S. Holmes, Jon E. Roeckelein, and Joseph A. Olmstead, *Perceptual and Motor Skills*, vol. 27, no. 2, October 1968; issued as Professional Paper 37-68, 16 pp., November 1968. AD-681 666

Previous researchers, notably Krech and Crutchfield (1958) and Natsoulas and Dubanoski (1964), have reported finding individual differences in perception of symbols drawn by finger on the skin. Natsoulas (1966, 1967), and Yonge (1965) have presented alternative formulations of the determinants of tactual perception of symbols. This paper contains an analysis of some of the conceptual and methodological issues involved and presents a third formulation. Failure to find individual differences with 46 subjects in the present study supports the conclusion that individual differences previously reported can be attributed to errors occurring under conditions of ambiguity.

Research By-Products resulting from this research effort are listed in Part III.

CONTACT—Division No. 7 (Social Science)[1]

Development of Training Procedures for Faster Acquisition of Perishable Tactical Information From Non-English-Speaking Prisoners of War (Research for the Department of the Army)

§"A Feasibility Study of a Special, Machine-Taught Oral-Aural Russian Language Course," by E.H. Rocklyn and R.I. Moren, paper for American Psychological Association convention, September 1960 (CONTACT I).

Popularity of commercial, machine-taught, "do-it-yourself" foreign language courses is widespread. The effectiveness of such courses, especially in teaching speaking and understanding, is not usually evaluated. A special machine-taught course in speaking and understanding Russian was constructed to answer such questions as: Can basic skills in speaking and understanding foreign languages be programed and machine-taught? Can students learn to pronounce Russian adequately without human (live) instruction or assistance? Can course material be programed to produce and sustain student motivation? Administration and evaluation of this course supports the feasibility of machine-teaching foreign languages.

"A Limited Language for Obtaining Combat Information From POW's: A Pilot Study," by Richard I. Moren and Eugene H. Rocklyn, paper for American Psychological Association convention, September 1960 (CONTACT I).

In order for combat troops to obtain perishable tactical information from newly captured prisoners of war, knowledge of the enemy language is necessary. A limited language in 20 days. In a simulated POW situation they questioned Russian-speaking personnel and were able to obtain information which could have been of value in actual combat, thus demonstrating the feasibility of the model in the Slavic language family.

[1] This Work Unit was initiated at Division No. 1 (System Operations). The symbol § indicated an item prepared at Division No. 1.

"Problems in Programming an Intensive Oral-Aural Language Course," by Eugene H. Rocklyn, paper for First Conference of Language Programmers, University of Michigan, April 1961 (CONTACT I).

"An Approach to Automated Language Teaching," by Eugene H. Rocklyn, paper for District of Columbia Psychological Association meeting, [May 1961] (CONTACT I).

"Language Programing for the Foreign Student," by Eugene H. Rocklyn, paper for Speech Association of America convention, New York, December 1961; issued as Professional Paper 5-67, February 1967 (CONTACT I). AD-647 839 ED-022 401

The possibility of constructing a core language course that would be completely automated, or self-instructional, for the purpose of teaching foreign students to speak and understand English is discussed. In order to avoid superimposing English instruction upon the original educational goal of foreign students in the United States, a self-instructional English course built for the student's specific country might be given to him before he leaves for the United States, or soon after arrival if necessary. As an example of a self-instructional course, the author describes an automated course in the Russian language which was designed for a specialized military need. The problems faced in creating it, and their solutions are described. Course effectiveness, in terms of student ability to speak and understand the Russian material given, supports the feasibility of machine-teaching a limited language course.

Development and Evaluation of Training Methods for the Rapid Acquisition of Language Skills, by Eugene H. Rocklyn, Richard I. Moren, and Andre Zinovieff, Research Report 9, January 1962 (CONTACT I). AD-271 642

This research explored the feasibility of machine-teaching enough of a foreign language to combat soldiers to enable them to obtain tactical information from newly captured prisoners of war. The course material used in the pilot study (Russian) was limited to tactical subject matter, presented by means of dual-track tape recorders, and arranged to build and sustain motivation and maximize learning efficiency without use of human instructors. The results of this study, as measured by both academic and job-simulated tests, support the feasibility of machine-teaching limited foreign language skills. The methodology developed has further possible application in foreign language teaching.

"Programming an Intensive Oral-Aural Language Course," by Eugene H. Rocklyn, paper for Southeastern Psychological Association meeting, Spring 1962 (CONTACT I).

"The Evaluation of Self-Instructional Foreign Language Courses," by Eugene H. Rocklyn, paper for National Society for Programmed Instruction meeting, San Antonio, April 1964.

"A Self-Instructional Program for Tonal Discrimination—Identification Lessons in Foreign Language Learning," by Eugene H. Rocklyn and Catherine Garvey, paper for National Society for Programmed Instruction meeting, San Antonio, April 1964.

A Self-Instructional Tactical Language Course in Russian, Eugene H. Rocklyn, Technical Report 65-14, December 1965 (CONTACT II). AD-626 262

To enable the combat soldier to obtain perishable, tactical information from newly captured prisoners of war, a brief, self-instructional Russian language course was developed and evaluated. Course content, based on questionnaires to combat-experienced personnel, covered areas of information likely to be used in any offensive or defensive questioning situation. The course was taken by 13 students who ranged from 0 to the 97th percentile on the Army Language Aptitude Test. They were tested on acquisition of course content and on ability to use the material to obtain information from native Russians during simulated combat-area questioning. They scored 93% in speaking and understanding Russian and 89% in translating answers given by the Russians, thus demonstrating the feasibility of such a course. The structure and questioning techniques seem effective in helping to elicit understandable answers from non-English-speaking personnel and may serve as a basis for development of similar courses in other languages.

CONTACT *(Cont.)*

Development and Evaluation of a Tactical Mandarin Chinese Language Course, by Catherine Garvey and Eugene H. Rocklyn, Technical Report 65-15, December 1965 (CONTACT III). AD-629 444

To meet the need for a short, self-instructional tactical language course in a Far Eastern tonal type language of potential military significance, a course in Mandarin Chinese was developed, by adapting the methods described in Sub-Unit CONTACT II with reference to a European type language (Russian). The purpose of the course was to enable combat soldiers to acquire perishable tactical information from newly captured POWs. The course was programed in the format of the Russian model with a major change in the addition of tone-discrimination and tone-production lessons. Six male students, high school seniors and graduates with varied language-learning aptitudes, took the course and completed it in 61 to 84 hours. Their final test scores, indicating ability to speak and understand all the assigned Chinese vocabulary, ranged from 55% to 98% correct. In a simulated questioning test, the mean percentage of correctly translated answers was 86%. Although low language-learning aptitude was associated with lower scores, the overall achievement appeared to be satisfactory.

"The Development and Test of a Special Purpose Foreign Language Training Concept," by Eugene H. Rocklyn, *International Review of Applied Linguistics*, vol. V, no. 1, March 1967.

See Technical Report 65-14 and Technical Report 65-15.

Research By-Products resulting from this research effort are listed in Part III.

CONTROL–Division No. 4

Control in Small Infantry Units

(Research for the Department of the Army)

Squad Performance as a Function of the Distribution of a Squad Radio by James W. Dees, Technical Report 69-24, 48 pp., December 1969. AD-701 152

To determine the optimum radio distribution within the infantry squad, a three-phase squad tactical problem was conducted to test seven distributions of the radio and a no-radio control condition. Measures included times required to accomplish specific actions, and the rated effectiveness of the squad in accomplishing its assigned tasks. The radio provided a significant advantage under simulated enemy fire and/or limited visibility. The optimal radio distribution was two-way communication between platoon leader and squad leader. Additional receivers below the level of the squad leader neither helped nor hindered proficiency, but additional transmitters below this level deteriorated overall performance. The data on proficiency ratings were generally not significant.

COPE—Division No. 7 (Social Science)
Development of a Method for Training Military Personnel for Interaction With Foreign Nationals (Research for the Department of the Army)

"The Development of Cultural Self-Awareness: Design of a Program of Instruction," by Alfred J. Kraemer, paper for NATO Conference, Brussels, Belgium, July 1969; issued as Professional Paper 27-69, 12 pp., August 1969. AD-694 505

In this paper the design of a training process for developing cultural self-awareness is described. Spontaneous interactions of Americans with foreigners in simulated on-the-job encounters are video-taped. Different behavioral manifestations of particular cognitions and their relation to American cultural premises and values are shown in sequences of video-taped excerpts used for training. The training is intended to enhance the effectiveness of U.S. personnel in overseas assignments.

"Development of a Technique for Creating 'Cultural Self-Awareness'," by Alfred J. Kraemer, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970.

CULTECH—Division No. 7 (Social Science)
Technical Training Across Cultural Barriers (Research for the Department of the Army)

The Achievement of Foreign Students in U.S. Army Technical Schools, by George H. Brown, Technical Report 65-7, June 1965 (For Official Use Only). AD-483 332

The research objectives in this study were (a) to obtain information on the academic achievement of foreign students in selected Army technical schools, (b) to assess the relationship between English language proficiency and academic achievement, and (c) to describe the viewpoints and recommendations of U.S. instructors on the problems involved in training foreign personnel. Information was collected from the academic records maintained by the U.S. Army Engineer, Signal, Ordnance, and Transportation Schools and from a survey of instructors with experience in teaching foreign students. The data thus obtained form the basis for the findings and conclusions presented in this report. (U)

DECISION–Division No. 3
Factors Influencing Command and Tactical Decision Making
(Research for the Department of the Army)

"Problems and Possibilities in the Use of Discussion for Organizational Decision Making," by Richard Snyder, paper for American Speech Association meeting, 1955

This paper presents comments on some aspects of trends in research on "discussion," broadly defined as all processes of social communication that mediate group and organizational problem solving or decision making

"The Influence of Cognitive Dissonance on Sequential Decisions," by Richard Snyder and Carl H. Rittenhouse, paper for Western Psychological Association meeting, 1957

An Investigation of Flexibility in Tactical Decision Making, by Richard Snyder, Carl H. Rittenhouse, and George E. Deane, Staff Memorandum, December 1957 AD-180 316

Combat arms officers were given a tactical problem presented in stages; initial information strongly favored holding a certain dominating terrain, while subsequent information favored withdrawal. Officers in a control group were required to make only a final decision. Data from the second of three experiments yielded significant relationships between the subjects' final decision and their scores on tests of tolerance for dissonance, and between the decisions and the subjects' military rank. In the third experiment, only the relationship with rank was significant. Interpretations of these contradictory findings and some implications for training are discussed.

DESERT ROCK I–Motivation, Morale, and Leadership Division
Factors Influencing Performance of Troops Exposed to an Atomic Shot
(Research for the Department of the Army)

DESERT ROCK I A Psychological Study of Troop Reactions to an Atomic Explosion, by Peter A. Bordes, John L. Finan, Joseph R. Hochstim, Howard H. McFann, and Shepard G. Schwartz, Technical Report 1, February 1953. AD-6 092

A major objective of this exercise was to evaluate psychologically the troops' reactions to the maneuver before indoctrination, after indoctrination, after the detonation, and after a lapse of about three weeks. Attitude research techniques as well as physiological measures were used to estimate (a) the effectiveness of the indoctrination procedures in increasing the troops' knowledge about atomic warfare and (b) the effects of the detonation, together with its accompanying consequences, on the troops' confidence in their ability to do well in A-bomb fighting.

DESERT ROCK I A Psychological Study of Troop Reactions to an Atomic Explosion–Additional Data Related to Attrition, by Joseph R. Hochstim, Supplement to Technical Report 1, March 1953 (For Official Use Only).

DESERT ROCK IV--Motivation, Morale, and Leadership Division
Factors Influencing Performance of Troops Exposed to an Atomic Shot
(Research for the Department of the Army)

DESERT ROCK IV: Reactions of an Armored Infantry Battalion to an Atomic Bomb Maneuver, Technical Report 2, August 1953. AD-16 451

To study the psychological reactions of troops who witnessed the detonation of an atomic weapon as part of a field maneuver, armored infantry troops were stationed in trenches four miles from ground zero. Some of the men had received limited indoctrination and others were given a special four-hour indoctrination the day before the maneuver. The men were measured before and after indoctrination and after the maneuver to determine the amount and kind of information they had learned regarding atomic effects, the ways in which the two groups reacted during the exercise, and the nature and extent of their fears and their self-confidence. The extent to which participant troops disseminated information to nonparticipants after returning to their home station was also measured.

Characteristics of Troops With Varying Levels of Information About Atomic Effects - DESERT ROCK IV, Staff Memorandum, November 1953. AD-482 185

"Preparation of Soldiers for Atomic Maneuvers," by Shepard Schwartz and Berton Winograd, *Journal of Social Issues*, vol. 10, no. 3, 1954.

DESERT ROCK V--Division No. 3
Psychological Study of Troop Reactions at an Atomic Explosion[1]
(Research for the Department of the Army)

DESERT ROCK V: Reactions of Troop Participants and Forward Volunteer Officer Groups to Atomic Exercises, by Benjamin W. White, Information Report, August 1953. AD 178 053

Questionnaires were administered to troops participating in an atomic test maneuver to ascertain what and how much the troops learned on these maneuvers and the degree to which the experience changed their attitudes toward atomic warfare. Reactions of volunteer officers who took forward positions during the test maneuvers were determined through interviews. Questionnaire and interview responses are reviewed in this report.

Spread of Information Following an Atomic Maneuver, by Richard Snyder and Eli Saltz, Information Report, February 1954. AD-482 183

This study investigated the effectiveness of word-of-mouth communication in spreading the information gained by three enlisted men who were observers at an atomic test explosion to other men of their home units. Questionnaire measures of information and attitudes about atomic effects, protective measures, and related topics were obtained from all battery members before the observers departed for the atomic test and again two weeks after they had returned. The observers' information and opinions were also measured at the end of their stay at the test site camp. As measured by the questionnaires, observer information gains were small, but there was considerable spread of information to the remaining members of the observers' units. Actively involving all members of home units in the advance preparation of observers produced important effects in increasing observers' information gains and in spreading information in the batteries.

[1] Related research is reported under Work Unit YUCCA

DESERT ROCK V *(Cont.)*

Gain in Information in the DESERT ROCK A-Bomb Maneuvers, by Berton Winograd, Staff Memorandum, March 1954.[1] AD-482 184

Findings from HumRRO studies on three different DESERT ROCK atomic-bomb maneuvers have been organized around the subject of troops' information gain from indoctrination on atomic weapons and warfare. In all three studies, the indoctrinations were evidently pitched at such a level that they produced about the same effects among troops of varying backgrounds and attitudes. Men who learned a substantial number of facts from the indoctrination were more likely than other men to become self-confident and willing to volunteer for potentially hazardous duty.

"Communication and Leadership Roles," by Richard Snyder, paper for West Coast Society for Small Group Research meeting, April 1955.

A theoretical formulation of "group roles" as related to the abstract model of a group regarded solely as a communication structure is presented. A review of some research related to role functions in this theoretical context is also included.

"Group Participation and Informal Status of Source as Determinants of Spread of Information in Organizational Groups," by Richard Snyder, paper for American Psychological Association convention, September 1955.

Experiences at Desert Rock VIII, by Robert D. Baldwin, Staff Memorandum, March 1958.[2]

DRIVER EDUCATION–Division No. 1 (System Operations)

Development of Driver Education Objectives: A Driving Task Analysis (Research for the Department of Transportation)

"Image Generation for Driving Simulators: Analysis of the Driving Task," by A. James McKnight, paper for Third Annual Human Factors Workshop in Highway Transportation, Washington, January 1970.

Description of the analysis of the driving task for the Department of Transportation. This task is to identify driving behaviors leading to the development of instructional objectives for driver education courses based on study of the driving system.

"The Development of Driver Education Objectives Through an Analysis of the Driving Task," by A. James McKnight and Bert B. Adams, paper for National Safety Congress, Chicago, October 1970; issued as Professional Paper 4-71, 14 pp., April 1971. PB-200 692

The ultimate goal of the research described in this paper is to develop a set of instructional objectives for driver education courses based on a comprehensive and detailed analysis of the driver's task. There are two phases– first, an analysis of the driver's tasks; second, a set of instructional objectives developed from results of the task analysis. The task analysis is described in this paper. It consists of three activities: (a) the analysis proper reduction of the driver's tasks into their component behaviors, (b) a criticality evaluation an attempt to assess the importance of each behavior to safe and efficient driving, and (c) the development of task descriptions preparation of a booklet containing the results of the task analysis and a criticality evaluation.

[1] This report, consolidating information from the DESERT ROCK I, IV, and V research studies, was prepared by the Motivation, Morale, and Leadership Division.

[2] This report, the final HumRRO report originating in the DESERT ROCK series of atomic bomb maneuvers by the Army, was prepared by Division No. 1.

DRIVER EDUCATION *(Cont.)*

Driver Education Task Analysis, Volume I: Task Descriptions, by A. James McKnight and Bert B. Adams, (HumRRO Technical Report 70-103), U.S. Department of Transportation Technical Report HS 800 367, DOT Contract No. FH 11-7336, 356 pp., November 1970. PB-197 325

This volume is the first of a four-volume report dealing with the development of driver education objectives through an analysis of the driver's task. It contains a detailed description of the behaviors required of passenger car drivers, rated criticalities of these behaviors, and items of supporting information relating to driver performance and performance limits, enabling driver knowledges and skills, and behavior criticality. The task descriptions have been organized in terms of the situations giving rise to the behaviors; behaviors involved in controlling movement of the car without regard to specific situations; behaviors that must be performed continuously or periodically while driving, rather than in response to a specific situation; and those off-road behaviors that are performed before driving, to maintain the car in sound operating condition, and in compliance with the legal regulations.

Driver Education Task Analysis, Volume II: Task Analysis Methods, by A. James McKnight and Bert B. Adams (HumRRO Interim Report IR-D1-70-1), U.S. Department of Transportation Technical Report HS 800 368, DOT Contract No. FH 11-7336, 44 pp., November 1970.

This report describes a method used to analyze and evaluate the criticality of driver behaviors. To assure comprehensive identification of driving behaviors, an analysis was made of the total highway transportation system including the driver, vehicle, roadway, traffic, and natural environment. Each aspect of the system was examined to identify specific situations that drivers encounter and the appropriate responses. The behaviors arising out of the systems analysis were organized into groups of related behaviors or "tasks". The analysis was continued to assure the identification of specific driving responses and associated cues. A group of 100 traffic safety experts, selected from among driver educators, enforcement officers, license officials, and fleet safety personnel, were asked to evaluate the criticality of the 1700 identified behaviors to the safety and efficiency of the highway transportation system. The driving behaviors, together with their associated criticality indices and various items of supporting information gained through a survey of the driving literature, were entered into a set of driving task descriptions

Driver Education Task Analysis, Volume III Instructional Objectives, by A. James McKnight and Alan G. Hundt, (HumRRO Technical Report 71-9), U.S. Department of Transportation Technical Report (in press), DOT Contract No. FH 11-7336, 351 pp., March 1971.

This report describes a set of instructional objectives for driver education courses, and an evaluation instrument for assessing the degree to which the objectives have been attained. The objectives are grouped into 74 learning units, each consisting of a statement of purpose, a list of performance objectives and a description of enabling knowledge and skill objectives. The objectives are grouped into categories representing either major steps toward fulfilling the stated purpose, or groups of similar objectives, and are presented in sequence of normal occurrence. They are also grouped into five levels of criticality. The evaluation instrument comprises three separate tests the Driving Fundamentals Test, Driving Situations Test, and Driving Knowledge Test.

Driver Education Task Analysis, Volume IV: The Development of Instructional Objectives, by A. James McKnight and Alan G. Hundt, (HumRRO Interim Report IR-D1-71-1), Department of Transportation Technical Report (in press), DOT Contract No. 11-7336, 68 pp., March 1971.

This report describes the methods that were used to develop for driver education courses a set of instructional objectives and an evaluation instrument to measure their attainment, based upon the results of a driving task analysis conducted earlier. Driving behaviors considered critical enough to be required of all drivers were organized into a set of performance objectives and accompanying performance standards. A set of enabling objectives, describing the skills and knowledges required in carrying out performance objectives, was also prepared. The evaluation instrument was composed of three tests: a Driving Fundamentals Test, a Driving Situations Test, and a Driving Knowledge Test. All tests were pilot-tested at a neighboring high school to establish their feasibility of administration.

ECHO–Division No. 6 (Aviation)
Synthetic Flight Training Programs and Devices
(Research for the Department of the Army)

"The Importance of Training Requirements Information in the Design and Use of Aviation Training Devices," by Wallace W. Prophet, paper for 16th Annual International Air Safety Seminar, Athens, Greece, November 1963; issued as Professional Paper 8-66, 9 pp., December 1966. AD-645 961

Too often people in education and training tend to forget that a simulator does not train; the training program trains. The simulator is potentially one of the most useful tools for training, but it is just that—a tool for the training program. The best sequence of procedures for new devices and training programs is examined. The presentation includes examples of psychologists applying their skills to development of training devices and working with engineers to produce the best simulator for the particular purpose.

"Reduction of Helicopter Pilot Attrition Through Synthetic Contact Flight Taining," by Paul W. Caro, Jr., paper for American Psychological Association convention, Chicago, September 1965 (ECHO II).

The reduction of flight attrition in primary helicopter training through the use of a synthetic contact flight training device is described. The device, a one-man helicopter mounted on a ground effects machine through an articulated linkage which allows freedom of movement in six dimensions, preserves the handling characteristics and visual, auditory, and proprioceptive cues of the in-flight task. Two experimental groups received 3¼ or 7¼ hours device training, and their attrition rates during subsequent flight training were compared to that of controls. The synthetic training groups experienced lower attrition ($p<.01$) than the controls. No significant difference existed between experimental groups.

"Changes in Flight Trainee Performance Following Synthetic Helicopter Flight Training," by Paul W. Caro, Jr., and Robert N. Isley, paper for Southeastern Psychological Association meeting, New Orleans, La., April 1966; issued as Professional Paper 1-66, 13 pp., April 1966 (ECHO II). AD-630 484 ED-015 422

Research was conducted to determine whether student performance on helicopter contact flight training could be improved with the use of a helicopter training device. Four groups of subjects, two experimental and two control, were used. Results showed that the experimental subjects acquired the necessary skills with less inflight training during the Pre-Solo phase of training. The most significant improvement occurred in the reduction in elimination rates during subsequent flight training.

"Helicopter Trainee Performance Following Synthetic Flight Training," by Paul W. Caro, Jr., and Robert N. Isley, *Journal of the American Helicopter Society*, vol. 11, no. 3, July 1966; issued as Professional Paper 7-66, 16 pp., November 1966 (ECHO II). AD-646 157

Two groups of trainees at the U.S. Army Primary Helicopter School were trained to "fly" a captive helicopter mounted on a ground effects machine. The device had the approximate handling characteristics of a free-flying vehicle, yet it allowed the trainees to obtain "aeronautical experience" not otherwise possible at their level of training. It was found that the device-trained subjects, when compared with non-device-trained controls, were significantly less likely to be eliminated from subsequent primary helicopter training for reasons of flight skills deficiency. Further, measures of relative performance during primary flight training indicated the device-trained group soloed the helicopter earlier and made better flight grades during the pre-solo phase of training than did the controls.

"Helicopter Training Devices in Support of Army Aviation," by Paul W. Caro, Jr., paper for symposium at annual meeting of Southeastern Psychological Association, Atlanta, Ga., April 1967; included in *Human Factors Research in Support of Army Aviation*, Professional Paper 27-67, June 1967.

ECHO *(Cont.)*

"Human Factors in Aviation: Some Recurrent Problems and New Approaches," by Wallace W. Prophet, paper for Alabama Psychological Association meeting, Mobile, Ala., May 1967; issued as Professional Paper 30-67, 20 pp., June 1967. AD-656 971

Three areas of human factors concern in aviation—performance assessment, prediction of performance, and simulation in training—are discussed. Emphasis is placed on the necessity for providing objective and standardized evaluation of flight trainees, rather than using the unreliable subjective evaluation methods. Methods for predicting trainees' performance, particularly in combat situations, are being sought. Use of simulation in training helicopter pilots has been minimal, but recently two devices have been developed to provide better transfer of training from the device to the actual helicopter situation.

"Inflight Performance After Zero, Ten, or Twenty Hours of Synthetic Instrument Flight Training," by Robert N. Isley, paper for Alabama Psychological Association meeting, Birmingham, Ala., May 1968; issued as Professional Paper 23-68, 16 pp., June 1968 (ECHO IV). AD-675 379

Three groups of Warrant Officer Candidates, enrolled in the Tactical Instrument Phase of the Officer/Warrant Officer Rotary Wing Aviator Course, were given zero, 10, or 20 hours of synthetic instrument flight training in Device 1-CA-1. End-of-phase flight proficiency measures were obtained from photographic records of the aircraft instrument panel taken during a hypothetical tactical instrument mission. The results indicated generally that there were no significant differences in flight performance among the three groups in terms of the relative incidence of aircraft control and procedural errors. It is concluded that synthetic device training, as given during the conduct of this study, has little, if any, measurable effect on end-of-phase flight performance.

The Captive Helicopter as a Training Device: Experimental Evaluation of a Concept, by Paul W. Caro, Jr., Robert N. Isley, and Oran B. Jolley, Technical Report 68-9, 47 pp., June 1968. AD-673 136

The research objective was to determine the effectiveness of a new device concept for helicopter contact flight training and the usefulness of such a device for predicting performance during subsequent flight training. The device was a commercially available captive helicopter attached to a ground effects machine. Two experimental groups of trainees received 3¼ or 7¼ hours of device training prior to primary helicopter training. In comparison with control groups, both device trained groups (a) were significantly less likely to be eliminated from subsequent flight training for reasons of flying deficiency; (b) required less flight training to attain the proficiency required to solo the helicopter; and (c) received higher grades during early training. Trainees who performed well on the training device tended to perform well during subsequent flight training. Instructors using devices such as this one need not be proficient in the helicopter used for subsequent flight training.

Evaluation of Synthetic Instrument Flight Training in the Officer/Warrant Officer Rotary Wing Aviator Course, by Robert N. Isley, Paul W. Caro, Jr., and Oran B. Jolley, Technical Report 68-14, 43 pp., November 1968 (ECHO III). AD-680 586

The objective was to determine the training value of synthetic instrument flight training given in the Tactical Instrument Phase of the Army's Officer/Warrant Officer Rotary Wing Aviator Course. Synthetic training in that course is administered in a modified fixed wing instrument training device. One group of trainees received the standard 20-hour synthetic instrument flight training program, a second group received 10 hours, and a third group received no synthetic training. The synthetic training given in the modified fixed wing training device did not increase trainee helicopter instrument flight proficiency in terms of aircraft control and procedural skills. In addition, there were no significant differences among the three groups in attrition, instructor-assigned daily grades, amount of flight instructional time required to complete the phase, and final checkride grades.

ECHO *(Cont.)*

"Use of Time-Lapse Photography in Flight Perfor nce Evaluation," by Robert N. Isley and Paul W. Caro, Jr., *Journal of Applied Psychology*, vol. 54, no. 1, February 1970; issued as Professional Paper 10-70, 7 pp., April 1970 (ECHO III). AD-716 726

A time-lapse photographic technique for recording and scoring the inflight performance of helicopter aviator trainees during a hypothetical tactical instrument mission is described. Data were derived from 16-mm films of the instrument panel readings of the TH-13T helicopter. Advantages, disadvantages, and other possible applications of the film technique are also discussed.

A Determination of Selected Costs of Flight and Synthetic Flight Training, by Oran B. Jolley and Paul W. Caro, Jr., Technical Report 70-6, 42 pp., April 1970 (ECHO III). AD-706 764 ED-042 952

This report is concerned with identifying and computing costs associated with the conduct of flight and synthetic training in the instrument phase of the Army's Officer/Warrant Officer Rotary Wing Aviator Course. The report describes the sources for and the treatment of data, and the major assumptions made in allocating the costs. Other applications of the information are discussed.

Equipment-Device Task Commonality Analysis and Transfer of Training, by Paul W. Caro, Technical Report 70-7, 34 pp., June 1970 (ECHO IV). AD-709 534 ED-043 833

This is a report on procedures developed to determine the potential uses of training devices for missions in operational equipment. The procedures are designed in connection with an Army rotary wing instrument flight training program.

Research By-Products resulting from this research effort are listed in Part III.

Educational Workshops (Division No. 5)
(Research for the River Rouge, Michigan School District)

Introducing Innovation in Instruction: In-Service Teacher Workshops in Classroom Management, by William H. Melching, Edward W. Frederickson, and Paul G. Whitmore, Technical Report 70-104, 45 pp., November 1970. AD-730 959 ED-048 098

An integrated set of summer workshops was conducted for elementary teachers in the River Rouge, Michigan School District in selected innovative techniques for the management of classroom behavior and instructional materials. The three teacher workshops dealt with development and use of instructional objectives stated in performance terms, implementation of the concepts of learning modules and mastery tests, and application of contingency management techniques for controlling student behavior in the classroom. Additional workshops were conducted for administrative and supervisory personnel.

"A Classroom Management Project," by Paul G. Whitmore, presentation to River Rouge Board of Education, January 1971.

"Report of In-Service Teacher Training Workshops in the Management of Classroom Behavior," by Paul G. Whitmore, Edward W. Frederickson, and William H. Melching, paper for American Educational Research Association convention, New York City, February 1971.

"Individualized Instruction," by Paul G. Whitmore, William H. Melching, and Edward W. Frederickson, paper for Michigan Meeting on Individualized Instruction, Lansing, Mich., April 1971.

"Inservice Training for a New Function for School Psychologists," by Edward W. Frederickson, William H. Melching, and Paul G. Whitmore, paper for Southwestern Psychological Association convention, San Antonio, Tex., April 1971.

"Classroom Management," by Paul G. Whitmore, paper for Education Service Center Conference, El Paso, Tex., May 1971.

ENDORSE—Division No. 3[1]

Effects of Controlled Isolation on Performance[2]
(Research for the Department of the Army)

"The Counting of Auditory Stimuli," by Richard A. Monty, paper for annual meeting of Western Psychological Association, Monterey, Calif., Spring 1958 (ENDORSE II).

*This study involved a complex discrimination task in response to an auditory stimulus with many parameters (such as loudness, pitch, frequency, speed of repetition, and numerosity) appearing against certain background noise. All parameters except numerosity were held constant. It was found that error was directly related to numerosity and that a reduction in error was attributable to knowledge of results and was itself positively related to numerosity.

"Influence of Instructions on Verbal Report of Visual Sensations Under Conditions of Reduced Sensory Input," by Donald B. Murphy, Edward J. Kandel, and Thomas I. Myers, paper for annual meeting of Western Psychological Association, Monterey, Calif., Spring 1958 (ENDORSE II).

*The subjects (42 basic trainees of superior intelligence) were taken into a semi-lightproofed office and given instructions of a positive-suggestive or negative-suggestive nature with respect to the possibilities of actual visual sensations in semi- or complete darkness. The positive instruction group reported a significantly greater number of visual sensations than did the negative instruction group and the sensations reported were significantly more complex.

"The Reliability of a Modified Digit Span Test Procedure," by Thomas I. Myers, Gerald Burday, Lyman Forbes, and Jack Arbit, paper for annual meeting of Western Psychological Association, Spring 1958 (ENDORSE II).[3]

A modified digit span test was devised to assess ability to concentrate and recall. A scrambled arrangement of series length 5 through 10 was used, the total test consisting of six such blocks of scrambled items. There was no evidence that the "Random Digits" procedure adversely affected motivation; however, an inverse practice or "fatigue" effect was found. Reliability estimates for the "Random Digits" method were obtained separately for two groups of individually tested subjects. The obtained reliabilities were .86 and .79.

"Influence of Prior Verbalization and Instructions on Visual Sensations Reported Under Conditions of Reduced Sensory Input," by Edward J. Kandel, Thomas I. Myers, and Donald B. Murphy, paper for American Psychological Association convention, Washington, September 1958.

*Thirty Army trainees received verbalization experience on selected Rorschach cards; another 30 had no Rorschach pretest. Subsequently, half of the subjects in each group were instructed that it was normal to experience visual sensations in the absence of light; the other half were told that psychiatric patients experienced these visual sensations. Each subject then put on opaque goggles and lay on a bed in a darkened room. After ten minutes the subject was asked to describe the visual sensations he was actually seeing. The positive instructions resulted in significantly more reports of visual sensations than the negative instructions; prior verbalization had no effect.

"Some Basic Factors in Sensory Deprivation Research," by Thomas I. Myers, paper for American Psychological Association convention, Washington, September 1958 (ENDORSE II).[3]

This report is designed to analyze and describe some basic methodological distinctions deemed pertinent to the research area of sensory deprivation.

[1] This Work Unit became a Basic Research study, first as PIONEER VI and subsequently as Basic Research Study 6. See BR-6 for additional items.

[2] A star at the beginning of the abstract indicates that the item is one of the ENDORSE papers or presentations included in *Collected Papers Prepared Under Work Unit ENDORSE: Effects of Controlled Isolation on Performance*, Professional Paper 6-68, March 1968. AD-667 630

[3] Included in *Collected Papers Related to the Study of the Effects of Sensory Deprivation and Social Isolation*, Basic Research Study 6, Research Memorandum by Staff, February 1962. AD-478 300

"Studies on the Effects of Sensory Deprivation Upon Vigilance: I. Progress in the Development of a Visual Vigilance Task," by Richard A. Monty, Thomas I. Myers, and Donald B. Murphy, research paper, August 1958.

★This study was part of a series concerned with effects of sensory deprivation and social isolation on the individual. A major research problem in this specific area is the development of measures that introduce minimum stimulation to the subject. This study is designed to develop a visual task that could be used to measure the effect of deprivation upon behavior.

"The Effects of Misinformation Upon the Counting of Auditory Stimuli," by Richard A. Monty, Thomas I. Myers, and Donald B. Murphy, paper for Western Psychological Association meeting, San Diego, Calif., Spring 1959.

★Subjects were given misinformation on "blip" items, interspersed with correct information in an experiment involving the ability to count auditory stimuli.

"Effects of Sensory Deprivation Upon Reception of Complex Instructions: Development of a Measure," by Robert D. McDonald, paper for Western Psychological Association meeting, San Diego, Calif., Spring 1959.

★Experiments were conducted to develop a simple motor task which would indicate the efficiency of reception of complex instructions in complete darkness after sensory or social deprivation. Army trainees were administered 10 tape-recorded problems. Analysis of variance indicated significant improvement in performance over trials; other experimental treatments had no effect.

Effects of Correct and Incorrect Knowledge of Results on Ability to Count Auditory Stimuli, by Richard A. Monty, Thomas I. Myers, and Donald B. Murphy, Research Report 3, 21 pp., March 1960 (ENDORSE I). PB-148728 AD-234 599

The purpose of this study was to develop a measure which would be useful in detecting changes both in utilization of correct information and in susceptibility to misinformation under conditions of partial or complete sensory deprivation. Two experiments are reported in which the effects of correct and incorrect feedback on ability to count rapidly produced auditory stimuli were studied. Correct knowledge of results contributed to better performance; misinformation contributed to disruption of counting ability; and both effects were evident over time in the absence of all feedback. The technique was considered useful as a measure of the effects of sensory deprivation upon a variety of variables.

Progress Report on Studies of Sensory Deprivation, by Thomas I. Myers, Donald B. Murphy, and Seward Smith, Research Memorandum, 31 pp., March 1961. AD-478 520

Special dark, quiet cubicles were used as a means of effecting the isolated confinement of troop volunteers in a limited sensory environment. It was concluded that the seemingly innocuous and comfortable laboratory environment, which was characterized by a dearth of sensory events, was a stressful and formidable experience. Intellectual efficiency was temporarily impaired and subjects reported visual sensations of a highly repetitive nature.

"Notes on an Auditory Vigilance Technique," by Seward Smith and Paul M. Haas, paper for Western Psychological Association meeting, Seattle, Spring 1961 (ENDORSE II).

★An auditory vigilance technique was developed for use in research involving sensory deprivation and social isolation. Subjects were placed separately in special rooms constructed to provide an average sound transmission loss of 40db to sounds from the outside. They took the test while lying on a bed in a quiet lighted room. The subject's task was to operate a Lindsley manipulandum by releasing it as quickly as he could each time he heard a short tone. The technique produced a vigilance effect and a significant performance deterioration over time, and also minimized the adverse effects of such factors as sensory thresholds, motivation, signal rate expectancy, and drowsiness.

ENDORSE *(Cont.)*

"A Technique for Studying Attitude Change," by Donald B. Murphy and George L. Hampton, paper for Western Psychological Association meeting, Seattle, Spring 1961 (ENDORSE II).[1]

A technique for studying attitude change by the use of propaganda in a limited sensory environment was developed and tested. Post-propaganda tests indicated that the groups receiving propaganda showed significantly greater shift in attitude in the intended direction than did the groups receiving no propaganda; the changes were limited to the dimension propagandized and did not shift to related dimensions. The essential elements for this technique are (a) positive and negative propaganda material of similar potency, and (b) a test for measuring attitude both before and after exposure to propaganda.

Collected Papers Prepared Under Work Unit ENDORSE: Effects of Controlled Isolation on Performance, Presentations and Papers, 1958-1961, Professional Paper 6-68, 40 pp., March 1968. AD-667 630

(ENDORSE items included in this Professional Paper are indicated with a star at the beginning of the abstract.)

This collection of papers given at meetings of the Western Psychological and the American Psychological Associations during the years 1958-1961 reports on specific phases of research to evaluate experimentally the effects of sensory deprivation and social isolation upon a variety of human behaviors. The phases reported on include a study involving a complex discrimination task in response to an auditory stimulus; an experiment involving positive-suggestive or negative-suggestive instructions concerning the possibilities of actual visual sensations in semi- or complete darkness; an experiment on the influence of positive and negative instructions concerning visual sensations; an experiment to develop a simple motor task to indicate efficiency of reception of instructions in complete darkness after sensory or social deprivation; an experiment to assess the effects of misinformation on the counting of auditory stimuli; a study to assess the effects of sensory deprivation and social isolation on reception of complex instructions; and a study of an auditory vigilance technique.

ENDURE–Division No. 2[2]

Tank Crew Performance During Periods of Extended Combat (Research for the Department of the Army)

"Separating the Effects of the Acoustic Reflex From Remote Masking," by Walter J. Gunn, paper for Acoustical Society of America meeting, Cleveland, Ohio, November 1968.

The Effects of Sleep Deprivation on Performance Over a 48-Hour Period, by Eugene H. Drucker, L. Dennis Cannon, and J. Roger Ware, Technical Report 69-8, 32 pp., May 1969 (ENDURE I). AD-688 950

An experiment was conducted to determine, for extended periods of work, the effects of (a) working for 48 hours without sleep on the efficiency of the work done, (b) starting work periods at night compared with starting in the morning, and (c) rotating jobs. Two-man teams performed a driving task and a target detection task; a control group performed the same tasks, but with provisions for sleep. Results indicate that performance deteriorates over a 48-hour period of work without sleep, and that deterioration occurs primarily at night, or during the subjects' normal sleeping hours. Job rotation to introduce another activity did not prevent performance decrements.

"HumRRO Studies in Continuous Operations," by Donald F. Haggard, paper for 15th Annual Army Human Factors Research and Development Conference, Fort Ord, Calif., November 1969; issued as Professional Paper 7-70, 13 pp., March 1970. AD-705 705

A laboratory study and a field study were conducted to obtain data on performance decrements on tank crew tasks during 48 hours of continuous combat operations, and to examine the degree of decrement in terms of its effect on tactical efficiency. Experience in the studies illustrates the need for increased efficiency in obtaining human factors information, demanded by the increasing complexity of military tactics and equipment.

[1] Included in *Collected Papers Related to the Study of the Effects of Sensory Deprivation and Social Isolation*, Basic Research Study 6, Research Memorandum by Staff, February 1962. AD-478 300

[2] For earlier work in this area, see Exploratory Study 24.

FICON–Division No. 1 (System Operations)

A Study of the Activities of Ordnance Fire-Control Maintenance Personnel in the Field and the Relationship Between These Activities and Training (Research for the Department of the Army)

Ordnance IFC Electronics Maintenance Personnel: Analysis of Activities With Implications for Training. Part I—M-33, by Ralph H. Kolstoe, Joseph C. Hammock, Gilbert B. Rozran, Robert S. Czeh, and Sylvia Hoke, Technical Report 31, September 1956. PB-132408 AD-108 199

Information concerning the job in the field of third- and fourth-echelon electronics maintenance personnel in ordnance detachments (IFC M33) was sought in this study as a basis for relating school training as closely as possible to job requirements. Data were obtained on the background and training of the personnel studied, the job activities they performed, the equipment and procedures they used, and estimates of their proficiency.

Ordnance IFC Electronics Maintenance Personnel: Analysis of Field Activities With Implications for Training. Part II—T-38, by Ralph H. Kolstoe, Robert S. Czeh, and Gilbert B. Rozran, Technical Report 37, March 1957. AD-158 177

Data describing the job done in the field by third- and fourth-echelon electronics maintenance personnel were obtained in 22 ordnance detachments (IFC T38) in the United States and overseas. Field maintenance activities and procedures, test equipment and manual usage, job proficiency, on-the-job training experiences, and the "value in maintenance" of school training subjects were analyzed for graduates of both basic and advanced electronics courses. Recommendations are made for emphasis on specific areas of training and for reorientation of training programs.

FIGHTER–Division No. 3

Factors Related to Effectiveness and Ineffectiveness of Individuals in Combat (Research for the Department of the Army)

Incidental Observations Gathered During Research in Combat Units, by Robert L. Egbert, Robert V. Katter, and George D. Greer, Jr., Information Report, October 1953 (FIGHTER I). AD-478 562

In the course of interviews with 650 infantrymen recently engaged in Korean combat, seven continuing problem conditions were noted: (a) Many troops never become offense minded; (b) at the squad and platoon levels, leader-follower contacts sometimes fail unnecessarily; (c) the foot soldier often does not have a sufficient understanding of the ongoing battle situation; (d) some troops have not been well trained in problems specific to their combat situations; (e) squad members frequently do not know how much they can count on the men around them; (f) the weapon that inspires the most individual confidence is often not the weapon the man carries into combat; (g) breakdown in combat communications is sometimes paid for with loss of life.

"A Study of the Characteristics of Successful and Unsuccessful Men Working in Situations of Extreme Stress," by Robert L. Egbert, paper for American Psychological Association Convention, New York City, 1954 (FIGHTER I).

The papers in this symposium covered the methodological considerations in the selection, testing, and analysis of results of fighter (men who demonstrated good combat behavior) and nonfighter (men whose combat behavior was reported as inadequate) personalities. Ten major areas in which fighters were superior to nonfighters were found to be general intelligence, emotional stability and psychological soundness, masculinity, physical good health, the "doer" syndrome (fighters are doers, nonfighters are non-doers), socioeconomic level, stable home life with stronger affectional ties with parents, social acceptance by peers, leadership syndrome, and social responsibility.

FIGHTER *(Cont.)*

"Profile of a Fighter," by Robert L. Egbert, *Infantry School Quarterly*, October 1954 (FIGHTER I).
Groups of men actively engaged in combat in Korea were interviewed. On the basis of eyewitness accounts, 310 men were selected who had either performed well in repelling final enemy attacks, or whose performance in the same action was inadequate. Differences revealed by 28 personality and intelligence tests clearly distinguished the fighter from the nonfighter; the numbers were roughly equal.

"Invariance of Motivational Measures Derived by Factor Analysis," by Tor Meeland, paper for Western Psychological Association meeting, 1956 (FIGHTER II).
In the criterion development of a motivational measure of attitude structure, the two best items from nine factors derived from a college student sample were presented to 300 subjects in Korea in a Preference Test which paired each item with every other one. In spite of the extreme differences in the samples used and the smaller number of variables included for the soldier sample, there were some noteworthy consistencies in the factor structure of attitude (motivation) measures. Although some useful data were lost when the attitude measurement was restricted to a Preference Test source, the simple structure obtained in the soldier sample was so good it seemed profitable to pursue this area with the easily administered Preference Test.

"Relationship of Life History, Family Background, and Intelligence Data to Performance in Situations Employing Height, Fire, Distraction, Shock, Dark, and Noise as Sources of Stress," by Jerald N. Walker and Tor Neeland, paper for Western Psychological Association meeting, Spring 1956 (FIGHTER II).
This study was concerned with an examination of performance under stress (effective and ineffective combat performance) as related to life history data and intelligence. The sample consisted of 110 subjects who had no prior military service and had just completed their eight weeks of Basic Training. A Stress Index was developed from a composite score of ten measures of performance under a variety of stressful situations. It was found that a specific identifiable life history pattern related to how an individual would perform under stress; however, the results were specific to the particular stress situations in this study.

"Dimensions of Stress Performance in Field and Laboratory Situations," by Tor Meeland and Robert L. Egbert, paper for American Psychological Association convention, September 1956 (FIGHTER II).
One hundred soldiers who had completed a 29-mile march and had very little sleep for two nights were subjected to three days of stress performances in the laboratory and in the field, including fighting oil fires, jumping off a 30-foot tower, performing in the dark, combat-in-cities, and so forth. Fifty performance scores and stress indices were factor-analyzed and ten factors rotated to simple structure. The factors are related to: intelligence, accuracy, stress index, eosinophil level, dark, fire fighting, pulse-rate change, autonomic efficiency, and two residuals.

Detailed Results of the FIGHTER I Assessment Program, by Robert L. Egbert, Tor Meeland, Victor B. Cline, Edward W. Forgy, Martin W. Spickler, and Charles Brown, Supplementary Appendices to Special Report 13, Staff Memorandum, February 1957 (FIGHTER I). AD-800 676
These appendices contain results of questionnaire-type personality tests for the total sample; content analysis groupings of discriminating items from MMPI and CPI; scoring of clinical interviews; results on life history inventory; objective test results; results of picture preference tests; write-a-story test (modified TAT); multiple choice rating forms; results of word suggestion inventory; empirical fighter scales (interest opinion questionnaires), scoring key, and item sources; and case histories of two fighters and two nonfighters.

Observations of Seven Armed Forces Specialized Training Schools, by Tor Meeland and Morris Showel, Staff Memorandum, February 1957 (FIGHTER III). AD-800 677

Information was gathered from a series of trips to special training schools in continental United States and Alaska concerning aims, curricula, and procedures. Special elements that contribute to training for combat effectiveness were identified and the extent to which this research could be linked with existing training research programs was appraised. Several characteristics are common to all the schools: the volunteer status of participating enlisted men, the emphasis on physical fitness, the use of fear-provoking situations to build confidence, and the teaching of specific skills to produce competence in combat.

"Influence of a Partner on Tolerance for a Self-Administered Electric Shock," by Irwin Miller, Stanley B. Benson, Dennis Seidman, and Tor Meeland, *Journal of Abnormal Social Psychology*, vol. 54, no. 2, March 1957; paper for Western Psychological Association meeting, Spring 1956 (FIGHTER II).

In a study of the influence of a partner on tolerance to stress, subjects were tested on their maximum tolerance for a self-administered electric shock in two settings: one in which they were alone, and one in which a partner also appeared to receive the shock. Results indicate that tolerance to electric shock was significantly increased when a partner was perceived as sharing the stress than when the subject was alone.

"Reactions of Men Under Stress to a Picture Projective Test," by Victor B. Cline, Edward Forgy, Robert Egbert, and Tor Meeland, *Journal of Clinical Psychology*, vol. 13, no. 2, April 1957 (FIGHTER I).

Near the close of the Korean War 310 fighters and nonfighters were given a week's assessment. This involved administering 86 separate tests and procedures one of which was a TAT-like picture projective test. Using a special scoring system, four psychologists independently analyzed 100 test protocols. Fair rater agreement was obtained with the median interrater correlation being .72; however, differences between fighters and nonfighters were only at the chance level. This was in sharp contrast to such test instruments as the MMPI, Humor Test and the clinical life history interview, where a plethora of differences emerged.

"Subsequent Army Careers of Effective and Ineffective Combat Soldiers," by Jerald N. Walker, paper for Western Psychological Association meeting, Spring 1957.

This study deals with the Army careers, subsequent to Korean combat, of peer-nominated effective and ineffective combat performers (150 fighters and 150 nonfighters). Fighters and nonfighters did not differ on frequency of occurrence of disciplinary actions for military offenses, on mean date of separation from the service, or on reenlistment rate. However, fighters enjoyed a significantly greater mean increase in rank. No difference in intelligence and age was found between those subjects who were separated from the service and those who remained in the service.

Field Stress: A Preliminary Study of Its Structure, Measurement, and Relationship to Combat, by Tor Meeland, Robert L. Egbert, and Irwin Miller, Staff Memorandum, May 1957 (FIGHTER II). AD-800 675

This study was concerned with development of stress situations suitable for military testing and proposed training that would make demands demonstrably similar to those of combat. A variety of control stress situations was tried with an emphasis on realistic field activities. Many conventional psychological tests and questionnaires were also given. Correlation of rankings of the stress situations made independently by the men studied and by expert observers indicated that the relative stressfulness of each situation was determined with high reliability.

FIGHTER *(Cont.)*

"Effect of Intelligence and Race on the Correlation Between Barron-Welsh Figure Preferences and Performance in Combat," by Mitchell Berkun, Victor B. Cline, Robert Egbert, and Tor Meeland, paper for American Psychological Association convention, September 1957.

As part of an extensive research program, samples of extremely effective and of extremely ineffective combat infantrymen were selected in Korea in 1953 and given a large battery of objective and personal inventory tests, one of which is reported here. The pattern of figures selectively preferred by one or the other sample was slightly altered when fighters and nonfighters were matched for intelligence, the mean intelligence of fighters being significantly higher than that of nonfighters. The general maturity of the fighters as indicated by the other tests is related to their preferences. No significant racial differences were found.

FIGHTER I: An Analysis of Combat Fighters and Non-Fighters, by Robert L. Egbert, Tor Meeland, Victor B Cline, Edward W. Forgy, Martin W. Spickler, and Charles Brown, Technical Report 14, December 1957 (FIGHTER I) PB-136218 AD-158 178

The purpose of this study was to identify the characteristics that differentiate very good combat performers (fighters) from very poor combat performers (nonfighters). Knowledge of these characteristics can be used in the development of experimental procedures for training, and also for selection and organization of fighting units. The sample of 310 front-line soldiers in Korea was chosen for psychological testing on the basis of information about their recent combat behavior furnished by their peers and by themselves. The findings report the differences between fighters and nonfighters revealed by the test scores.

"Sociometric Effects of Race and of Combat Performance," by Tor Meeland and Mitchell M. Berkun, *Sociometry*, vol. 21, no. 2, 1958; presented under the title, "A Probability Analysis of Criterion and Racial Effects in Sociometric Data," at Western Psychological Association meeting, Spring 1957

Sociometric tests examining the effects of race and combat performance were given to 309 infantrymen immediately following Korean combat. The men were divided into 20 groups who lived together for a week of psychological testing. They were then given a sociometric test in which they were to choose and reject men to be with during rest and recreation, combat, and in a bunker, and to have as a combat leader. Results indicated (a) sociometric preferences show effects of race and characteristics associated with combat performance quality; (b) ineffective fighters were sociometrically rejected by both effective and ineffective fighters, and (c) ingroup and outgroup reactions to an outgroup are stronger in terms of rejecting the outgroup than in accepting the ingroup.

The Construction, Validation and Application of a Subjective Stress Scale by Robert H. Korb and Hilton M. Bialek, Staff Memorandum, February 1958; presented under the title, "Measuring Affective States by Means of Thurstone Scaling Techniques," at American Psychological Association convention, September 1958 (FIGHTER IV). AD-189 875

A persistent problem in field research is the measurement of subjects' perception of their own reactions or feelings. In innumerable situations, especially in stress and frustration experiments, this response is highly desirable and is usually accomplished either by a simple checklist or by asking the subject to verbally recollect after the experiment is completed. As a result, experimenters have been unable to derive measures of this response which would meet the criteria of objective measurement. The unique application of Thurstone scaling techniques to this problem has shown, empirically, the possibility of obtaining valid and reliable measures of affect which are amenable to conventional statistical manipulations.

FIGHTER I: A Study of Effective and Ineffective Combat Performers, by Robert L. Egbert, Tor Meeland, Victor B. Cline, Edward W. Forgy, Martin W. Spickler, and Charles Brown, Special Report 13, March 1958 (FIGHTER I). PB-135106 AD-158 581

This research was designed to obtain as complete a description as possible of the differences between soldiers who were judged to be effective and ineffective combat performers in the Korean conflict. Tests were administered in Korea to 310 combat infantrymen who had previously been identified as fighters or nonfighters on the basis of descriptions of their recent combat behavior. The 40-hour test battery consisted of a wide variety of instruments, including personality questionnaires and projective tests, sociometrics, a life history questionnaire and interview, and objective tests designed to study various characteristics of the group. This report deals with the methodology of the research, describing the assessment procedures and the analyses performed on the data.

"Idiosyncratic and Nomothetic Stresses," by Mitchell M. Berkun, paper for Western Psychological Association meeting, Monterey, Calif., April 1958; revised as "Criteria for Productive Research on Stress and Its Behavioral Effects" [August 1959].

Inferred Correlation Between Combat Performance and Some Field Laboratory Stresses, by Mitchell M. Berkun, Jerald N. Walker, and Tor Meeland, Research Memorandum, November 1958 (FIGHTER II). AD-478 358

Subjects were examined to determine whether there is a correlation between performance in combat and performance in particular artificial stress situations. One sample group of 300 infantrymen (classified as either effective or ineffective combat performers) was tested during and immediately after Korean combat. The second sample of 120 trainees at Fort Ord were exposed to field and laboratory stresses (simulated combat, mock parachute jumps, electric shock, fire fighting), and were ranked for effectiveness of performance. Results of tests administered to men undergoing the artificial stress situations and to combat performers did not correlate sufficiently to allow use of the situations as stress criterion indicators.

"Psychological and Physiological Responses in Observers of an Atomic Test Shot," by Mitchell M. Berkun, Paola S. Timiras, and Nello Pace, *Psychological Reports*, vol. 4, no. 4, December 1958 (Subcontractor: University of California).[1]

Fourteen men given the opportunity to observe a test shot at close range did not reveal any stressful responses either by superficial conversation with the experimenters or by altered urinary constituents. However, responses on a self-descriptive verbal checklist did shift significantly from a control measurement of the same subjects. The control mean was the word "cool-headed"; the mean word on the experimental day was "timid," a shift of 3.1 points on an 11-point equal-appearing-interval scale. This scale is thus promising for many applications in evaluating a subjective emotional response.

"Development of a Verbal Measure for Use in Stress Study," by Kan Yagi, Robert E. Knox, and Patrick Capretta, paper for Western Psychological Association meeting, 1959 (FIGHTER IV).

Army trainees were taken on a flight, presumably for a study of altitude effects, and the plane appeared to malfunction, with emergency conditions developing. The subjects were given, as a performance test, a contrived "official emergency data form" to complete, presumably as part of the ditching procedure. This form was actually a stress measure, with garbled and complicated instructions. One control group was given the measure on a normal flight; another, on the ground. The mean score of the experimental group was significantly lower than that of either control condition, indicating that the measure was sensitive to stress and that it did not reveal the pretense.

[1] Mitchell M. Berkun was on the staff of Division No. 3; Paola S. Timiras and Nello Pace were employees of the subcontractor.

"A Test-Retest Study of Two Tests Measuring Mechanical Ability," by James L. Berry, paper for Western Psychological Association meeting, 1959.

The test-retest reliabilities of the McQuarrie Mechanical Abilities Test and the Army Rifle Assembly Test were checked. During their fifth week of Basic Training, 93 Army trainees were divided into six groups counterbalanced to control for order of test presentation. The Rifle Assembly Test did not obtain the high measure of reliability of the McQuarrie test. The correlation between the tests was too low to warrant substitution of the Rifle Assembly Test in subsequent measures of mechanical ability.

"Validity of Two Types of Stress-Sensitive Measures in Military Field Studies: Experimentation and Discussion," by Patrick Capretta, Tor Meeland, and Hilton Bialek, paper for Western Psychological Association meeting, 1959.

To determine the degree of psychological stress in several military field problems, two categories of response—field performance (firing proficiency, message recall, retention of emergency instructions) and psychological test behavior (rigidity-flexibility, ideation, and perseverance) were examined. The performance measures had a greater overall sensitivity to stress than the psychological tests. The latter failed to discriminate between experimental stress and non-stress (control) in the field. Firing accuracy scores and recall of instructions showed highly significant effects.

"Some Characteristics Distinguishing Peer-Preferred From Non-Preferred and From Rejected Tentmates During a Cold-Weather Military Exercise," by Mitchell M. Berkun and Robert E. Knox, paper for Western Psychological Association meeting, 1959.

After engaging in cold weather maneuvers, 32 preferred, 32 rejected, and 18 sociometrically indifferent Army subjects were selected by tentmates who substantiated nominations with observed incidents of effective or ineffective behavior. Subsequently, an intensive two-day battery of tests was given to study characteristics distinguishing among these groups. The preferred subjects are reliably older and have more "automotive information." They are also better on measures of eye-hand coordination, ability to handle complex information, masculinity, and ego strength.

Human Psychophysiological Response to Stress: Successful Experimental Simulation of Real-Life Stresses, by Mitchell M. Berkun, Hilton M. Bialek, Kan Yagi, James L. Berry, Richard P. Kern, Robert D. McDonald, and Howard H. McFann, Research Memorandum, December 1959; Symposium at American Psychological Association convention, Cincinnati, Ohio, 1959 (FIGHTER IV). AD-478 299

This presentation deals with some of the theoretical aspects of, and two empirical situations of, simulated stress in combat. A review of the conceptualization of and research methodology involved in simulation of real life stress situations is also included.

"Army Data on Taylor MAS, Intelligence, and Ego Strength," by Hugh L. LaMonaca and Mitchell M. Berkun, *Educational and Psychological Measurement*, vol. 19, no. 4, Winter 1959; paper for Western Psychological Association meeting, 1958, under the title, "Some Army Normative Data on the 50-Item Form of the Taylor Manifest Anxiety Scale."

A 50-item short form of the Taylor Manifest Anxiety Scale was studied in relation to an Army enlisted population. The short form was found to be adequate for selecting anxious subjects from Army enlisted men. On this sample, MAS correlated negatively with ego strength and zero with intelligence.

"A Note on Eosinopenia as an Index of Psychological Stress," by Robert D. McDonald and Kan Yagi, *Journal of Psychosomatic Medicine*, vol. 22, no. 2, March-April 1960 (FIGHTER IV).

A military field problem used direct eosinophil counts as an index of psychological stress. Seventeen subjects, led to believe they had caused serious injury to a companion through misuse of explosives, were required to attempt to repair a switchboard to call for medical assistance. A control group of 24 subjects attempted the same repair for routine calls. When compared with the control group and to themselves after a week of rest, results showed eosinopenia (a significant decrease in eosinophils) occurred in the stressed group.

"Intercorrelations of Taylor MAS With Certain Other Personality Measures and a Physiological Measure," by Mitchell M. Berkun, paper for Western Psychological Association Meeting, 1960 (FIGHTER IV).

A random sample of 150 Army trainees was tested with a variety of instruments. Correlations were computed between the Taylor Manifest Anxiety Scale and ego strength, multiple-choice Rorschach, intelligence, and peripheral circulation eosinophils. Correlations with ego strength and intelligence were essentially the same as those found in previous studies. Correlation with multiple-choice Rorschach was essentially zero. There was a slight tendency for higher MAS subjects to have a higher basal eosinophil count, giving some support to relating these two manifestations of anxiety.

Validity and Reliability of Certain Indicators of Psychological Stress, by Patrick J. Capretta, James L. Berry, Robert H. Kerle, and Hugh L. LaMonaca, Research Memorandum, June 1960; paper for Western Psychological Association meeting, 1959, under the title, "Backward Digit Memory Span and Stress" (FIGHTER IV). AD-478 381

By utilizing a stressor with a high face validity and a measure which had previously discriminated transitory anxiety states, this study investigated the behavioral effects of stress on backward digit memory span, digit symbol substitution, number checking, and speed of rifle disassembly and assembly. It was determined that exposure of human beings to an apparently affect-producing situation produced concomitant performance effects on backward digit memory span tested during the situation, but not on subsequent performance of other tasks. Habituation reduced both the affective and behavioral response.

"Human Eosinophil Response to Acute Physical Exertion," by Robert D. McDonald, Kan Yagi, and Eugene Stockton, *Journal of Psychosomatic Medicine*, vol. 23, no. 1, January-February 1961 (FIGHTER IV).

Eosinophil level is determined before and immediately after and at four successive two-hour intervals after strenuous voluntary exercise. An immediate rise in count is followed by a drop of at least two hours duration, recovery to normal being noted at 5½ hours after end of exercise. This is compared with the immediate drop previously found following emotional stress.

"Some Problems in the Reliability of the Adjective Check List," by Kan Yagi and Mitchell Berkun, paper for Western Psychological Association meeting, 1961.

The Adjective Check List developed by Nowlis was given to 147 enlisted military personnel as part of a larger research project. In addition to the standard instructions, the subjects were asked to cross out words they did not know or understand. By dropping reports with more than 10% (15 or more) of the words crossed out, or reports with several contradictory responses, or reports with four or more instances of disagreement in response to the same word, only 38% of the reports could be retained. It was concluded that the Adjective Check List was not an appropriate instrument to be used with this particular enlisted population without major modifications.

"Summary of Research of Experimental Studies of Stress in Man," by Howard H. McFann, NATO Symposium on Defense Psychology, Soesterberg, The Netherlands, August 1961 (FIGHTER IV).

Five specific stress situations are briefly described and results of experimental studies in these situations are depicted graphically.

"Blood and Urinary Responses of Man to an Ordered Series of Realistically Stressful Situations," by Mitchell M. Berkun, paper for Symposium at Psychonomic Society meeting, Columbia University, September 1961 (FIGHTER IV).

This is one of four papers describing research on the physiological and psychological effects of stress, utilizing natural-appearing stress stimuli and embedded measures. In the experimental situations, subjects believed their survival or that of another person was in jeopardy. The realistic stress situations produced a decrement in performance of a relevant task, an increase in negative affect, and a physiological alteration, relative to control groups.

FIGHTER *(Cont.)*

"Contrasts Between More Effective and Less Effective Persons," by H. Bialek, paper for Symposium at Psychonomic Society meeting, Columbia University, September 1961 (FIGHTER IV).

Experimental and control subjects in three realistic stress situations were divided into high performance and low performance categories. Effectives displayed less manifest anxiety, were significantly higher on an interest-attitude scale keyed for selecting highly rated combat men in Korea, were more intelligent, had more formal schooling, and had higher reading comprehension and mechanical ability. Ineffective performers tended to complain of worrying and nervousness and were introspective, ruminative, and over-ideational.

"An Investigation of the Role of Defensive Functioning in Relation to Emotional Arousal and Effectiveness of Performance," by Richard P. Kern, paper for Symposium at Psychonomic Society meeting, Columbia University, September 1961 (FIGHTER IV).

Individual differences in reactions to experimental stressor situations were examined through an investigation of the clinical concept of defensive functioning and its role in relation to intensity of emotional arousal, perception of the physical harm threat, and quality of performance. Post-stress interviews and emotional arousal ratings obtained from a subjective stress scale supplied the data. It was concluded that defensive functioning, when it is assessed by means of retrospective report material, fills no useful function in accounting for individual differences in resistance to severe stressors.

"Quantitative Subjects and Projective Responses to an Ordered Series of Realistically Stressful Situations," by Kan Yagi, paper for Symposium at Psychonomic Society meeting, Columbia University, September 1961 (FIGHTER IV).

A subjective stress scale (SSS) was used to assess the intensity of emotional arousal produced by four realistic stress situations. The mean SSS rating for each of the situations was used as the index of the intensity of threat. In each case, the experimental group means were higher (more negative) than those of their appropriate controls. Circulating eosinophils and urinary steroids were examined as a function of mean SSS. A plotted curve for blood eosinophils proved to be erratic; however, the steroid curve indicated a rise, then a fall, as SSS increased. Mean performance level showed a decrement at the more intense end of the continuum.

"Validity and Reliability of Certain Measures of Psychological Stress," by Patrick J. Capretta and Mitchell M. Berkun, *Psychological Reports*, vol. 10, no. 3, June 1962 (FIGHTER IV).

"Urinary Responses to Psychological Stresses," by Mitchell M. Berkun, paper for Society for Psychophysiological Research meeting, Denver, October 1962 (FIGHTER IV).

Urine samples were collected from 124 males, each of whom underwent briefly one of the following contrived but apparently genuine experiences: an aircraft emergency aloft with a crash landing threatened; a comparable flight but with no emergency; an Army field exercise in which artillery shells were mistakenly shot at them; an Army exercise which was interrupted by a brush fire which threatened the subject's safety; an Army exercise in which the subject accidentally became exposed to nuclear fallout; a comparable Army exercise in which no emergency developed; an accident for which the subject considered himself responsible which appeared to seriously injure another person; and two comparable control situations with no accident. The pattern of urinary responses for stressed groups and independent control groups, and data for both groups on their "experimental" day and a "base line" day when all subjects rested are presented.

FIGHTER *(Cont.)*

Experimental Studies of Psychological Stress in Man, by Mitchell M. Berkun, Hilton M. Bialek, Richard P. Kern, and Kan Yagi, Research Report 10, December 1962; *Psychological Monographs*, vol. 76, no. 15 (Whole No. 534) [October] 1962 (FIGHTER IV). AD-469 091

This research consisted of efforts to develop stressful situations that could be used to determine individual reactions to stress. To establish that an effect is produced similar to the effect evoked by a naturally occurring event, three criteria were proposed: (a) a subjective self-report of the stress situation; (b) an objective measurement of the performance of acts relevant to the stressful environment; (c) a measurement of the physiological response to the stress situation. Five experimental situations were tested against these criteria, from 13 to 27 subjects exposed to each situation. Observations on subjects are presented, with brief descriptions of differences between more effective and less effective performers.

"Psychological and Physiological Criteria for Stress Simulation Research," by Mitchell M. Berkun, paper for 3d Annual Symposium, Human Factors Society of Los Angeles, June 1963 (FIGHTER IV).

To predict, from experimentation, the ability of men to cope with real stresses requires first a validation of the experimental situation as a substitute criterion for uncontrollable reality. Simulation of a stressful environment must avoid cues which invite the subject to deliberately assume a role or which provide him with more psychological support then he will receive in the reality to which the findings must generalize. The task he is to perform must be meaningful in the stress-producing context. Stressors which fuufill these requirements ought to produce (a) measurable disturbance of performance, (b) a report of awareness of a feeling of discomfort, fear, threat, or unpleasantness, and (c) a measurable perturbation of physiological processes.

"The Trumpet Sounds: Can Our Troops Be 'Battleproofed'?" *Army Information Digest*, vol. 20, no. 12, December 1965; based on a briefing by Richard Kern and Howard McFann given at the U.S. Army Infantry School, Fort Benning, Ga.

This article discusses the relation of combat training, personality, and attitudes and their effects on a trainee's performance under hazardous conditions. Such performance is viewed as a joint function of technical skills and the relative strength of two opposing attitudes—confidence or despair. When training contributes unnecessarily to a man's sense of despair, it can unintentionally undermine his ability to cope with the stresses of combat. Skills can be taught, however, in such a way as to increase a man's confidence and thus his resistance to combat stress, and it might be expected to make him less vulnerable during initial exposure to combat and more effective over a longer period of time.

A Conceptual Model of Behavior Under Stress, With Implications for Combat Training, by Richard P. Kern, Technical Report 66-12, June 1966 (FIGHTER V). AD-637 312

On the basis of reported observations of the behavior of individuals under various prolonged physical harm conditions, a sequential pattern of behavioral reactions is described, reflecting the behavioral manifestations of a stress process. This sequential pattern of behavior would be expected, over time, to apply to any individual in any severe physical harm threat. The rate of development of this behavioral pattern under a given set of environmental stressor conditions represents the individual's stress resistance. A conceptual model was developed to describe the mode of operation of key attitudinal variables and environmental stressor variables in producing this behavioral pattern as well as the individual differences in stress resistance. Design of training to increase stress resistance in combat or other hazardous jobs is discussed from the basis of this conceptual framework.

FIREPOWER–Division No. 2
Methods for Improving Performance in Tank Gunnery
(Research for the Department of the Army)

Error in the Use of the M1 Gunner's Quadrant, by Charles A. Bancroft, Staff Memorandum, June 1955 (FIREPOWER III) AD-480 315

Consistency in Laying the Main Tank Gun in a Live-Fire Situation, by Melvin A. Schmitz, Technical Report 39, June 1957 (FIREPOWER II). AD-137 495

Motion picture records of the lay-fire sequence were made of 23 armor trainees and 11 expert gunners firing a series of six live rounds at a simulated target. The motion picture data were studied with a view toward describing the consistency with which trainees and experts lay the main tank gun. In addition, factors contributing to variable lay error in the live-fire situation were discussed.

Comparison of the Stereoscopic Range Finder, M12 With the Coincidence Range Finder, T43, by Norman Willard, Jr., Technical Report 42, August 1957 (FIREPOWER I). AD-141 530

Two types of range finders have been developed for use in Armor as a means for determining target distance. In 1952 the stereoscopic instrument was adopted; subsequently, a new and improved model of the coincidence range finder was produced. In field tests, a controlled comparison was made of the operator's rate of learning and the final level of proficiency achieved on the two types of instrument.

Comparison of the Stereoscopic Range Finder, M12 and the Coincidence Range Finder, T43 as Used in Range Determination at Night, by Melvin A. Schmitz, Edward A. Stark, and Norman Willard, Jr., Technical Report 53, April 1959 (FIREPOWER I). PB-140522 AD-216 117

A comparison was made of the performance of highly skilled range finder operators using the stereoscopic range finder, M12, and the coincidence range finder, T43, on targets likely to be encountered at night. Rangings were made on tank targets set at varying distances from the line of observation, by daylight and at night with the targets under two different conditions of illumination. Findings indicated the superiority of the coincidence range finder as the optical ranging device for use in tank gunnery at night.

The Training Effectiveness of Table VII of the Tank Gunnery Qualification Course, by Ronald C. Kelsay, Research Memorandum, April 1959 (FIREPOWER VI). AD-487 892

Human Factors Evaluation of the Tank, Combat Full Tracked: 105mm Gun, M60, by Donald F. Haggard and Albert R. Wright, Consulting Report, February 1961 (FIREPOWER VIII). AD-487 893

Target Detection: Study 3, The Relative Usefulness of Active Participation and Verbal Description Techniques in Target Detection Training, by Peter C. Wolff and Joseph Van Loo, Research Memorandum, July 1962, (FIREPOWER IV). AD-487 891

The study dealt with active participation, verbal descriptions, and transfer from stationary to moving targets during training in target detection and identification. Findings indicated that target detection was improved by active participation but false detection was increased. Findings also suggested that target detection and target identification skills should be trained separately. Appendices list slides used, subject instruction, and slide test descriptions.

Target Detection: Study 6, The Effects of Schedules of Collective Reinforcement on a Class During Training in Target Detection, by Peter C. Wolff, David D. Burnstein, and Joseph A. Van Loo, Research Memorandum, July 1962; paper for Southeastern Psychological Association meeting, Spring 1962 (FIREPOWER IV). AD-487 889

Target detection training was studied to determine the effectiveness of (a) group training as compared to individual training, (b) graded and random sequences of difficulty in target detection slides, and (c) verbal reinforcement for correct detection responses. Results indicated no loss of effectiveness for group training, but that verbal reinforcement did not significantly increase target detection performance. Graded sequences of difficulty in detection problems were more effective than the randomly sequenced problems.

FIREPOWER *(Cont.)*

Training Methods for Simulators of Remote Control Human-Guided Missile Systems: 1. A Comparative Evaluation of Component Skill and Total Skill Training Exercises, by Donald F. Haggard, Research Memorandum, July 1962 (FIREPOWER VII). AD-463 442

Seven training programs including total task practice and component skill groups were compared to determine relative effectiveness for simulator training (particularly S-55 simulator). Total task practice was superior to the others. It was concluded that the S-55 is not so complex as to require training fractionation.

Target Detection: Study 7, Partial Point-Out of Targets as Collective Reinforcement in Group Target Detection Training, by Peter C. Wolff, Joseph A. Van Loo, and David D. Burnstein, Research Memorandum, August 1962 (FIREPOWER IV). AD-488 446

Collective reinforcement feedback in the form of providing partial point-out of targets according to one of six schedules, was studied during target detection training. Although there were significant differences between groups on different schedules of reinforcement, none of the groups performed as well as a comparison group receiving 100 percent reinforcement.

"Effects of Schedules of Collective Reinforcemant on a Class During a Target Detection Course," by Peter C. Wolff, David D. Burnstein, and Joseph A. Van Loo, *Perceptual and Motor Skills*, vol. 15, no. 3, December 1962 (FIREPOWER IV).

To determine whether the effects of group reinforcement are similar to those of individual reinforcement, 105 U.S. Army trainees in seven groups in target detection were given various schedules of verbal praise. Of three groups which saw the slides in a graded sequence of difficulty, one group received verbal praise whenever 80% made the correct response, one received praise whenever the cumulative total of correct responses was 24, and one received no reinforcement. Three other groups, similarly reinforced, saw the slides in a random sequence. The results were consistent with those obtained elsewhere. The graded sequence of slide presentation led to significantly better performance on the post-training test. Consistent reinforcement of "easy responses" led subjects to make only easy detections; whereas, reinforcement of "easy and difficult responses" led them to make difficult detections. That is, the ratio method led to better performance, and the percentage method to poorer performance, than the no-reinforcement method.

"Group Training With Active Participation: Some Methodological Limitations," by Peter C. Wolff, David D. Burnstein, Donald F. Haggard, and Joseph A. Van Loo, *Perceptual and Motor Skills*, vol. 16, no. 1, February 1963 (FIREPOWER IV).

Eighty enlisted men matched on visual acuity and color discrimination were divided into four equal groups: a demonstration method, an active participation method, an untrained group, and a group of "experts." Actively trained subjects detected significantly more targets than untrained subjects but, also made significantly more false detections. The expert group did not make any more detections than the active participation group but made fewer false detections than either the active participation group or the demonstration group.

Research By-Products resulting from this research effort are listed in Part III.

FLINCH–Division No. 2

The Effect of Flinch Upon M1 Rifle Markmanship
(Research for the Department of the Army)

The Effect of Flinching on M1 Rifle Marksmanship, by Eugene F. MacCaslin and Leo Levy, Staff Memorandum, March 1955. AD-477 645

This report summarizes two preliminary studies, one to determine whether the judgments of experts will serve as a reliable measure of flinching, and the other to find out how much flinching affects marksmanship scores. In both studies, flinching was rated by judges while the trainees were firing a series of live rounds interspersed with dummy rounds; however, the judgments of flinching were made only during dummy rounds. Results indicate that expert judgments will measure flinching reliably, and that flinching significantly affects marksmanship. The data suggest that about 38% of the variation in trainee marksmanship is due to flinching.

FORECAST–Division No. 1 (System Operations)

Development of a Method of Forecasting Training Demands Imposed by New Electronic Weapon Systems[1]
(Research for the Department of the Army)

"Cue-Response Analysis of a Maintenance Task," by Edgar L. Shriver, paper for symposium at American Psychological Association convention, Washington, September 1958 (FORECAST I).

*This paper describes the rationale employed in developing the FORECAST I experimental M33 weapon system training program. In addition to describing the application of Cue-Response analysis to maintenance tasks, the paper also describes its use in operator tasks in the context of the same experiment.

"The Approach and Results in the FORECAST I Experimental Study," by William A. McClelland, presented to Department of the Army, Washington, October 1958; also presented to U.S. Continental Army Command, Fort Monroe, Va., November 1958 (FORECAST I).

*This briefing was one of the first reports on FORECAST research, and describes the results of the FORECAST I experimental training program at Aberdeen, Maryland, in 1958. (HumRRO Technical Report 63 describes the FORECAST I research more fully.)

Increasing Electronics Maintenance Proficiency Through Cue-Response Analysis, by Edgar L. Shriver, C. Dennis Fink, and Robert C. Trexler, Research Memorandum, October 1959 (FORECAST II).

*Studies relating to the use of mockups and transfer potential of cue-response methods of job analysis were conducted under FORECAST II, using a subcourse of the FORECAST I M33 program. Significant increases in troubleshooting proficiency were obtained through the use of low-cost mockups.

[1] A star at the beginning of the abstract indicates that the item is one of the FORECAST papers or presentations included in *Collected Papers Prepared Under Work Unit FORECAST Development of a Method of Forecasting Training Demands Imposed by New Electronic Weapon Systems*, Professional Paper 16-68, June 1968

FORECAST *(Cont.)*

Determining Training Requirements for Electronic System Maintenance: Development and Test of a New Method of Skill and Knowledge Analysis, by Edgar L. Shriver, Technical Report 63, 108 pp., June 1960 (FORECAST I). PB-149202 AD-239 416

The object of this study was to develop methods of analysis that would (a) accurately define the skills and knowledges needed for the operation and repair of electronic systems, and (b) be applicable to such systems in preproduction stages so that they could be used in forecasting training needs. Methods of analyzing the operation and maintenance (through fourth echelon) from the system itself were developed for the M33 radar system, and a cue-response training content was derived. A nine-day performance test (including about the same number and type of field malfunction problems that an average MOS 232.1 repairman would encounter during his first 8 to 12 months on the job) was used to evaluate the proficiency of about 40 students trained by the experimental and the standard courses. Although the experimental training required less than half as much time as the standard course, there was no practical difference in the proficiency of the two groups.

A Procedural Guide for Technical Implementation of the FORECAST Methods of Task and Skill Analysis, by Edgar L. Shriver, C. Dennis Fink, and Robert C. Trexler, Research By-Product, 101 pp., July 1961 (FORECAST II-III). AD-262 771

Detailed guidance on the method of writing task analyses and the use of FORECAST training techniques to develop a more pertinent and better-organized electronics course is provided in this supplement to Technical Report 63. Although this manual devotes some attention to other areas of maintenance, it is primarily concerned with the problem of proficient troubleshooting of electronic equipment.

FORECAST Mockup System Technical Description, by C. Dennis Fink, Robert C. Trexler, James E. Birdsall, and Edgar L. Shriver, Research By-Product, 92 pp., September 1961 (FORECAST III). AD-637 726

This research by-product describes in technical detail the FORECAST system of mockups used to teach electronics repairmen the fundamental principles of troubleshooting and repairing electronics equipment without requiring expensive real equipment for training purposes.

"Using Cues and Responses to Translate Logical Into Practical Troubleshooting," by Edgar L. Shriver, paper for symposium at American Psychological Association convention, New York, September 1961.

*This paper distinguishes between logical troubleshooting wherein functional block diagrams are used as a means to convey systems operation information, and FORECAST troubleshooting block diagrams which result from the application of cue-response analysis to electronic maintenance diagnostic tasks. It refers to the early FORECAST I research as well as to subsequent applications of the FORECAST analytical methods.

A Description of SNAP Programming, by Edgar L. Shriver and Robert C. Trexler, Research Memorandum, 23 pp., May 1963 (FORECAST IV). AD-422 110

SNAP is a simplified training method of presenting programmed materials to avoid unduly exacting and boring techniques. SNAP Socratic Non-Anacoluthic Programming refers to tutorial interplay between program and student (Socratic) with unbroken sequence and coherence especially within single thoughts (Non-Anacoluthic). Material is presented in scrambled book form, interspersing what normally would be end-of-chapter questions throughout the chapter. In this way the learner participates actively, as he is expected to respond correctly in one step before he continues to the next.

Implementation and Checkout of the FORECAST Concept of Electronic System Repair at the U.S. Army Ordnance Guided Missile School, by Edgar L. Shriver, C. Dennis Fink, and Robert C. Trexler, Consulting Report, 75 pp., August 1963 (FORECAST III). AD-422 383

The FORECAST concept of electronic system repair was implemented and checked out on the Improved Nike-Hercules high power acquisition radar (HIPAR). The report goes into the basic concepts, mockup equipment used in training, and details of the training. The FORECAST portion is 10 weeks of the total training period, and covers overall system functioning and practice. Appendices give course outlines, equipment illustrations, and sample lesson plans.

FORECAST *(Cont.)*

SNAP Programming: Troubleshooting the Improved NIKE Hercules HIPAR Transmitter, by Edgar L. Shriver and Robert C. Trexler, 175 pp., February 1964, Research By-Product supplement to *A Description of SNAP Programming*, Research Memorandum, May 1963 (FORECAST IV). AD-637 731

This research by-product presents samples of SNAP programming prepared for the Nike Hercules HIPAR course, which uses the FORECAST concept for training repairmen. The material is divided into four areas of troubleshooting: Troubleshooting Block Diagram and Technical Story; symptoms; within block troubleshooting; and practical exercises in troubleshooting the HIPAR transmitter.

"SNAP Programming," by Edgar L. Shriver and Robert C. Trexler, paper for National Society for Programmed Instruction, San Antonio, April 1964 (FORECAST IV).

*The underlying principles of SNAP programming are described in this memorandum. In addition, an example of SNAP programmed materials is provided in a scrambled text format in keeping with the denotative aspect of the technique.

FORECAST Systems Analysis and Training Methods for Electronics Maintenance Training, by Edgar L. Shriver, C. Dennis Fink, and Robert C. Trexler, Research Report 13, 52 pp., May 1964. AD-441 248

The research presented in this report was directed primarily toward troubleshooting electronic weapon systems. Its principal findings bear upon three interconnected problems: (a) developing training content based upon a cue-response paradigm; (b) developing training and job methods and aids, such as mockups, substitute or obsolete equipment, and block diagrams for troubleshooting; (c) planning and managing personnel, with special reference to transition training from old to new weapon systems. Results of the studies made suggest that training based on FORECAST methods of analysis produces men capable of effectively performing the job with less training time than needed for traditional instruction in electronics maintenance.

"Two Jobs for One in Electronic Maintenance," by Edgar L. Shriver and Robert C. Trexler, paper for American Psychological Association convention, Chicago, September 1965.

*Splitting the electronics maintenance job into two jobs is proposed in this paper. The jobs are identified according to their function: planning and execution. The proposal suggests that second enlistment planners, with appropriate training, can develop the job aids required by first enlistment technicians in executing maintenance operations.

Collected Papers Prepared Under Work Unit FORECAST: Development of a Method of Forecasting Training Demands Imposed by New Electronic Weapon Systems, Professional Paper 16-68, 41 pp., June 1968.[1] AD-673 026

(FORECAST items included in this Professional Paper are indicated with a star at the beginning of the abstract.)

Reports on research in the area of electronics maintenance include descriptions of the results of the FORECAST I experimental electronics maintenance training program; the application of cue-response analysis to the development of an experimental M33 weapon system training program; use of mockups and cue-response methods for troubleshooting proficiency in FORECAST II; the distinguishing characteristics of the FORECAST method of troubleshooting; SNAP programming; and a proposal to split the electronics maintenance job according to planning and executing functions.

Additional Research By-Products and other related research materials are listed in Part III under FORECAST, and also under Technical Advisory Service.

[1] See Technical Advisory Service for HumRRO Technical Report 65-3, prepared for the Department of the Navy, an additional publication that was based on FORECAST work.

FORGE–Division No. 4[1]

Factors in Military Organizational Effectiveness (Research for the Department of the Army)

"Requirements for Organizational Leadership," by Joseph A. Olmstead, paper for conference at U.S. Military Academy, West Point, June 1969; issued as Professional Paper 26-69, 12 pp., August 1969. AD-693 010

The requirements for leadership of complex organizations, present and future, are described. The changing performance demanded of military organizations, and the implications for developing leaders who will have the necessary capabilities are discussed. Since the performances required of military organizations are becoming more adaptive, the distinctive quality of future leadership will lie in ability to develop and guide responsive systems of decision and action. Developing of future leaders will require recognizing the organizational role of leadership and designing training programs specifically attuned to that role.

"Factors in Organizational Effectiveness," by Joseph A. Olmstead, paper for Southeastern Psychological Association meeting, Miami, Fla., April 1971.

Leadership Actions as Evaluated by Experienced Company-Grade Officers, by Joseph A. Olmstead, Larry L. Lackey, and Harold E. Christensen, Technical Report 71-11, 37 pp., June 1971. AD-729 380

The study was designed to determine (a) the desirability of certain leader actions for battalion commanders, company commanders, and platoon leaders, and (b) possible effects of source of commission (ROTC and OCS) and branch specialty (Infantry, Armor, and Army Aviation) upon the judged desirability of leader actions. Random samples of experienced officers attending Officer Advanced Courses at the Army Infantry and Armor Schools rated 36 leader actions on desirability for the three command levels. No differences were found between groups differentiated according to source of commission and branch specialty. Differences were found in desirability ratings for the three command levels in relation to mission accomplishment, with increased decentralization desired as command level goes up. Differences also occurred between functional groupings.

[1] FORGE became a Basic Research effort in FY70.

GAMBIT–Psychological Warfare Division

Identification of Personnel Characteristics for Evaluating Special Forces Training (Research for the Department of the Army)

Factors Related to the Effectiveness of Special Forces Personnel, by Herbert I. Abelson, Staff Memorandum, with Technical Appendices (published separately) by Harriet S. Beckwitt and Herbert I. Abelson, August 1954. AD-379 522

This research was designed to identify the differences between effective and ineffective Special Forces personnel, as a first step toward developing techniques for screening volunteers for Special Forces training. Peer ratings predicting success in operational conditions were used along with other instruments to differentiate the two groups. Many of the differences were found to be measurable and identifiable: In comparison with the ineffective men, effective men were found to prefer outdoor work, physical activity, and new experiences; to be able to rate their abilities and limitations realistically; and to be less likely to view their job as a glamorous occupation. No relationship was found between estimates of effectiveness in Special Forces and numerical grade in Special Forces school.

GUNNERY–Division No. 2

Conservation of Tank Ammunition Through an Improved Training Method: Subcaliber Substitution (Research for the Department of the Army)

An Analysis of the M-48 Troop Test Firing Data, by Charles A. Bancroft, Staff Memorandum, March 1955.

The Effect of Increased Subcaliber Substitution Training on 90mm Gunnery Proficiency, by Vonne F. Porter, Donald J. Baerman, and John G. Reddan, Staff Memorandum, June 1955 (GUNNERY I). AD-480 427

Consistency in Re-laying as a Factor in Tank Gunnery, by Leland E. Thune and Andrew J. Eckles III, Technical Report 25, December 1955 (GUNNERY II). PB-134405 AD-103 634

This study was designed to measure the degree to which accuracy of fire in tank gunnery is limited by the operator's ability to re-lay the weapon on the same aiming point. Tests made on the M48 tank show that (a) highly consistent re-laying is possible with the range finder, the telescope, and the periscope; (b) variability in ranging and in action of the computer is a larger source of inconsistency than is aligning the sight reticle on the target; (c) consistency in re-laying is directly related to refinement and optical power of the fire control device used; and (d) consistency in re-laying by tank crews reaffirms the need for having boresight retention checks made by skilled technicians using special aids. Tests made on the M47 tank showed that both tank gunnery experts and trainees re-lay with high consistency, but that re-laying consistency of trainees as measured in this study is only very slightly related to gunnery proficiency.

HAWKEYE–Division No. 5

Methods for Improving Performance of Radar Technicians (Research for the Department of the Army)

Development of a Procedure-Oriented Training Program for HAWK Radar Mechanics, Technical Report 69-25, 111 pp., December 1969 (HAWKEYE I). AD-703 315

In recent years the Army has experienced unacceptably high student failure rates in its electronics training programs. An experimental program was developed for training HAWK Continuous Wave Radar Mechanics, emphasizing the learning of specific sets of procedures for radar troubleshooting. Three classes were given the experimental training over a two-year period, and were compared with contemporary conventionally trained classes. In each comparison, the experimental program's attrition levels were as low as or lower than conventional classes, and end-of-course performance was equal to or slightly superior to that of conventionally trained graduates.

Research By-Products and other related research materials are listed in Part III.

HELFIRE–Division No. 6 (Aviation)

Methods for Improving Training and Performance in Aerial Firepower Systems (Research for the Department of the Army)

"Target Acquisition From the Armed Helicopter," by Francis H. Thomas, paper for classified Visual Search Symposium of the Armed Forces - NRC Committee on Vision, San Diego, April 1962.

"Let's Take a Look at New Project Task HELFIRE," by CPT Donald J. Haid, *Army Aviation*, vol. 11, no. 9, September 1962.[1]

"A Discussion of U.S. Army Aircraft Armament Program, 1 February 1963," by MAJ Donald J. Haid, paper for American Helicopter Society meeting, Washington, May 1963.[1]

"Aviator Performance in the Light Weapons Helicopter During Nap-of-the-Earth Flight," by Francis H. Thomas, paper for 10th Army Human Factors Research and Development Conference, U.S. Army Board for Aviation Accident Research, Fort Rucker, Ala., October 1964 (HELFIRE II).

[1] Major Haid was the Unit Chief of the U.S. Army Aviation Human Research Unit

HIGHLEAD—Division No. 4

Training for Leadership at Senior Levels of Command
(Research for the Department of the Army)

"Assumption of Command," by Joseph A. Olmstead, *Military Review*, vol. XLIV, no. 2, February 1964.

"Leadership at Senior Levels of Command," by Joseph A. Olmstead, paper for Georgia Psychological Association meeting, Jekyll Island, Ga., February 1965; issued as Professional Paper 5-68, 7 pp., February 1968. AD-666 070

In HumRRO Work Unit HIGHLEAD, an effort has been made to integrate, systematize, and apply relevant existing knowledge from the social sciences in order to provide a better understanding of the organizational role of the high-level military commander. The study deals with leadership as it is relevant to a broad range of upper-level command positions. [A source document in book form, "Leadership at Senior Levels of Command," was published by Headquarters, Department of the Army, as DA Pamphlet 600-15, October 1968.]

"The View From the Top—The Demands of Organizational Leadership," by Joseph A. Olmstead, paper for symposium at American Psychological Association convention, New York, September 1966; included in *Goal-Directed Leadership: Superordinate to Human Relations?*, Professional Paper 11-67, March 1967.

"The Skills of Leadership," by Joseph A. Olmstead, *Military Review*, vol. XLVII, no. 3, March 1967; issued as Professional Paper 15-67, April 1967; reprinted in *Indian Air Force Quarterly*, Winter 1968. AD-650 712

Performance of an organization's personnel, both individually and as a unit, is shown as the criterion of the effectiveness of its leadership; hence leadership is defined as the process of influencing individuals and organizations to obtain desired results. The effective leader is characterized, and the needs of a leader in the areas of diagnostic and action skills are described.

HILO—Division No. 4

An Experimental Study of Habituation to Height at the Mock Tower
(Research for the Department of the Army)

The Effect of Mock Tower Height in Airborne Training, by Charles D. Windle, Joseph S. Ward, Kimball Nedved, and Jerome Nathan, Technical Report 29, May 1956. PB- 124636 AD-108 198

As the final phase of a research study of attrition in basic Airborne training, experimental variations were introduced into the mock tower jumps: Group A, all from 18 ft.; Group B, all from 26 ft.; Group C, all from 34 ft. (standard procedure); and Group D, progressing from 18 to 26 to 34 ft. Performance comparisons showed that the first two groups learned jump form more readily than did Group C; Group D did not appear to be superior to Group C in learning jump form. The attrition rate for the experimental was less than for the standard group during mock tower training; however, the four groups did not differ significantly in attrition by the end of the course.

IMPACT—Division No. 1 (System Operations)[1]
Prototypes of Computerized Training for Army Personnel
(Research for the Department of the Army) (see also NSF-IDM)

"The Development and Maintenance of Optimal Learning Conditions," by Robert J. Seidel, paper for symposium at American Psychological Association convention, Washington, September 1967; issued under the title, *A General Systems Approach to the Development and Maintenance of Optimal Learning Conditions*, by Robert J. Seidel and Felix F. Kopstein, as Professional Paper 1-68, 22 pp., January 1968. AD-665 274

In the context that a general systems approach to the development and maintenance of optimal learning conditions is a point of view rather than a doctrine, two empirical examples are given. To illustrate the desirability of the systems-like approach in studying the nature of learning, the organisms chosen were representative of two widely separate points on the phylogenetic scale. The first comes from a study done with the hooded rat, and the second from research on human behavior. Finally, an illustration of a total systems approach is given by describing the development of an instructional model *a priori* to experimentation.

"Comment on Schurdak's 'An Approach to the Use of Computers in the Instructional Process and an Evaluation'," by Felix F. Kopstein and Robert J. Seidel, *American Educational Research Journal*, vol. 4, no. 4, November 1967.

This is a critical analysis of Schurdak's suggestion that science has not yet adequately conceptualized the instructional process. The authors present several suggestions for judging theory and research on computer-administered instruction.

"Discuusion of a Unique Approach to CAI: Project IMPACT," by Robert J. Seidel, paper for USCONARC Training Innovations Conference, Fort Benning, Ga., September 1968; included in *Innovations for Training*, Professional Paper 6-69, 44 pp., February 1969. AD-685 498

This paper includes a description of the hardware and software configuration for the first cycle of Project IMPACT, research toward the development of a prototype computer-administered instructional system. The development of an Instructional Decision Model, considering the subject-matter structure, the nature of individual student characteristics, and the information to be presented, is outlined. Included also are illustrations and discussion of the data structure, a glossary technique, a diagnostic technique called Valid Confidence Testing, and interactive procedures for instruction.

"Product or Systems Research as Applied to Education for Business," by Felix F. Kopstein, paper for meeting of Research Institute, National Business Education Association, St. Louis, Mo., October 1968; *National Business Education Quarterly*, vol. 37, no. 3, Spring 1969; issued as Professional Paper 30-69, 23 pp., October 1969. AD-697 541

This paper gives a brief summary of the conceptual structure of systems and their ramifications which includes surveys of three instructional models—the traditionally administered instruction, (TAI), programmed instruction (PI), and computer-administered instruction (CAI). Three brief articles of comment have also been reprinted with the original paper.

[1] For earlier work in this area, see Exploratory Research 12.

IMPACT *(Cont.)*

"Graph Theory as a Metalanguage of Communicable Knowledge," by Edward Kingsley, Felix F. Kopstein, and Robert J. Seidel, paper for annual meeting of the Society for General Systems Research, Dallas, Tex., December 1968, issued as Professional Paper 29-69, 24 pp., September 1969. AD-695 808

The attempts to devise and develop complete computer-administered instruction (CAI) systems have shown the need for an objective, rigorous, and subject-matter independent means for describing the organization of instructional content. Similar approaches to the problem, adopted independently in the U.S. and in France, involve the establishment of a set of subject-matter terms, concepts, topics, or other "units," and the subsequent defining of 1 to N relations on this set. The relations to be defined can reflect (a) inherent structure of the subject matter, (b) pedagogical strategy, (c) successful instructional communication, i.e., the student's current repertoire of subject matter and its structure. It is proposed to represent the set of concepts and relations as graphs or nets, a metalanguage whose mathematical properties are quite well-known. Graph descriptions of instructional subject matter furnish a map so that an instructional agent, human or computer, can orient the presentation.

"Computers in Education: The Copernican Revolution in Education Systems," by Robert J. Seidel, paper for symposium at American Association for the Advancement of Science conference, Dallas, Tex., December 1968; *Computers and Automation*, March 1969; issued as Professional Paper 16-69, 9 pp., May 1969. AD-689 016

In this paper the prediction of great success in the use of computerized education and training systems is made. The author believes that man will have to relinquish his egocentric role in teaching to be replaced by inter-disciplinary instructional teams in the design of contents of courses. The system for information exchange between learner and knowledge will become far more explicit, more efficient, and more reliable through the use of computers.

Project IMPACT: Computer-Administered Instruction Concepts and Initial Development, by Robert J. Seidel and the IMPACT Staff, Technical Report 69-3, 81 pp., March 1969. AD-685 157

Project IMPACT, Instructional Model/Prototypes Attainable in Computerized Training, is a comprehensive advanced development project designed to produce an effective and economical computer-administered instruction system for the Army. In this report on the first year of work, the rationale for conceptualizing the instructional process in a form implementable by computer is described. The Instructional Decision Model (IDM), the heart of the CAI system, is discussed. Major issues are summarized and expectations for future model development are projected. The HumRRO hardware configuration is divided into three major subsystems: Information Processing, Data Storage, and Communications. Development of the initial course (COBOL) is discussed in terms of job analysis, training objectives and trainee attributes, organizational rationale for course content, and criterion tests. Short-range and long-range computer software development is discussed.

"Is CAI Cost/Effective? The Right Question at the Wrong Time," by Robert J. Seidel, *Educational Technology*, vol. 9, no. 5, May 1969.

"Project IMPACT: Description of Learning and Prescription for Instruction," by Robert J. Seidel, Judy G. Compton, Felix F. Kopstein, Richard D. Rosenblatt, and Sally See, paper for Association for Computing Machinery symposium, Gaithersburg, Md., June 1969; issued as Professional Paper 22-69, 15 pp., June 1969. AD-691 707

Project IMPACT, Instructional Model/Prototypes Attainable in Computerized Training, is a comprehensive advanced development project designed to produce an effective and economical computer-administered instruction system for the Army. In this paper, the rationale for conceptualizing the instructional process in a form implementable by computer is described. The Instructional Decision Model (IDM), the heart of the CAI system, is discussed. Major issues are summarized and expectations for future model development are projected. The HumRRO hardware configuration is divided into three major subsystems: Information Processing, Data Storage, and Communications.

IMPACT *(Cont.)*

"Rational vs. Empirical Approaches to Job/Task Descriptions for COBOL Programmers," by Felix F. Kopstein, paper for The Special Interest Group Computer Personnel Research of the Association for Computing Machinery annual conference, University of Chicago, June 1969; issued as Professional Paper 18-70, 11 pp., June 1970. AD-713 716

Empirical approaches deriving from job analysis and *rational* approaches deriving from task/equipment analysis are contrasted, to suggest the differences in the information to be gained from each. Job analysis establishes what exactly a sample of incumbents do on the job. Task/equipment analysis deduces the behavioral requirements for its operators and maintainers from the functional characteristics of equipment, or from task situations that do not yet actually exist. The purely empirical approach develops a set of behavioral capabilities together with associated frequencies of occurrence, but cannot guarantee that the required set of behavioral capabilities will be exhaustively enumerated. The purely rational approach will develop an exhaustive set of behavioral capabilities requisite for certain job or task constellations, but will provide no good way of establishing their probabilities of occurrence. A combined approach, therefore, seems desirable, and is illustrated in the context of a COBOL programmer's job. The use of data from combined rational and empirical job/task analyses for statistical models of job families is discussed, as is the use of these models in training design.

"The Computer as Adaptive Instructional Decision Maker," by Felix F. Kopstein and Robert J. Seidel, paper for International Symposium on Man-Machine Systems, Cambridge, England, September 1969; issued as Professional Paper 1-70, 14 pp., January 1970. AD-703 597 ED-041 450

This is a report on the computer's job for education and for instruction. It is maintained that the computer hardware and software alone cannot accomplish educational miracles, but is contingent on the development of a class of instructional decision models that interact with the student. To serve these purposes, the man-computer-man-communication channel must be of adequate capacity and relatively free of constraining filters. Issues are discussed in the context of an ongoing CAI systems development project.

"Technology of Training: Project IMPACT," by J.D. Lyons, paper for CONARC briefing, Fort Monroe, Va., February 1970; included in *HumRRO Research in Training Technology*, Professional Paper 21-70, 39 pp., June 1970. AD-712 285

This paper is one of four presentations on research and development in educational technology by members of the HumRRO staff at a briefing sponsored by the Office of the Deputy Chief of Staff for Individual Training at Headquarters, U.S. Continental Army Command in February 1970. This presentation describes research under Work Unit IMPACT, Prototypes of Computerized Training for Army Personnel.

"Resource Allocations to Effect Operationally Useful CAI," by Robert J. Seidel and Felix F. Kopstein, paper for National Security Industrial Association (NSIA) conference, Washington, February 1970; issued as Professional Paper 12-70, 19 pp., April 1970. AD-706 839 ED-041 466

Resource allocations, in terms of funds, people, facilities, and the delegation of appropriate authority to formulate appropriate policy for research and development and implementation of computer-assisted instruction are discussed in this paper. A description and justification of CAI as a technology is included. The need for incorporating a systems approach to educational innovation is stressed. A partnership among industry (profit and nonprofit), government, and education is suggested as a model, and a national network of multidisciplinary centers is advocated as the vehicle for accomplishing the goals of research, development, and implementation of effective and efficient CAI systems.

"Psychology or Cybernetics as Basis for Instructional Strategy," by Felix F. Kopstein and Robert J. Seidel, paper for The American Educational Research Association, Minneapolis, Minn., March 1970.

In this paper, it is found that experience with programmed instruction leaves some doubt that effective and efficient instructional strategies can be derived solely from behavioral psychology. An alternative for meaningful instructional strategies cybernetics was found to have much to recommend it. The principles of iterative feedback control and regulation in the instructional process are discussed, and the use of these principles in recent instructional theories is illustrated.

"CAI: Technological Misconceptions," letter by Robert J. Seidel, Felix F. Kopstein, and Ronald J. Swallow, *Science*, vol. 168, no. 3938, June 1970.

IMPACT *(Cont.)*

Project IMPACT—Computer-Administered Instruction: Description of the Hardware/Software Subsystem, by the IMPACT Staff, Technical Report 70-22, 56 pp., December 1970, AD-721 159 ED-047 528

Project IMPACT is a comprehensive advanced development project designed to produce an effective and economical computer-administered instruction (CAI) system for the Army. In this report the computer hardware and software capabilities of the prototype system are described. The components of the computer hardware/software subsystem are discussed in terms of the four main activities they support. These activities are: (a) Administering instruction to students, (b) implementing courses into CAI format, (c) evaluating students, courses, and instructional decision models, and (c) performing administrative functions in a school.

INGO–Division No. 5

Methods for Deriving Instructional Objectives
(Research for the Department of the Army)

"Deriving, Specifying, and Using Instructional Objectives," symposium at annual meeting of Southwestern Psychological Association, Arlington, Tex., April 1966; issued as Professional Paper 10-66, December 1966. AD-646 976 ED-014 795

"In Defense of Instructional Objectives," by William H. Melching.

Instructional objectives that are stated in terms of the performance expected of a student upon completion of instruction are intended to communicate to both students and instructors. Sample objectives, a history of the development of ideas about objectives, and methods of preparing suitable objectives are given.

"Some Important Ways in Which Performance Objectives Can Vary," by Harry L. Ammerman.

A study of the objectives for 40 courses from eight schools is summarized. Objectives varied in level of specificity of student action, extent to which action is described, completeness, and relevance. Each of these factors is illustrated and discussed. Suggestions are given for promoting objectives to better meet these factors as criteria of useful communicating objectives.

"The Content Validity of Instructional Objectives," by Paul G. Whitmore.

Instructional objectives are equated to specifications for test construction, which should lead to the construction of essentially similar tests. These objectives should relate to some later job situation. The content validity of the test situations is a function of those job descriptive characteristics that affect the required performances in the job situations. Such characteristics are identified during the development of task descriptions. The various classes of task descriptions are related to the design of instructional testing procedures, printed job aids, and instructional communications.

"Instructional Objectives and Measuring Success of Instruction," by John A. Cox.

Given instructional objectives, test items to measure these objectives are relatively easy to conceive. Content validity for the test can be attained by sampling procedures; construct validity is *prima facie*; predictive validity can be computed, if it is reasonable to do so. The logic of developing a curriculum independently from the test is discussed, and use of the test for controlling the quality of trainees is emphasized.

The Derivation, Analysis, and Classification of Instructional Objectives, by Harry L. Ammerman and William H. Melching, Technical Report 66-4, May 1966. AD-633 474 ED-014 793

An examination of the methods, terms, and criteria associated with the determination of student performance objectives was made in order to synthesize and apply the relatively new developments in Human Factors research on this subject. Educational and training research literature on the subject was examined to identify procedures currently being used or proposed. A survey of eight Army service schools was conducted to determine procedures employed by instructional personnel in determining course content. On the basis of data obtained, important problems arising in connection with the development of objectives are identified and analyzed. A system for analyzing instructional objectives by identifying factors that influence their meaningfulness and usefulness was developed. Types of student performance objectives are listed, and a classification scheme for terminal objectives is suggested. The classification is based on five factors on which a statement of an objective may vary, affecting the nature of the student action description and the communicability of the statement itself. The variety of terms associated with objectives are discussed.

INGROUP–Division No. 4
Small-Group Instructional Methods for Military Training
(Research for the Department of the Army)

Theory and State of the Art of Small-Group Methods of Instruction, by Joseph A. Olmstead, Technical Report 70-3, 51 pp., March 1970. AD-703 377 ED-040 345

In this report, the more common small-group methods are evaluated in terms of their effectiveness for teaching adults. A rationale for small-group instruction is presented, followed by descriptions of the principal methods, and an evaluation of the techniques based on existing research findings. It is concluded that small-group methods can be effective for enhancing motivation for learning, developing positive attitudes toward later use of course materials, and improving problem-solving skills. But they are not more effective than lectures for transmitting information and concepts, although—when used in conjunction with lectures—the methods are helpful for increasing depth of understanding of course content. Implications for use of small-group methods, including requirements for instructors, are discussed.

INTACT–Division No. 6 (Aviation)[1]
Integrated Contact/Instrument Training
(Research for the Department of the Army)

§*A Summary of Prior Research on Integrated Contact/Instrument Flight Training*, by Oran B. Jolley, Staff Memorandum, June 1958 (INTACT I). AD-480 456

"INTACT: Integrated Instrument Contact Primary Flight Training," by Arthur C. Poe, Jr., MAJ O.B. Jolley, USA Ret., and W.W. Prophet, *U.S. Army Aviation Digest*, vol. 6, no. 7, July 1960.

"Let's Take a Look at the Sequence of Flight Instruction," by LTC Arne H. Eliasson, *Army Aviation*, vol. 10, no. 6, June 1961.[2]

Evaluation of the Integrated Contact-Instrument Concept for Army Fixed Wing Flight Instruction, by Wallace W. Prophet and Oran B. Jolley, Technical Report 69-26, 108 pp., December 1969 (INTACT I). AD-703 161

This report describes the results of an experimental comparison of three primary fixed wing flight training methods. Three groups of students from two Army primary fixed wing flight classes were given one of the three methods of instruction. Their flight performances in primary, advanced contact and advanced instrument training phases were compared, using specially developed objective flight performance measures, and results were given.

Research materials resulting from this research effort are listed in Part III.

[1] This Work Unit was initiated at Division No. 1 (System Operations). The symbol § indicates an item prepared at Division No. 1.

[2] Colonel Eliasson was the Unit Chief of the U.S. Army Aviation Human Research Unit.

INTERSQUAD–Division No. 3

A Study of the Factors Which Account for the Differences Between Effective and Ineffective Rifle Squads[1] (Research for the Department of the Army)

"A Study of Leadership Status," by Rodney A. Clark and William R. Smith, research note, October 1952.

*Eighty-five trainees taking a course at Fort Ord, Calif., for qualified NCO leadership positions at the squad level were subjects in a study of Leaders Course problems. Data from sociometric questionnaires, interviews, and observations concerning class member valuations of each other are presented. Sociographs showing positive and negative nominations in regard to seven factors of leadership attributes are described.

"Analyzing the Group Structures of Rifle Squads in Combat," by Rodney A. Clark, paper for American Psychological Association convention, Cleveland, Ohio, 1953.

*This paper presents sociographs derived from the positive and negative valuations of 28 riflemen in one platoon; for example, each soldier was asked to nominate the three platoon mates with whom he would most like to share a bunker and the three with whom he would least like to live. The sociographic sequence for organizing the sociometric valuations is presented along with a sociographic analysis of the platoon under study.

"Developing a Functional Theory of Leadership," by Rodney A. Clark, paper for American Psychological Association convention, San Francisco, Calif., 1955.

*Members of 69 rifle squads on the Korean front lines during the winter 1952-53 completed questionnaires on their civilian and military backgrounds, skills, and attitudes. Also, each man was interviewed about himself, his squad, its activities, and the men in it. Platoon leaders, company commanders, and battalion commanders contributed performance ratings of their units. Analyses showed two kinds of variables, leadership functions and group structures of values. From these data, the functional theory of leadership indicated that the activities of a leader which increase effectiveness of group performance are those activities that change the group structure of values.

Leadership in Rifle Squads on the Korean Front Line, by Rodney A. Clark, Technical Report 21, Septeber 1955 (For Official Use Only). AD-91 214

The purpose of the study was to determine some of the factors accounting for the difference between effective and ineffective combat rifle squads, with particular attention to differences in squad leadership which may be related to squad effectiveness. Leadership functions, in addition to squad management, found to be important to rifle squad combat effectiveness are: defining goals, setting appropriate examples, teaching, and giving emotional support to the squad. These leadership functions can be effectively performed by squad members other than the squad leader. Findings of this study point to a need for constructing a squad leader training program directed toward development of squad leadership potential. (U)

"The Use of the Q-Sort for Collecting Attitude Data from Company Commanders Under Field Conditions," by Rodney A. Clark, paper for annual meeting of Western Psychological Association, Spring 1956.

*In division-size field maneuvers to test certain changes in division organization, the effect of the changes on the attitudes of company commanders toward their jobs was evaluated. A 36 item Q-sort was used to record the commanders' self-descriptions. Each commander described himself in three ways: (a) as he saw himself commanding under the new organization, (b) as he used to see himself commanding under the previous organization, and (c) as he would like to see himself commanding under the best possible organization. Subjects recognized the Q-items as of consistent descriptive relevance to a commander's performance, and it was demonstrated that, in spite of administrative difficulties, utilization of a Q-sort under field conditions is possible.

[1] Presence of a star at the beginning of the abstract indicates that an item is one of the INTERSQUAD papers or presentations included in *Collected Papers Prepared Under Work Unit INTERSQUAD* Professional Paper 8-69, March 1969

INTERSQUAD *(Cont.)*

Collected Papers Prepared Under Work Unit INTERSQUAD: A Study of the Factors Which Account for the Differences Between Effective and Ineffective Rifle Squads, Professional Paper 8-69, 49 pp., March 1969. AD-686 621

(INTERSQUAD items included in this Professional Paper are indicated with a star at the beginning of the abstract.)

Research in Sociometric valuations, and analysis of questionnaires showing leadership functions and group structures of values are among the topics illustrated and discussed in this collection of four papers. Included are a study of leadership status, an analysis of rifle squad group structures in combat, the development of a functional theory of leadership, and use of the Q-sort for collecting attitude data.

JOBTEST—Division No. 2
Proficiency Measurement Techniques
(Research for the Department of the Army)

"An Approach to Standardizing Human Performance Assessment," by John D. Engel, paper for THEMIS conference, Texas Technological University, Lubbock, Tex., March 1970; issued as Professional Paper 26-70, 12 pp., October 1970. AD-717 258

The standardization and evaluation of methods of performance assessment represents an important area of concern. In this paper an approach that concentrates on two critical areas and the relationship between them is discussed. These are: (a) A task classification system, and (b) a performance measure classification system. An example is presented that illustrates some preliminary research related to the use of a performance measure classification system. The paper concludes by suggesting areas and directions for future research efforts.

Development of a Work Sample Criterion for General Vehicle Mechanic, by John D. Engel, Technical Report 70-11, 32 pp., July 1970 (JOBTEST 1). AD-714 212

A work sample criterion test was developed for General Vehicle Repairman, MOS 63C30 and 63C40. Test items covered three task categories: troubleshooting, corrective action, and preventive maintenance. Thirty-eight organizational mechanics were tested. Data were also collected on the quality of performance, e.g., use of good procedures, use of test equipment, and so forth. The study indicated that (a) the test appears to have a high degree of reliability ($r = .82$), (b) on the average, 60% of the test exercises were successfully completed by the 38 mechanics, (c) there was a moderate relationship between performance and length of experience, and (d) there were indications of lack of use and unfamiliarity with technical publications, and also a lack of skill in the use of special tools and equipment.

JOBTEST *(Cont.)*

A Comparison of Correlated-Job and Work-Sample Measures for General Vehicle Repairman, by John D. Engel and Robert J. Rehder, Technical Report 70-16, 26 pp., October 1970 (JOBTEST II). AD-714 842

Two correlated-job measures were compared with the work-sample criterion developed for the General Vehicle Repairman in earlier HumRRO research. Thirty organizational mechanics who had been subjects in the earlier study were given paper-and-pencil tests for their MOS. Later they were given the Metropolitan Achievement Test, in order to determine the relation between reading level and performance of the written and work-sample tests. Three peer ratings were obtained for each subject. Statistical analysis was performed to compare the validity and reliability of these two measures with the work-sample criterion.

JOBTRAIN—Division No. 1 (System Operations)
Development of a Method for Building Training Programs for Signal Corps Electronics Repairmen (Research for the Department of the Army)

The Development of Training Programs for First Enlistment Personnel in Electronics Maintenance MOS's: II. How to Analyze Performance Objectives to Determine Training Content, by Arthur J. Hoehn, Research Memorandum, January 1960 (JOBTRAIN II). AD-623 944

This is the second of a series of guidance documents concerning the design and development of integrated school and on-the-job training programs for first-enlistment personnel in electronics maintenance MOSs. The purpose of the series is to assist instructors in (a) reducing the time required for formal school training, and/or improving the initial job capabilities of electronics repairmen, and (b) improving individual technical training provided at the unit level for electronics repairmen in units with a full-time training mission. This report is concerned with how to analyze performance requirements in order to define training content. Devided into two parts, it consists of a statement of assumptions, concepts, and principles relating to the analysis of performance requirements, and describes procedures for applying the concepts.

The Development of Training Programs for First Enlistment Personnel in Electronics Maintenance MOS's: III. How to Design the Handbook Materials, by Arthur J. Hoehn, Research Memorandum, February 1960 (JOBTRAIN II). AD-631 069

This is the third of a series of guidance documents concerning the design and development of integrated school and on-the-job training programs for first-enlistment personnel in electronics maintenance MOSs. This report consists of concepts and principles relating to handbook design and describes procedures for applying the principles.

JOBTRAIN *(Cont.)*

The Development of Training Programs for First Enlistment Personnel in Electronics Maintenance MOS's: IV. How to Design Training Methods and Materials, by Arthur J. Hoehn, Research Memorandum, February 1960 (JOBTRAIN II). AD-628 168

This is the fourth of a series of guidance documents concerning the design and development of integrated school and on-the-job training programs for first-enlistment personnel in electronics maintenance MOSs. This report states concepts and principles relevant to the design of training methods and materials, and includes a brief outline of the procedure for applying these concepts and principles.

The Development of Training Programs for First Enlistment Repairmen: I. How to Define Training Objectives, by Arthur J. Hoehn and Andrew H. McClure, Research Memorandum, July 1960 (JOBTRAIN I). AD-632 490

This is the first of a series of guidance documents concerning the design and development of integrated school and on-the-job training programs for first-enlistment personnel in electronics maintenance MOSs. The purpose of these documents is to assist training officers in (a) reducing the time required for formal school training, and/or improving the initial job capabilities of electronics repairmen, and (b) improving individual technical training provided at the unit level for electronics repairmen in units with a full-time training mission. This first document focuses primarily on the design of formal school programs by defining training objectives.

"Military Training Research in the Engineering of Training Programs for Technical Personnel," by Arthur J. Hoehn, paper for symposium at American Psychological Association convention, New York City, September 1961; issued as Professional Paper 4-69, 10 pp., February 1969. AD-684 206

Rapid technological change makes it necessary to train and retrain personnel as man-machine systems and associated jobs are altered. Because of the continuing rise in required skill levels, the demand for high aptitude, highly trained manpower outruns the supply while it is hard to use lower aptitude men. Recent advances in training technology should, if implemented, help to solve training and manpower problems. Major directions indicated by military research in this area include (1) improved methods for describing required human performance outputs and for deriving training content, (2) better design of informational job aids, and (3) new techniques and devices for guiding the learning process.

"The Technician as a Data Processing System Within the Electronics Maintenance Complex," by R. Gebhard, paper for American Psychological Association convention, Philadelphia, 1963.

Two among the many parameters which determine the maintainability of military electronic systems are of special interest to behavioral technicians because they contribute so greatly to efficiency in terms of training time, repair time, and equipment downtime. These parameters are, respectively, the data processing function, which provides decisions about possible malfunctioning piece parts, and the information matrix, which provides test data and programs the data processing system. An experimental comparison is reported evaluating a method for structuring the information matrix so as to capitalize on superior capabilities, from among Gagné's hierarchy of human functioning, which are easily programed.

The Development and Test of a Training Program and Job Aids for Maintenance of Electronic Communication Equipment, by Richard Gebhard, Technical Report 70-19, 75 pp., December 1970 (JOBTRAIN IV). AD-718 025

The JOBTRAIN IV research was designed to develop methods for producing a combination of training and manuals (job aids) that would require less training time than the standard course for the 291.1 Carrier Equipment Repairman. The methods developed were those of an equipment malfunction analysis for producing content for special manuals and methods of course construction which introduced theory as the student needed it to solve practical maintenance problems. Twenty-two students graduating from an 11-week JOBTRAIN course were tested on the same job performance test as graduates of the 25-week standard (291.1 MOS) course. The students from the two groups were matched and each was individually tested for 22 hours during a 6-day period. There were no statistically significant differences in performance between the two groups. It was concluded that the combination of JOBTRAIN training and job aids is as effective for the 291.1 MOS as conventional school training and manuals and that a 50% reduction in academic hours can be achieved by this combination.

Research By-Products resulting from this research effort are listed in Part III.

JUMPBOOT–Motivation, Morale, and Leadership Division

An Investigation Into Causes and Methods of Overcoming Attrition in the Army Airborne Training Program
(Research for the Department of the Army)

"Self-Ratings of Fear as a Research Instrument in Fear-Invoking Situations," by Richard D. Walk, paper for Eastern Psychological Association meeting, 1954; also in *Journal of Abnormal Social Psychology*, vol. 52, no. 2, March 1956 under the title "Self-Ratings of Fear in a Fear-Invoking Situation."

"Susceptibility to Stress on a Simple Psychomotor Task," by Richard D. Walk, paper for annual meeting of Eastern Psychological Association, 1956.

KAZPO–Psychological Warfare Division

A Study of the Vulnerabilities of the Kazakh Population
(Research for the Department of the Army)

The Kazakhs: A Background Study for Psychological Warfare, by Lawrence Krader and Ivor Wayne, Technical Report 23, November 1955 (Subcontractor: Bureau of Social Science Research, American University). AD-83 258

This study was made (a) to identify the source of conflicts between the Kazakhs' way of life and the policies imposed on them by the Communist regime and (b) to describe communication patterns and facilities relevant to possible psychological warfare needs. The study indicated that the Kazakhs' conflicts are related to loyalties to nationality and culture, strong ties to their kinsmen, and persistence of folk religion. The Kazakhs appear to be opposed to many aspects of Sovietization, but their resistance is largely passive.

KNOWHOLD–Division No. 1 (System Operations)

The Assessment of Military Knowledge at Different Stages of the Career Cycle (Research for the Department of the Army)

"Factors Affecting the Level of Basic Military Knowledge of Active Army Enlisted Personnel at Various Points During Army Service," by Albert I. Prince, Jr., William E. Montague, Ivan H. Scheier, and George J. Wischner, paper for American Psychological Association convention, San Francisco, 1955 (KNOWHOLD I).

"A Pilot Study of the Retention of Basic Military Subject Matter After Separation From the Service," by Harry W. Braun, paper for American Psychological Association convention, San Francisco, 1955 (Subcontractor: University of Pittsburgh) (KNOWHOLD II).

Basic Military Knowledge in the Army Reserve, by William E. Montague (a condensation based on Subcontractor's report by Harry W. Braun, Staff Memorandum, December 1956 (Subcontractor: University of Pittsburgh) (KNOWHOLD II). AD-480 323

Basic Military Knowledge in the Active Duty Army, by Ivan H. Scheier, William E. Montague, Albert I. Prince, and George J. Wischner, Staff Memorandum, June 1957 (KNOWHOLD I). AD-488 400

LEAD–Division No. 4

Development of Training for Improving the Combat Skills of Leaders in Small Infantry Units (Research for the Department of the Army)

"An Evaluation of the Effect of Programmed Instruction Response Origin and Form on Acquisition and Retention Scores," by T.J. McCrystal and T.O. Jacobs, paper for American Psychological Association convention, Philadelphia, September 1963 (LEAD II).

One hundred and twenty infantry lieutenants studied fundamentals of defensive tactics by programed booklet instruction, using four different response conditions. Constructed-overt, constructed-covert, prompted-overt, and prompted-covert response conditions were compared. No significant differences in criterion scores were observed between the response conditions as measured by immediate and delayed retention tests. There was no significant difference in test scores between the programed methods and the standard lecture method, although the latter method required twice the training time of the fastest programed method. Observations were made concerning attitude change toward programed instruction after eight weeks.

"Fundamentals of Tracking," by LTC Frank L. Brown (USA, Ret.), *Infantry*, vol. 56, no. 4, July-August 1966 (LEAD I).

"Pass on That Combat Lore," by LTC Frank L. Brown (USA, Ret.), *Army*, vol. 16, no. 9, September 1966 (LEAD I).

LEAD *(Cont.)*

The Effect of Programed Instruction Response Conditions on Acquistion and Retention, by Thomas J. McCrystal and T.O. Jacobs, Technical Report 66-20, December 1966 (LEAD II). AD-646 347

The objective was to evaluate the effect on criterion scores of programed instruction requiring subjects either to write or not to write their responses, under either constructed or prompted conditions, with military tactics as the content. One hundred and twenty Infantry lieutenants in groups of 30 used the programed booklet instruction with the four response conditions: constructed-overt, constructed-covert, prompted-overt, and prompted-covert. Two control groups were also tested. Although test scores from conventional lecture and programed instruction methods did not differ significantly, the lecture method required twice the average training time of the fastest programed method. The similarity in effectiveness resulting from the disparate responses (either overt or covert) may be dispensed with in favor of prompted covert responses, which require less learning time without compromising the training effectiveness of programed instruction.

"Combat Patrols," by LTC F.L. Brown (USA, Ret.), *Infantry*, vol. 58, no. 1, January-February 1968.

Critical Combat Performances, Knowledges, and Skills Required of the Infantry Rifle Platoon Leader, (LEAD I).

This series of 41 research by-products details the critical skills, knowledges, and performances the infantry rifle platoon leader must have for effective individual and unit combat performance. The overall goal of the research is to improve officer training in these critical combat skill areas necessary for effective leadership. Each volume deals with a particular area, as noted in the subtitle:

Land Navigation, Research By-Product, March 1966. AD-704 976

Counterintelligence, Research By-Product, July 1966. AD-704 970

Messenger Communication, Research By-Product, July 1966. AD-704 978

Observation, Combat Intelligence, and Reporting, Research By-Product, July 1966. AD-704 742

Radio Communication, Research By-Product, July 1966. AD-704 992

Visual, Sound and Tactual Communication, Research By-Product, July 1966. AD-704 997

Wire Communication, Research By-Product, July 1966. AD-704 998

Use of Indirect Supporting Fires, Research By-Product, April 1967. AD-704 996

Cover, Concealment, and Camouflage, Research By-Product, September 1967. AD-704 871

Antipersonnel Mine M18A1 (Claymore), Research-By Product, September 1967. AD-704 961

Human Maintenance Under Campaign Conditions, Research By-Product, October 1967. AD-704 740

Physical Conditioning, Research By-Product, November 1967. AD-704 988

Self-Aid, First Aid and Evacuation, by Elizabeth Y. Felton, T.O. Jacobs, and Kenneth Perkinson, Research By-Product, January 1968. AD-704 872

Protection Against Mines, Boobytraps, and Warning and Illuminating Devices, by Frank L. Brown and John D. Loomis, Research By-Product, January 1968. AD-704 991

Patrolling, by Fred K. Cleary, Research By-Product, March 1968. AD-704 987

Rifle, 5.56mm M16, by Staff, LEAD I, Research By-Product, March 1968. AD-704 993

Hand Grenades, by Frank L. Brown, Research By-Product, April 1968. AD-704 975

Mounted and Dismounted Platoon Combat Formations, by Staff, LEAD I, Research By-Product, April 1968. AD-704 953

Tactical Movement, by Henry E. Kelly, Research By-Product, April 1968. AD-704 949

Squad Formations, Battle Drill, and Elementary Fire and Maneuver, by Arthur J. DeLuca and George J. Magner, Research By-Product, June 1968. AD-704 947

Retrograde Operations, by Fred K. Cleary, Research By-Product, July 1968. AD-704 955

Bayonet Knife and Hand-to-Hand Combat, by Henry E. Kelly, Research By-Product, July 1968. AD-704 968

Offensive Operations, by Fred K Cleary and Henry E Kelly, Research By Product, July 1968. AD-704 986

Defensive Operations, by George J. Magner, Research By Product, July 1968 AD-704 971

Demolitions and Boobytraps, by George J Magner, Research By-Product, July 1968. AD-704 972

Mission, Organization, and General Operation of the Rifle Platoon, by Frank L. Brown and Henry E. Kelly, Research By-Product, July 1968. AD-704 985

Maintenance of Clothing and Equipment, by Jane V. Lee, Dennis I. Jarden, and Joseph A. Moody, Research By-Product, August 1968. AD-704 879

Antitank Weapon, 66-mm HEAT Rocket, M72, by George J. Magner, Research By-Product, August 1968. AD-704 966

Rifle, 7.62-mm M14, by Frank L. Brown, Research By-Product, August 1968. AD-704 948

Technique of Fire of the Rifle Squad, by Henry E. Kelly, Research By-Product, August 1968. AD-704 995

Portable Flamethrowers, by Henry E. Kelly, Research By-Product, August 1968. AD-704 989

Grenade Launcher, 40-mm, M79, by George J. Magner, Research By-Product, September 1968. AD-704 974

Rifle, 7.62-mm, M14A1, by Frank L. Brown, Research By-Product, September 1968. AD-704 994

Emplacements, Shelters, Obstacles, and Fields of Fire, by Fred K. Cleary, Research By-Product, September 1968. AD-704 973

Protection Against CBR Warfare and Nuclear Explosvies, by Henry E. Kelly and George J. Magner, Research By-Product, October 1968. AD-704 990

Mines, Antitank and Antipersonnel, and Warning and Illuminating Devices, by Fred K. Cleary and Theodore R. Powers, Research By-Product, October 1968. AD-704 979

Machinegun 7.62-mm, M60, by Henry E. Kelly, Research By-Product, October 1968. AD-704 977

Armored Personnel Carrier, by George J. Magner and Johnnie O. Holder, Research By-Product, December 1968. AD-704 967

Infrared Weaponsight and Image Intensification Devices, by Frank L. Brown and John D. Loomis, Research By-Product, March 1969. AD-704 952

Airmobile Operations, by Frank L. Brown, Chester I. Christie, Hubert S. Shaw, and Cecil P. Kimberling, Research By-Product, June 1969. AD-704 959

Code of Conduct, Evasion, and Escape, by Frank L. Brown, Research By-Product, July 1969. (Revised) AD-704 969

Critical Combat Performances, Knowledges, and Skills Required of the Infantry Rifle Squad Leader (LEAD I).

This series of 41 research by-products details the critical skills, knowledge, and performances the infantry squad leader must have for effective individual and unit combat performance. It parallels a series for the platoon leader. Each volume deals with a particular area, as noted in the subtitle.

Hand Grenades, by Frank L. Brown, Research By-Product, December 1968. AD-713 754

Antipersonnel Mine M18A1 (Claymore), by Frank L. Brown, Research By-Product, December 1968. AD-713 808

Armored Personnel Carrier, by George J. Magner and Johnnie O. Holder, Research By-Product, December 1968. AD-713 809

Bayonet Knife and Hand-to-Hand Combat, by Henry E. Kelly, Research By-Product, December 1968. AD-713 927

Code of Conduct, Evasion, and Escape, by Frank L. Brown, Research By-Product, December 1968. AD-713 930

Counterintelligence, by Frank L. Brown, Research By-Product, December 1968. AD-713 929

Cover, Concealment, and Camouflage, by Frank L. Brown, Research By-Product, December 1968. AD-713 792

Demolitions and Boobytraps, by George J. Magner and T.R. Powers, Research By-Product, December 1968. AD-713 755

Grenade Launcher, 40-mm, M79, by George J. Magner, Research By-Product, December 1968. AD-713 756

Land Navigation, by Frank L. Brown, Research By-Product, December 1968. AD-713 846

Maintenance of Clothing and Equipment, by Jane V. Lee, Dennis I. Jarden, and Joseph A. Moody, Research By-Product, December 1968. AD-713 790

Observation, Combat Intelligence, and Reporting, by Frank L. Brown, Research By-Product, December 1968. AD-713 758

LEAD *(Cont.)*

Messenger Communication, by Frank L. Brown, Research By-Product, December 1968. AD-713 802

Physical Conditioning, by Henry E. Kelly and Arthur J. DeLuca, Research By-Product, December 1968. AD-713 757

Portable Flamethrowers, by Henry E. Kelly, Research By-Product, December 1968. AD-713 801

Protection Against CBR Warfare and Nuclear Explosions, by Henry E. Kelly and George J. Magner, Research By-Product, December 1968. AD-713 803

Protection Against Mines, Boobytraps, and Warning and Illuminating Devices, by Frank L. Brown and John D. Loomis, Research By-Product, December 1968. AD-713 815

Radio Communication, by Frank L. Brown, Research By-Product, December 1968. AD-713 816

Rifle, 5.56mm, M16, by Henry E. Kelly, T.O. Jacobs, and Richard A. Taylor, Research By-Product, December 1968. AD-713 821

Rifle, 7.62-mm, M14, by Frank L. Brown, Research By-Product, December 1968. AD-713 931

Rifle, 7.62-mm, M14A1, by Frank L. Brown, Research By-Product, December 1968. AD-713 793

Visual, Sound, and Tactual Communication, by Frank L. Brown, Research By-Product, December 1968. AD-713 799

Wire Communication by Frank L. Brown, Research By-Product, December 1968. AD-713 828

Mission, Organization, and General Operation of the Rifle Squad and Platoon, by Frank L. Brown and Henry E. Kelly, Research By-Product, January 1969. AD-713 800

Mounted and Dismounted Platoon Combat Formations, by Frank L. Brown, T.O. Jacobs, and Arthur J. DeLuca, Research By-Product, January 1969. AD-713 813

Antitank Weapon, 66-mm HEAT Rocket, M72, by George J. Magner, Research By-Product, January 1969. AD-713 789

Human Maintenance Under Campaign Conditions, by Frank L. Brown and T.O. Jacobs, Research By-Product, January 1969. AD-713 759

Self-Aid, First Aid and Evacuation, by Elizabeth Y. Felton, T.O. Jacobs, and Kenneth Perkinson, Research By-Product, January 1969. AD-713 805

Emplacements, Shelters, Obstacles, and Fields of Fire, by Fred K. Cleary, Research By-Product, February 1969. AD-713 810

Infrared Weaponsight and Image Intensification Devices, by Frank L. Brown, and John D. Loomis, Research By-Product, March 1969 AD-713 904

Mines, Antitank and Antipersonnel, and Warning and Illuminating Devices, by Fred K. Cleary and Theodore R. Powers, Research By-Product, March 1969. AD-713 812

Squad Formations, Battle Drill, and Elementary Fire and Maneuver, by Fred K. Cleary, Herbert Thompson, Arthur J. DeLuca, and George J. Magner, Research By-Product, March 1969. AD-713 822

Use of Indirect Supporting Fires, by Frank L. Brown, Research By-Product, March 1969. AD-713 928

Retrograde Operations, by Fred K. Cleary, Research By-Product, May 1969. AD-713 806

Offensive Operations, by Fred K. Cleary and Henry E. Kelly, Research By-Product, May 1969. AD-713 827

Defensive Operations, by Frank L. Brown and George J. Magner, Research By-Product, June 1969. AD-713 791

Patrolling, by Fred K. Cleary, Research By-Product, July 1969. AD-713 814

Machinegun, 7.62-mm, M60, by Frank L. Brown, Research By-Product, August 1969. AD-713 811

Airmobile Operations, by Frank L. Brown, Chester I. Christies Jr., and Albert R. Amos, Jr., Research By-Product, August 1969. AD-713 807

Technique of Fire of the Rifle Squad, by Henry E. Kelly, Research By-Product, October 1969. AD-713 824

Tactical Movement, by Henry E. Kelly and Fred K. Cleary, Research By-Product, December 1969. AD-713 823

Developing the Critical Combat Performance Required of the Infantry Rifle Platoon Leader, by Frank L. Brown and T.O. Jacobs, Technical Report 70-5, 92 pp., April 1970 (LEAD I). AD-704 946

This paper describes the methods employed in Work Unit LEAD to identify and record the critical combat performances, knowledges, and skills required of the Infantry Rifle Platoon Leader. From over 200 small-unit combat actions ranging from World War II to Vietnam, some 6,000 performances, knowledges, and skills were extracted, categorized into major subject areas, and finally recorded in 41 research by-products. The general methodology developed by this research may be applicable to the identification of the combat requirements of other military command or staff functions.

Additional Research By-Products resulting from this research effort are listed in Part III.

LEADREVIEW—Division No. 4

The Development of a Comprehensive Review of Psychological and Sociological Literature on Organizational Leadership
(Research for the Office of Naval Research)

Annual Summary Report, Project: Leadership Training, by T.O. Jacobs, 16 pp., June 1970. AD-708 408

The objective of the present project is to develop a review and integration of the current social psychological and sociological literature relevant to leadership in formal organizations. The work during the first year of the project has consisted of abstracting and cataloging approximately 900 references; the projected outline for the review is presented as an appendix to the report.

Leadership and Exchange in Formal Organizations, by T.O. Jacobs, HumRRO Final Report to the Office of Naval Research, Group Psychology Programs, Contract No. N00014-70-C-0091, NR 171-811/9-4-69 (452), 353 pp., December 1970. AD-725 584

The focus of this volume is on influence processes in formal organizations. It is based on an integration of basic and applied research on leadership, drawing upon review of more than 1,000 separate titles. The most important conclusion reached in this work is the importance of distinguishing between the concepts of leadership, power, and authority, and of identifying superordinate role behaviors that constitute each. The volume also provides a basis for identifying fruitful work in organizational leadership and for immediate application of existing organizational and leadership findings.

LIFT–Division No. 6 (Aviation)[1]
Army Aviation Helicopter Pilot Training[2]
(Research for the Department of the Army)

§*Survey of the Army Cargo Helicopter Pilot Course*, by Albert I. Prince and Hobart G. Osburn, Staff Memorandum, 51 pp., June 1957 (LIFT I). AD-480 458

This report describes research conducted to (a) develop a simple "patter-type" instructional booklet for helicopter training, (b) identify the instructional and training problems in the Basic Cargo Helicopter Pilot Course to provide a basis for subsequent research, and (c) collect maneuver difficulty information.

"The Effects on Flight Proficiency Measurement Reliability of Differences in Check Pilot Standards," by George D. Greer, Jr., paper for American Psychological Association convention, Cincinnati, Ohio, September 1959 (LIFT II).

★The problem of low or variable flight proficiency measurement reliability, whether the measure is subjective or relatively objective, is attributed to marked, identifiable differences in the standards applied by different check pilots. A technique is described for selecting pairs of check pilots whose standards are sufficiently uniform so that the ride-ride reliability of the flight proficiency evaluation system can go from less than .20 up to .65 or higher.

"Let's Take a Look at Quality Control in Helicopter Training," by LTC Arne H. Eliasson, *Army Aviation*, vol. 10, no. 7, July 1961.[3]

Survey of Operational Flying Activities of Rotary Wing Aviators, by Norman W. Heimstra, Nicholas B. Louis, and MAJ Arnold R. Young, Technical Report 75, 73 pp., April 1962 (LIFT III). AD-274 980

As part of a world-wide survey of Army aviators, 743 rotary wing aviators completed a 166-item questionnaire, giving detailed information on their operational activities and evaluating their school and unit training. Data are presented on such topics as frequency of types of missions and of various operations or maneuvers, the flying techniques used in these operations, and type and amount of unit training received. In addition, interviews were conducted with 90 unit commanders, instructor pilots, and operations officers to obtain their evaluations of the proficiency of aviators received from the Aviation School and of the unit training given rotary wing aviators.

Survey of Operational Flying Activities of Fixed Wing Aviators, by Norman W. Heimstra, Nicholas B. Louis, and MAJ Arnold R. Young, Technical Report 76, 63 pp., April 1962 (LIFT III). AD-274 929

As part of a world-wide survey of Army aviators, 578 fixed wing aviators completed a 121-item questionnaire, giving detailed information on their operational activities and evaluating their school and unit training. Data are presented on such topics as frequency of types of missions and of various operations or maneuvers, the flying techniques used in these operations, and type and amount of unit training received. In addition, interviews were conducted with 90 unit commanders, instructor pilots, and operations officers to obtain their evaluations of the proficiency of aviators received from the Aviation School and of the unit training given fixed wing aaviators.

[1] This Work Unit was initiated at Division No. 1 (System Operations). The symbol § indicates an item prepared at Division No. 1.

[2] Presence of a star at the beginning of the abstract indicates that the item is one of the LIFT papers or presentations included in *Collected Papers Prepared Under Work Unit LIFT Army Aviation Helicopter Pilot Training*, Professional Paper 18-68, June 1968.

[3] Colonel Eliasson was the Unit Chief of the U.S. Army Aviation Human Research Unit

Improving Flight Proficiency Evaluation in Army Helicopter Pilot Training, by George D. Greer, Jr., Wayne D. Smith, and CPT Jimmy L. Hatfield, Technical Report 77, 48 pp., May 1962 (LIFT II). AD-276 115

A method was devised for evaluating helicopter pilots' end-of-phase performance in primary helicopter training on the basis of a standard check ride evaluated with more objective measures. The measures—termed the Intermediate PPDR (Pilot Performance Description Record) and the Advanced PPDR—consist of scales for the critical maneuvers given in primary helicopter training, on which the check pilot can record his observations of each component of performance during the actual flight. The PPDR system of evaluation was found to be more reliable and diagnostic than the method used in the past. In addition to the PPDR booklet, the new system includes a training program for check pilots in the use of the PPDR and classroom practice in scoring the PPDRs for the correction of atypical standards of evaluation.

"Briefing on Task LIFT," by John O. Duffy and Oran B. Jolley, paper for 15th Annual International Air Safety Seminar, in cooperation with U.S. Naval Aviation Safety Center and U.S. Army Transportation Research Command, Williamsburg, Va., December 1962.

★The development of the Pilot Performance Description Record (PPDR), a means of standardizing the evaluation of student helicopter pilot proficiency, is described in this paper. The detailed scoring device also serves as a standardizing instrument for check pilots, a diagnostic method of detecting weaknesses in instructor pilots, and a quality control program of benefit to a training system.

A System of Flight Training Quality Control and Its Application to Helicopter Training, by John O. Duffy and Carroll M. Colgan, Consulting Report, 40 pp., June 1963 (LIFT IV). AD-419 081

This report describes the manner in which the concepts and principles of quality control were applied to the flight training course at the U.S. Army Primary Helicopter School. The quality control system described is characterized by: (a) comprehensive and consistent testing of students' flight proficiency; (b) accurate and equitable evaluation of the efficiency of training personnel; (c) a high degree of uniformity of flight-check procedures and scoring practices; and (d) objective and detailed school standards by which individual students or classes may be evaluated.

"A Quality Control Program Applied to Helicopter Training," by John O. Duffy, paper for American Psychological Association convention, Philadelphia, September 1963 (LIFT IV).

★A quality control system to develop and standardize means of evaluating the performance of student helicopter pilots is described. Means of controlling the training given by instructor and check pilots are also discussed.

PPDR Handbook: Use of Pilot Performance Description Record in Flight Training Quality Control, by George D. Greer, Jr., Wayne D. Smith, Jimmy L. Hatfield, Carroll M. Colgan, and John O. Duffy, Research By-Product, 58 pp., December 1963. AD-675 337

This handbook provides a description of the Pilot Performance Description Record (PPDR), its characteristics, and general instructions for its use. It also offers a description of the check-pilot training program. An appendix contains a description of the Primary and Basic PPDR performance scales as used in helicopter flight evaluation.

"Flight Training Quality Control," by John O. Duffy and Edgar N. Anderson, paper for 10th Annual Army Human Factors Research and Development Conference, Fort Rucker, Ala., October 1964 (LIFT IV).

★A quality control program implemented at the U.S. Army Primary Helicopter School consists of systematic evaluation of checkrides given to students at two levels of proficiency during training. Data are used to evaluate student performance; compute a class error score per maneuver and a school standard of errors per maneuver; determine sources of class deviation from the average; evaluate instructor pilot performance; regulate check pilot performance and standardizations; and indicate changes in school standards.

LIFT *(Cont.)*

Collected Papers Prepared Under Work Unit LIFT: Army Aviation Helicopter Pilot Training. Professional Paper 18-68, 25 pp., June 1968. AD-673 936

(LIFT items included in this Professional Paper are indicated with a star at the beginning of the abstract.)

Results of studies to develop more efficient and more effective methods for Army helicopter pilot training are discussed. Topics covered include a technique of pairing check pilots with uniform standards to improve reliability of flight proficiency measurement; a description of the Pilot Performance Description Record (PPDR); a description of a quality control system for helicopter training; and a program to systematically evaluate student proficiency from checkrides.

Additional Research By-Products and other related research materials are listed in Part III under LIFT, and also under INTACT.

LIMIT—Division No. 1 (System Operations)
Adapting Service School Courses for Enlisted Men With Minimal Qualifications (Research for the Department of the Army)

The Effectiveness of Different Training Methods in School Situations, by Robert S. Beecroft, Staff Memorandum, September 1955 (LIMIT I). AD-480 457

"Verbal Learning and Retention as a Function of the Number of Competing Associations," by Robert S. Beecroft, *Journal of Experimental Psychology*, vol. 51, no. 3, March 1956 (LIMIT I).

Previous studies of verbal learning have indicated that interference in learning increases with the number of competing associations. Four paired adjective lists, varying in the number of competing associations per pair were learned by the anticipation method and recalled 24 hours after learning. The results agree with previous findings that competing associations handicap performance early in learning and that intralist similarity does not affect recall.

Effectiveness of Increased Repetition in Classroom Learning, by Robert S. Beecroft and Robert Anneser, Staff Memorandum, July 1957; paper for annual meeting of Midwestern Psychological Association, Spring 1957 (LIMIT I). AD-665 281

An experiment evaluating the effectiveness of increased repetition of major points in classroom instruction found student achievement increased by this technique.

Special Lesson Plans Gasoline Engine Fuel System, by Robert Anneser and Robert S. Beecroft, Staff Memorandum, February 1958 (LIMIT I). AD-488 590

This memorandum contains a series of special lesson plans providing integrated nomenclature and operation instruction on the gasoline engine fuel system. These plans are intended for use by persons who are concerned with gasoline engine maintenance training and may be used in providing such instruction or as a model in developing lessons for similar subject areas. Included are five lesson plans on nomenclature and operation of the fuel system, a plan which condenses three of these hours, and one lesson plan on troubleshooting and maintenance. Furnished as a guide for testing student achievement are three objective paper-and-pencil tests: a Fuel System Nomenclature and Operation Test, a Fuel System Trouble Shooting and Maintenance Test, and a Carburetor and Operation Test.

Basic Electronics for Minimally Qualified Men: An Experimental Evaluation of a Method of Presentation, by S. James Goffard, Norman W. Heimstra, Robert S. Beecroft, and Joseph W. Openshaw, Technical Report 61, February 1960 (LIMIT I). PB-149460 AD-233 596

This study is the last of a series dealing with methods of training designed to improve the achievement in technical courses of men with minimal qualifications for technical training. In this study, the three-week Basic Electronics section of the Field Radio Repair course (MOS 296.1) was reorganized according to the principle of "functional context." No item of information or training was presented until it could be fitted into a context of material already learned; training was in whole-to-part rather than in the conventional part-to-whole order. One group of standard input classes (a total of 184 men) was trained by the functional context method and another group (a total of 202 men) was trained by the conventional method. A battery of 10 tests on basic electronics was administered after the three weeks of training. The functional context training proved to be superior, particularly for men at the lower levels of aptitude for electronics training.

Research By-Products resulting from this research effort are listed in Part III.

LISTEN—Division No. 3

Development of Automated Programs to Improve Listening Skills Required in Army Jobs (Research for the Department of the Army)

"Factors Affecting Learning by Listening," by Thomas G. Sticht, paper for National Research Council Conference on Language Acquisition and Comprehension, Durham, N.C., April 1971.

LOCK-ON–Division No. 1 (System Operations)
Training of Guided Missiles Operator Personnel
(Research for the Department of the Army)

USARADCOM Integrated Fire Control Training Guide, Research By-Product, July 1957. AD-158 584
This training guide provides a simple and practical presentation of IFC operator procedures for on-site training. The manual includes overall characteristics of the program, operations procedures, checks, and adjustments.
See Technical Report 64.

"The Development and Evaluation of On-Site Training for Nike Integrated Fire Control Operators," by Myron Woolman, paper for American Psychological Association convention, September 1958 (LOCK-ON 1).
A method of training inexperienced Nike integrated fire control (IFC) operators on-site was developed and experimentally tested. The experiment involved 24 Nike batteries, six in each of four training methods (N=424 operators). The four experimental methods were: The Experimental Program, Periodic Evaluation, Experimental Program plus Periodic Evaluation, and Controls (conventional training). Periodic Evaluation consisted of frequent evaluations of operator performance. Operators given the Experimental Program were significantly superior to Controls in both performance (split-half reliability .91) and written test results (split-half reliability .95). Periodic Evaluation offered no significant training benefits.

On-Site Training of Guided Missile Operators, by Myron Woolman, Technical Report 64, August 1960, with Supplement, *USARADCOM Integrated Fire Control Training Guide (Illustrative Selections)* (LOCK-ON 1). PB-152580 AD-244 250
The study was concerned with developing and testing a method of training Nike IFC operators on site. In a five-month field test, three experimental methods were compared with conventional training. The principal experimental method—Operational Context Training— was incorporated in a *Training Guide* that included (a) a step-by-step breakdown of all operator procedures, (b) specific instructional techniques for use by battery personnel without experience as instructors, and (c) a systematic method of evaluating trainees. Operators trained by the various methods were compared by means of job-sample and written criterion tests, and by other measures. Operators trained by the OCT method were more proficient than those trained by the other methods in the study; OCT-trained operators were as proficient as school-trained personnel with greater on-site experience.

"Dependency on Supervisors, Proficiency and Morale in Guided Missile Batteries," by Myron Woolman, paper for American Psychological Association convention, September 1960 (LOCK-ON 1).
A study was undertaken to obtain estimates of the effects of morale and supervisory dependency measures on battery operator proficiency. The subjects used were operators in 24 Nike batteries in the United States. Twelve batteries received "military inspections" and twelve did not. Six measures were available: Four evaluations of operator proficiency, one supervisory dependency measure, and one morale measure. Cross correlations of mean battery scores were made for (a) total batteries, (b) inspected, and (c) non-inspected batteries. Proficiency was not related to morale but was negatively correlated with supervisory dependency for the total sample; in the sub-groups the relationships between variables differed markedly.

On-Site Training of Guided Missile Operators Evaluation Materials, by Myron Woolman, Research Memorandum, October 1960 (LOCK-ON 1). AD-489 291
This supplement to Technical Report 64 presents the evaluation materials used to develop and test a training program suitable for use in an operational missile battery setting. Materials include a personnel information form, training proficiency checks, a procedures written test, and an attitude scale.

Research By-Products resulting from this research effort are listed in Part III.

LOWENTRY—Division No. 6 (Aviation)
Methods for Improving Navigation Training for Low-Level Flight
(Research for the Department of the Army)

"Let's Take a Look at New Project: Task LOWENTRY," by LTC Arne H. Eliasson, *Army Aviation*, vol. 10, no. 8, August 1961.[1]

Pictorial Navigation Displays and Low-Altitude Navigation, by Robert H. Wright and Thomas G. Waller, Consulting Report, April 1964. AD-601 711

This report seeks to describe what a pictorial navigation display system for use in Army aviation should do, how it should look, and what tactical and training implications such a device might have. Several devices commercially available are examined. While none of the three displays discussed will meet all of the major requirements, all three systems appear to be steps in the right direction.

"The Effect of Training on Accuracy of Angle Estimation," by T. Gary Waller and Robert H. Wright, paper for annual meeting of Southeastern Psychological Association, Spring 1964.

"Army Low Altitude Navigation: System Considerations and Procedural Solutions," by Robert H. Wright and T. Harrison Gray, paper for 10th Annual Army Human Factors Research and Development Conference, Fort Rucker, Ala., October 1964.

The Effect of Training on Accuracy of Angle Estimation, by T. Gary Waller and Robert H. Wright, Technical Report 65-8, August 1965 (LOWENTRY I). AD-619 958

This study examined the feasibility of using direct perceptual estimation on maps to determine angles of drift, and the effect of training on this ability. Subjects were divided into a control group and two training groups, one of which was trained using angles drawn on plain white cards, and the other using angles drawn on both cards and tactical maps. Both training groups initially estimated the size of angles, ranging from 1° to 18°, with a mean absolute error of 2.57° and a mean algebraic error of -0.20°. After training absolute error was 1.34° and algebraic error was +0.43°. A job aid consisting of reference angles of 5°, 10°, and 15° did not significantly affect performance on map items, although on card items, performance of the training groups shifted from underestimation to slight overestimation of angle size.

The Effects of Map Scale on Position Location, by Ed Moon Edmonds and Robert H. Wright, Technical Report 65-9, September 1965 (LOWENTRY I). AD-623 396

This study was conducted to determine the relationship between field position location and map scale. Two map scales were used—1:25,000 and 1:250,000. Twelve subjects were required to mark their position on a map at each of 12 terrain positions. The task was then repeated, utilizing the other scale map. The error in position location was approximately 10 times greater with the 1:250,000 scale map than with the 1:25,000 scale map. However, a significant scale-by-position interaction was found. It was concluded that maps of 1:100,000 or 1:125,000 scale would best meet the tactical target area requirements of Army aviators, and that the 1:250,000 scale map, with certain format changes, would provide the information necessary for en route tactical navigation over moderate or long distances.

[1] Colonel Eliasson was the Unit Chief of the U.S. Army Aviation Human Research Unit.

***Speed and Accuracy of Addition in Normal Time and Decimal Time Systems*, by T. Harrison Gray, T. Gary Waller, and Robert H. Wright, Technical Report 66-17, October 1966 (LOWENTRY II). AD-642 697**

The study compared the efficiency of decimal and sexagesimal, or normal, time systems in the solution of addition problems, using the time required to reach a solution and the number of errors as dependent variables. Twelve subjects solved sets of addition problems composed of 8, 16, or 24 digits, using the decimal and sexagesimal time system. When the conversion process required by the sexagesimal system was included in the analysis, the results clearly showed that addition using the sexagesimal system required significantly more time (1½ to 2½ times as much) and produced significantly more errors (1½ to 3 times as many). When the conversion process required by the sexagesimal system was excluded from the analysis, there was no significant difference between the two time systems on either dependent variable.

"Some Comments on the Display of Cartographic Information for Very Low Level Flight," by Robert H. Wright, paper for Symposium on Aeronautical Charts and Map Displays, Office of Naval Research, Department of the Navy, Washington, November 1966; issued as Professional Paper 13-67, March 1967. AD-650 445

Geographic orientation information available to the pilot flying at very low levels, and cartographic displays that can help him use this information more effectively, are discussed. Attention is given to characteristics of a cartographic presentation emphasizing perception of feature detail, relief, and vegetation. Considerations involved in developing such a presentation are discussed.

Techniques for Low Altitude Navigation: Direction Estimation From Tactical Maps, by T. Harrison Gray, T. Gary Waller, and Robert H. Wright, Technical Report 67-4, April 1967. AD-651 627

The objective was to study the effects of map scale, map reference point variables, and training on the ability of pilots to estimate direction using Army tactical maps for low-level navigation. Twenty-four experienced officer and warrant officer pilot personnel working with various map reference point conditions made direction estimates using 48 maps with a scale of 1:100,000 and 48 maps with a scale of 1:250,000. The effect of training was studied by using a test-train-retest-delay-retest procedure. Performance was measured in terms of absolute error, in degrees, between the estimated direction and correct direction. Analyses showed that average error in direction estimation using tactical maps was reduced significantly by training, dropping from a mean of 6.1° before training to 4.8° after training. There were also significant differences in accuracy of direction estimates as a function of map scale, distance between reference points, and compass octant in which the reference points were located.

"Orientation Systems: First Things First,," by Robert H. Wright, paper for JANAIR, Joint Army-Navy Aircraft Instrumentation Research Symposium, Washington, November 1969; issued as Professional Paper 3-70, 10 pp., February 1970. AD-705 021 ED-040 058

The geographic orientation requirement for the Army's lighter aircraft, and for Army aviation as a system, is a system-analysis and system-design problem that appears to have defied solution. The factors considered in this paper indicate that the requirement is not filled by a simple "more sophisticated machine" systems approach. Instead, the *man* part of the man-machine system needs to be deliberately "designed in" to contribute his full potential as a functional part of the system. Also, the Army aviation operational environment, with all of its complex interacting coordination requirements, needs to be considered, for an affordable and operationally effective geographic orientation system.

Survey of Factors Influencing Army Low Level Navigation, by Robert H. Wright and Warren P. Pauley, Technical Report 71-10, 118 pp., June 1971.

Factors that influence low level navigation and affect Army capability in conducting low level missions were surveyed. The nature of improvements in equipment, procedures, and training needed to provide the Army with effective operational capability in low level navigation were indicated. Major conclusions from the survey: Limited capability in low level aerial navigation would have significant consequences on future Army combat effectiveness; the rapid reaction mission over unfamiliar terrain presents a low level navigation problem; no potential improvements in training or procedures for present navigation system and equipment appear capable of significantly improving low level performance; a simple automatic dead reckoning navigation computer appears to be essential to routine attainment of operationally effective low level navigation performance; reorienting navigation procedures and training to simplified Line of Position navigation techniques would improve performance with current equipment.

MAINTRAIN–Division No. 5

Maintenance Proficiency and Its Relation to Training Procedures for Guided Missile Personnel (Research for the Department of the Army)

Maintenance Personnel and Training Research: A Bibliography, by Helen J. Stiles and Robert G. Demaree, Staff Memorandum, March 1958. AD-610 126

References in this 368-item bibliography are divided into the following sections and listed alphabetically by senior author: Maintenance research programs and their management, design of equipment and work situations for maintainability; job description and forecasting; selection; training, training equipment; proficiency measurement and criteria of job performance; job aids and handbooks, collected works; and bibliographies and indexes.

Some Problems in the Analysis of Trouble Shooting Behavior, by Paul G. Whitmore, Research Report 2, October 1959 (MAINTRAIN II). PB-141231. AD-228 316

Data from three previous HumRRO studies (RADAR IV, RADAR VI, and ACHILLES) were pooled and analyzed to identify problems of maintenance and maintenance training. The data consisted of (a) observations of maintenance activities made during the administration of job-sample proficiency tests to M33 and Nike-Ajax fire control system maintenance technicians, and (b) responses to multiple-choice items on a written test given to Nike-Ajax fire control system maintenance technicians. The set of coded categories used in recording activities did not meet the requirements for describing the technician's troubleshooting procedures; consequently, the technician's knowledges and skills could not be clearly inferred. It was not possible to isolate "knowledge" classes for the written test items related to overall proficiency. The generalization of modifications introduced into the M33 FCS experimental training programs to Nike-Ajax IFC training was supported at a very gross level of analysis.

MAINTRAIN *(Cont.)*

Experimental Comparison of Two Basic Electronics Courses for Fire Control Technicians, by Lloyd Hitchcock, Jr., Technical Report 60, February 1960 (MAINTRAIN I). PB-149459 AD-233 597

The present study provides further data on the effectiveness of an experimental subcourse in basic electronics developed in earlier research as part of a training program for air defense electronics technicians. One class of trainees was given the standard 12-week subcourse in basic electronics and another received the shorter experimental course; both groups completed the standard program of instruction for maintenance of M33 equipment. Results of performance and written tests revealed no significant differences in proficiency between graduates of the two courses. The shorter basic electronics subcourse is recommended for adoption as standard preliminary instruction in electronic fire control maintenance courses and for possible application to maintenance training programs for other electronic equipment.

"Research on Missile Maintenance Technicians," by P.G. Whitmore and J.P. Rogers, paper for symposium at annual meeting of Southwestern Psychological Association, Spring 1960.

Current Practices in Electronics Training in Industry, by Robert F. Mager, Research Memorandum, May 1960 (MAINTRAIN IV). AD-480 549

A Survey of Organizational Maintenance of the Nike Ajax Missile, by Robert A. Goldbeck, Emanuel Kay, W.L. Williams, Jr., and James P. Rogers, Research Memorandum, July 1960 (Subcontractor: American Institute for Research) (MAINTRAIN III).[1] AD-488 616

"Electronics Maintenance Research," by J.P. Rogers, paper for symposium at meeting of Rocky Mountain Psychological Association, Spring 1961.

"The Improvement of Trouble Shooting Proficiency Through Improved Maintenance Manuals," by James P. Rogers, paper for American Psychological Association convention, New York, September 1961 (MAINTRAIN V).

See Technical Report 65-1.

An Annotated Bibliography on the Troubleshooting of Electronic Equipment, by Clinton S. Trafton, Research Memorandum, March 1962 (MAINTRAIN V). AD-464 065

Preparation of MAINTRAIN Troubleshooting Manuals, Working Paper, by James P. Rogers and Julia S. Harris, October 1964 (MAINTRAIN V). AD-640 425

The Development and Evaluation of an Improved Electronics Troubleshooting Manual, by James P. Rogers and H. Walter Thorne, Technical Report 65-1, March 1965 (MAINTRAIN V). AD-614 606

To develop a maintenance manual that would permit a trained technician to troubleshoot electronic equipment faster and more accurately, hypotheses were developed about what information should be presented. An experimental manual was prepared for troubleshooting the Nike Ajax and its test equipment; it contained some information not found in conventional manuals and was organized according to when and how information is to be used. An experimental group using the experimental manual was able to troubleshoot faster and more effectively than a control group using standard schematic and functional diagrams and personal notes. A list of desirable contents for troubleshooting manuals was drawn up, and procedures for preparing troubleshooting manuals were written.

Research By-Products resulting from this research effort are listed in Part III.

[1] Dr. Goldbeck and Dr. Kay were employees of the subcontractor; Dr. Williams and Dr. Rogers were on the staff of Division No. 5.

MALT—Division No. 7 (Social Science)
Construction and Evaluation of a Short, Automated Vietnamese Language Course
(Research for the Department of the Army)

"Design of a Short, Automated Course in Vietnamese: An Interim Report," by Alfred Fiks, paper for Inter-Agency Language Roundtable, Syracuse University, November 1963.

***Some Language Aspects of the U.S. Advisory Role in South Vietnam*, by Alfred I. Fiks and John W. McCrary, Research Memorandum, 29 pp., November 1963 (MALT I). AD-434 056 ED-011 105**

"A Psychological Approach to the Design of a Short, Self-Instructional, Functional Course in a Foreign Language," by Alfred I. Fiks, paper for International Congress of Applied Psychology, Ljubljana, Yugoslavia, August 1964.

The paper describes the methodology used to construct a course that would enable a student to achieve some predetermined skill levels in understanding and speaking a tonal language like Vietnamese using only programed, audio-lingual material. The psychological and linguistic rationale for the techniques used is discussed. Problems in shaping foreign language comprehension and verbal production skills are explored. Empirical evaluation of the course, to determine how much of the foreign language phonology, syntax, and vocabulary is learned by actual students, is described.

"Some Psychological Aspects in Foreign Language Training," by Alfred I. Fiks, paper for American Psychological Association convention, Chicago, September 1965.

While constructing a programed Vietnamese course, these research issues were investigated: Does prior listening exposure to phonology of a foreign language (FL) facilitate learning to speak the FL? How much variability in FL speaking test scores is attributable to heterogeneity of native listeners and to sequence effects? What factors attenuate the correlation between FL aptitude and achievement measures? Regarding the first question, no facilitation was demonstrated. To the second, listeners differed by as much as 25% from each other; test scoring sequence accounted for a 13% difference. Thirdly, r attenuation from +.70 to −.24 is attributed to differential aptitude ranges.

"Development of a Short, Practical, Programed Vietnamese Course," by Alfred I. Fiks, paper for 11th Annual Army Human Factors Research and Development Conference, Fort Bragg, N.C., October 1965; issued as Professional Paper 41-67, 9 pp., September 1967. AD-660 740

This presentation reports the goals, approach, and results of developing a Vietnamese language course that could be taught without the presence of an instructor. The 50-lesson course that was developed was given to 19 Military Assistance Training Advisor students, all officers at the Special Warfare Center. These students did as well as or better than a traditionally trained group when both were tested on the Army Language Proficiency Test.

"A Short Vietnamese Language Program: Training Course and Research Vehicle," by Alfred I. Fiks, *International Review of Applied Linguistics*, vol. IV, no. 4, December 1966; issued as Professional Paper 4-68, 23 pp., February 1968. AD-665 217

The project reported in this paper demonstrates the feasibility of teaching elementary Vietnamese language skills with a short, self-instructional, automated program. The course was tailored for military advisors. Nineteen subjects were used in the course evaluation. The performance of the 16 subjects who completed the 50-lesson taped course, in auditory comprehension and oral-production tests, was considered satisfactory (90 and 73%, respectively) and their attitude toward the course was generally favorable.

MALT *(Cont.)*

Programed Learning in Vietnamese: Construction and Evaluation of a Short Practical Language Course, by Alfred I. Fiks and Dinh Van Ban, Technical Report 67-1, 57 pp., January 1967. AD-647 460 ED-091 628

Language skill is an especially important element in the performance of overseas military operations that are primarily advisory in nature. This research project sought to develop and assess the value of a short, self-instructional, job-oriented Vietnamese language program. A fifty-lesson taped course was constructed. The program was evaluated on Military Assistance Training Advisor students. Learning achievement was satisfactory, and trainees in general reported liking the course. Language aptitude was related to performance in the course, which was in turn related to performance in subsequent more advanced language training.

Research By-Products resulting from this research effort are listed in Part III

MANICON—Division No. 5

Determination of Performance Capabilities and Training Requirements for Manual Command and Control Functions of the NIKE-X Weapon System
(Research for the Department of the Army)

"A Concept of the Role of Man in Automated Systems," by William H. Melching, paper for annual meeting of Southwestern Psychological Association, New Orleans, La., April 1968, issued as Professional Paper 14-68, 8 pp., May 1968. AD-671 128

A problem that has long plagued system designers and human factors engineers is that of allocation of functions between man and machine. This paper reports an attempt to isolate and identify factors pertinent to making allocation decisions. From an analysis of the functions and missions of several automated systems, six factors were shown to be highly relevant to allocation decisions. One factor, man's role in automated systems, emerged as a variable of particular interest. In addition, four classes of manual functions common to all automated systems were identified. It was determined that these classes, in turn, constituted a meaningful description of the role of man in today's automated systems.

"Man in Control of Highly Automated Systems," by Harry I. Ammerman and William H. Melching, paper for Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970, issued as Professional Paper 7-71, 14 pp., May 1971

In this paper the identification of what man should do as a decision maker and controller in the newly evolving man-machine systems is considered. Among the topics discussed are man's underlying basic functions in a complex system, task activities for individual jobs and their analyses, and training and the design of operational job positions.

MAP—Division No. 7 (Social Science)[1]

Development of Guidelines for Training Personnel for Military Assistance Advisory Duties (Research for the Department of the Army)

"The Design of Cross-Cultural Training for Military Advisors," by Arthur J. Hoehn, paper for American Psychological Association convention, New York, September 1966; issued as Professional Paper 12-66, December 1966. AD-646 977

This paper deals with the design of training for military advisors, with particular attention to the objectives toward which the training should be directed and the kinds of content coverage needed. Factors that make the advisor's assignment quite different from typical military assignments include the unusual physical and cultural setting, the unfamiliar functions to be performed, and the complex intercultural, international, and interpersonal aspects of the job. Adequate preparation requires high-order knowledges and skills that can be developed only by adoption of new perspectives for area training. These new perspectives relate not only to objectives and content but also to the overall plan for programing area training into the larger pattern of education and training spanning the military officer's career.

An Experimental Criterion of Cross-Cultural Interaction Effectiveness: A Study of Military Advisors and Counterparts, by Dean K. Froehlich, Professional Paper 38-68, 10 pp., December 1968 (MAP II). AD-682 346

This paper describes some of the military requirements for an assessment technique with which to estimate the effectiveness of the interactions that occur between Military Assistance Program advisors and their counterparts. An experimental criterion of effectiveness, willingness to work together, is described, and estimates of its validity reported. Validity estimates are based on the relationship of the criterion scores to descriptions of the personal traits given by advisors and counterparts to one another, the extent to which they satisfy certain critical-role behaviors, and, counterparts' perceptions of the advisors' primary concerns.

Military Advisors and Counterparts in Korea I Job Characteristics, by Dean K. Froehlich, Technical Report, 69-15, 87 pp., August 1969 (For Official Use Only) (MAP II). AD-860 235

U.S. Army personnel assigned to the Korea Military Assistance Group and functioning as advisors to counterparts in the Republic of Korea were surveyed by means of a questionnaire. Information was collected on the objectives advisors sought, the obstacles they encountered, the amounts of time required to accomplish changes, the nature of counterparts' participation in the work, and features of the advisor role judged important. Results of the survey provide a description of the advisor with respect to the information obtained and are used as a basis for identifying certain cardinal characteristics of the advisor role.

"The Military Advisor as Defined by Counterparts," by Dean K. Froehlich, paper for 15th Annual Army Human Factors Research and Development Conference, Fort Ord, Calif., November 1969; issued as Professional Paper 9-70, 9 pp., March 1970. AD-705 699

An attempt to define the characteristics of successful Military Assistance Program advisors has been made as part of a research effort which has the ultimate aim of applying scientific techniques to the selection, training, and management of advisors. Data describing the work of advisors have been collected from both advisors and their counterparts. This paper mainly discusses the characteristics and behaviors of the successful advisor as viewed by counterparts.

[1] For earlier work in this area see Exploratory Study 2.

Military Advisors and Counterparts in Korea: 2. A Study of Personal Traits and Role Behaviors, by Dean K. Froehlich, Technical Report 70-13, 101 pp., September 1970 (MAP II). AD-876 926

In order to develop successful selection procedures, training materials, and management policies for Military Assistance Program (MAP) advisors, the conditions under which they work were analyzed, including identifying the culturally determined preferences counterparts have for the people with whom they wish to work, and the extent to which advisors and counterparts satisfy what each regards as critical role behaviors of the other. U.S. Army advisory personnel assigned to the U.S. Army Advisory Group, Korea (KMAG) and counterparts in the Republic of Korea Army (ROKA) were surveyed in the summer and fall of 1966. Through rating scales and questionnaires, observations were made of the kinds of personalities with whom advisors and counterparts most preferred to work. In addition, advisors and counterparts judged one another in terms of a large number of role behaviors previously identified as important.

Military Advisors and Counterparts in Korea: 3. An Experimental Criterion of Proficiency, by Dean K. Froehlich, Technical Report 71-2, 110 pp., February 1971 (MAP II). AD-883 238

In order to identify the human factors that affect the achievement of the Military Assistance Program (MAP) objectives and from them define personnel selection criteria, training objectives, and management policies, a conception of advisor proficiency and a method with which to study it were developed. Results presented in this report are based upon a questionnaire survey conducted in 1966 among U.S. Army advisor personnel assigned to the Korea Military Advisory Group (KMAG) and their counterparts in the Republic of Korea Army. A rationale for conceiving of proficient advisor-counterpart transactions in terms of their stated willingness to continue working together in the future is presented. Construction of an assessment technique to obtain estimates of these intentions is described, as are the results of tests of the validity of the concept and method.

MAPREADING—Division No. 2

Assessment of Effectiveness of Basic Map-Reading Training (Research for the Department of the Army)

The Map-Using Proficiency of Basic Trainees, by Robert B. Fallarico, William E. Montague, and Victor H. Denenberg, Technical Report 11, September 1954. PB-115178 AD-63 878

Objectives of this study were to (1) determine how well basic trainees learn from the standard ATP course (a) to *read* maps fully and accurately and (b) to *utilize* a contour map and lensatic compass successfully in the field, and (2) develop a training method which would increase trainee map and compass proficiency. Proficiency was tested by means of written and performance tests. It was found that low-aptitude trainees did not learn satisfactorily in the standard ATP course; men of high aptitude did. A lesson plan employing five "critical skills" was developed but its importance was not adequately tested.

"The Problem of Simple Combination Scores in Measurement," by Eugene A. Cogan, paper for American Psychological Association convention, September 1955.

Research By-Products resulting from this research effort are listed in Part III

MAPUSING–Division No. 2

The Mapusing Proficiency of Army Personnel
(Research for the Department of the Army)

Training Basic Combat Soldiers in the Critical Skills of Map Using, by Robert B. Tallarico and Bobby E. Palk, Staff Memorandum, April 1955 (MAPUSING I). AD-480,550

"Identification of Important Skills in Field Navigation," by Donald C. Findlay, Eugene G. Roach, and Eugene A. Cogan, paper for American Psychological Association convention, September 1956; earlier version under the title, "A Factor Analysis of Field Navigation Skills," presented at annual meeting of Midwestern Psychological Association, Spring 1956 (MAPUSING IV).

To identify important skills in field navigation, and to test validity of a short test of field navigation, 96 trainees took tests of six map-compass skills, two spatial relations tests, and a criterion test and a short test of field navigation. Subjects' scores on these tests and three classification tests were factor analyzed (centroid) and yielded five factors: Field Navigation, Verbal-Arithmetic Reasoning, Field Skills, Spatial Relations, and Compass Skills. Since criterion and short tests loaded only on Field Navigation, the short test appeared valid. Skills most closely identified with Field Navigation were direction estimation and contour visualization.

Several Methods of Teaching Contour Interpretation, by F.J. McGuigan and James W. Grubb, Technical Report 35, January 1957 (MAPUSING V). PB 126807 AD-122 271

Three ways of representing terrain (terrain board. 3-D slides, and 2-D slides) and two ways of representing contours (standard flat relief map and three-dimensional relief map) were tested for effectiveness in teaching a map user how to visualize terrain features. The experimental training method which consistently led to the greatest proficiency combined use of 2-D slides and 3-D relief maps.

"An Investigation of Several Methods of Teaching Contour Interpretation," by F.J. McGuigan, *Journal of Applied Psychology*, vol. 41, no. 1, February 1957 (MAPUSING V).

A study was conducted to determine whether representations of terrain and the symbols associated with those representations are more effectively taught when they are concrete or abstract in nature. Results were inconclusive on the concrete-abstract methods of teaching representation of terrain, but symbols were more effectively taught when fairly concrete in nature.

Identification of the Important Skills in Daylight Land Navigation, by Donald C. Findlay, Eugene G. Roach, and Eugene A. Cogan, Technical Report 40, July 1957 (MAPUSING IV). PB-132161 AD-137 782

Ninety-six recent graduates of basic combat training were scored on 14 tests: the Map Patrol Test (a comprehensive test against which performance on the other tests was measured), the Location Test, two compass skills tests, five location skills tests, and five standard aptitude tests. Location skills, particularly direction estimation and the ability to visualize terrain from contour lines, proved more important than compass skills. The Location Test method offers promise as a way of giving instruction and practice in location skills, and of testing ability in land navigation when longer, free-movement tests are not feasible.

A Survey of Map Skills Requirements, by Eugene A. Cogan, Norman E. Willmorth, and Donald C. Findlay, Technical Report 43, September 1957 (MAPUSING II). PB-132004 AD-144 863

The degree to which each of 53 map skills and map skill applications is required for infantry, armor, and reconnaissance combat personnel was investigated for each of seven levels of responsibility, ranging from squad members (tank crewmen in armor and reconnaissance units) to battalion commanders. The summary derived as to the relative importance of the 53 skills may be used as a guide in developing or revising training programs pertaining to map skills, and as a means for assessing the degree to which tactical doctrine and actual map using practice correspond.

Research By-Products resulting from this research effort are listed in Part III.

MARKSMAN—Division No. 4
Combat Marksmanship
(Research for the Department of the Army)

An Experimental Review of Basic Combat Rifle Marksmanship: MARKSMAN, Phase 1, by James W. Dees, George J. Magner, and Michael R. McCluskey, Technical Report 71-4, 142 pp., March 1971.

Commanding officers in Vietnam and others have indicated that individual rifle marksmanship training needed attention. Furthermore, no comprehensive, systematic study of Army rifle marksmanship has been conducted since the Work Unit TRAINFIRE studies conducted by HumRRO in 1954. Phase I of the MARKSMAN research dealt with basic rifle marksmanship. This report describes a series of 21 experiments addressing both "what" should be taught and "how" it should be taught. A number of conclusions were reached concerning such matters as the use of automatic fire, aimed fire vs. pointing fire including Quick Fire, night firing techniques, firing positions, carry positions, aiming points, night sights, multiple targets, area targets, surprise targets, sight calibration, and other issues.

MBT—Division No. 2
Training Guidelines for the US/FRG Main Battle Tank
(Research for the Department of the Army)

Crew Duties and Tasks for Operation of the M551, by R.E. Kraemer, Research By-Product, 272 pp., March 1968.

This document provides job task descriptions for crew operation of the M551 vehicle, and describes the sequence of task elements necessary in performing each task. It collates and delineates all vehicle-related tasks required in operation by the vehicle crew. The material will serve as a partial basis for research analyzing forthcoming training requirements for the Main Battle Tank (MBT-70).

Crew Duties and Tasks for Maintenance of the M551, by R.E. Kraemer, Research By-Product, 231 pp., July 1968.

This document provides job task descriptions for crew maintenance of the M551 vehicle, and describes the sequence of task elements necessary in performing each task. It collates and delineates all vehicle-related tasks required in maintenance by the vehicle crew. The material will serve as a partial basis for research analyzing forthcoming training requirements for the Main Battle Tank (MBT-70).

"Work Unit MBT -Training Guidelines for the US/FRG Main Battle Tank," by Donald F. Haggard, briefing to U.S. Continental Army Command, Fort Monroe, Va., October 1968; included in *Use of Job and Task Analysis in Training*, Professional Paper 1-69, 43 pp., January 1969. AD-688 810

Training Implications of the Control and Display Data for the US/FRG MBT-70, M60A1E2, M551, and M60A1, by G. Gary Boycan and Ronald E. Kraemer, Research By-Product, March 1969. AD-876 285

Additional Research By-Products and Other related research materials are listed in Part III.

MEDIA–Division No. 2

Improving Media Implementation in Army Training Programs
(Research for the Department of the Army)

"Procedure Learning and Display Motion," by Ronald W. Spangenberg, paper for Association for Educational Communication Technology convention, Philadelphia, March 1971. ED-047 537

The learning effects of display motion in a procedure learning task, the disassembly of a weapon consisting of nine separate steps, were studied. Two video tapes, using the same sound track, were constructed, one using the recorded televesion camera motion, the other substituting a parallel series of still camera shots. The video tapes provided an introduction to the weapon, an overview of the disassembly, and a step-by-step demonstration with the subject performing each step immediately. Upon completion of the initial disassembly (cued), a second weapon was provided, and subjects were asked to repeat the disassembly (uncued). Performance time was recorded for each step in both trials, and for the second (uncued) trial the number of errors in the order of steps was noted. The results show a superiority of the motion condition.

MEDICORPS–Motivation, Morale, and Leadership Division

Research on Career and Recruitment Problems of the Army: Opinion Survey of Army Medical Men
(Research for the Department of the Army)

Medical Officers' Opinions on Professional and Personal Problems of Army Service, Special Report 3, joint report of Research Division, Office of Armed Forces Information and Education, Department of Defense, and Motivation, Morale, and Leadership Division, HumRRO. July 1953. AD-815 641

At the request of the Surgeon General, an Army-wide survey was made of Medical Corps officers to ascertain: (a) their attitudes toward military service and military medicine and their suggestions for improvements; (b) the degree of interest in continuance in the Medical Corps after required service was completed; (c) how well informed and how interested they were in Medical Corps advanced training programs; (d) background information on general characteristics of Medical Corps officers. It was found that the attitudes and morale of regular Medical Corps officers differed from those of reserve officers but common areas do exist which furnish a basis for integration of the two groups.

Supplementary MEDICORPS Study Findings for Medical Officers in Various Types of Installations Within the Various Theatres, by Don Cahalan, Staff Memorandum, July 1953.

MELITE—Psychological Warfare Division
Pilot Research on A Comparative Study of Military and Scientific Leaders in Selected Countries (Research for the Department of the Army)

Satellite Generals: Some Vulnerabilities to Psychological Warfare, by Pio D. Uliassi, Staff Memorandum, July 1955. AD-379 521

METHOD—Division No. 1 (System Operations)
Research for Programed Instruction in Military Training (Research for the Department of the Army)

Organizing the Presentation of Concepts in Education and Training: The Lattice Technique, Research Memorandum, November 1962 (METHOD I). AD-480 548

"Verbal Paired-Associate Learning as a Function of Grouping Similar Stimuli or Responses," by Iris C. Rotberg and Myron Woolman, *Journal of Experimental Psychology*, vol. 67, no. 1, January 1963 (METHOD I).

Verbal paired-associate learning was measured when similar or dissimilar stimuli were grouped, and when similar or dissimilar responses were grouped. The following measures were employed: number of correct responses; type of errors made, i.e., errors indicating confusion between similar items and those indicating confusion between dissimilar items. The results indicated that learning was better when groups of stimuli were composed of similar items rather than dissimilar ones. The findings were interpreted in terms of discrimination and coding of the similar items.

"An Experimental Hypothesis of Intra-List Generalization," by Iris C. Rotberg, *Psychological Reports*, vol. 13, no. 2, October 1963 (METHOD I).

Gibson (1940) has hypothesized that stimulus generalization during discrimination learning must increase before it can decrease. This hypothesis can be either supported or rejected, depending on the procedures and measures used in testing it. This article suggests a different approach to the measurement of the trend of generalization during discrimination learning. The proposed methodology compares similar and dissimilar confusion errors on the first learning trial and the rates of decrease of the exponential functions of the two error types on subsequent trials. The implications of the methodology for transfer and predifferentiation studies are discussed.

METHOD *(Cont.)*

"Supplementary Report: Verbal Paired-Associate Learning as a Function of Grouping Similar Stimuli or Responses," by Iris C. Rotberg, *Journal of Experimental Psychology*, vol. 67, no. 3, March 1964 (METHOD I).

Previous experiments, in which similar and dissimilar stimulus groupings were compared, indicated the superiority of similar stimulus grouping. In those experiments, the similarity categories were clearly isolated during learning. In the present experiment, procedures were employed that provided a less marked separation of the similarity categories. Although the results confirmed the findings of the previous experiments in certain respects, similar stimulus grouping was not superior to dissimilar grouping. It is hypothesized that the superiority of similar stimulus grouping depends on the functional isolation of similarity categories.

"Experimentation and Programming," by Iris C. Rotberg, *AV Communication Revieww*, vol. 12, no. 1, Spring 1964 (METHOD I).

"Effects of Verbalization and Information on Problem Solving in Programmed Learning," by Robert J. Seidel and Iris C. Rotberg, paper for American Psychological Association convention, Los Angeles, 1964 (METHOD II).

Subjects were required in programed instruction to learn to write computer programs (CPs) without verbalization, or while additionally stating the rules they were using to write the CPs, or simply naming these rules. In addition, subjects served under a prompting or confirmation condition. Most subjects scored about 80% or better on the criterion tests. During learning, prompting was superior to confirmation, but the reverse appeared on the criterion. Subjects stating rules during training did worse on tests than subjects naming rules or subjects with neither requirement. Data are discussed in terms of dangers in generalizing from P-A or serial learning to conceptual learning.

"Effects of Written Verbalization and Timing of Information on Problem Solving in Programed Learning," by Robert J. Seidel and Iris C. Rotberg, *Journal of Educational Psychology*, vol. 57, no. 3, June 1966; issued as Professional Paper 6-66, November 1966 (METHOD II). AD644 223

Sixty high school students were trained on computer program (CP) writing. They were run in a 3 x 2 factoral design concerned with effects of (a) writing explicitly the rules used in constructing the CPs, (b) writing the names of these rules in conjunction with writing CPs, or (c) writing only the CPs. The other factor was prompting vs. confirmation. During learning, prompting was significantly superior to confirmation, but a reverse tendency appeared in the criterion tests. Results suggest that naming the rules in addition to writing CPs during training aids later performance when writing more complex CPs on the criterion tests. Writing rules during training actually hindered subjects in writing CPs later on the criterion tests.

"Error Rate and Variety of Contexts: Important Factors in Teaching Problem Solving via Programed Instruction," by Robert J. Seidel, paper for Psychonomics Society, St. Louis, Mo., October 1966; based on paper, "A Long-Term Study on the Teaching of Problem Solving via Programed Instruction," published in *Proceedings of the XVIII International Congress of Psychology*, Moscow, Russia, August 1966.

In a 10-week, five-part course in computer programming, two factorial experimental designs were used. Design 1 compared prompting and confirmation, naming (writing names of rules used in practice problems) and no-naming in Parts 1 and 2. Design 2 was 5x3x2 factorial of prompting, confirmation, and variety. Naming surpassed no-naming on Part 2 test. Prompting showed fewer errors than confirmation during training; the reverse occurred on both tests. Variety of practice was superior to no variety. Stimulus support (prompting and confirmation) was related negatively to student dropout and learning error but positively to error on tests.

METHOD *(Cont.)*

The Application of Theoretical Factors in Teaching Problem Solving by Programed Instruction, by Robert J. Seidel and Harold G. Hunter, Technical Report 68-4, 68 pp., April 1968 (METHOD II). AD-669 281

In continuing research into training technology, the aim was to devise guidelines for applying programed instruction to training that involves learning principles and rules for use in problem solving. A portion of the Army's ADPS Programing Specialist Course was programed to explore factors in using automated instruction to teach computer programming. Experimental versions of the course were administered to over 900 subjects in various experimental groupings. Criterion and retention tests based on actual job problems were used to measure subjects' performance, along with in-training measures.

"The Application of Theoretical Factors in Teaching Problem-Solving by Programed Instruction," by Robert J. Seidel and Harold G. Hunter, abbreviated version of Technical Report 68-4, April 1968; in *International Review of Applied Psychology*, vol. 19, no. 1, April 1970; issued as Professional Paper 23-70, 40 pp., August 1970 (METHOD II). AD-715 569 ED-047 525

Research By-Products resulting from this research effort are listed in Part III.

MOBILITY–Division No. 2
Methods for Improving Vehicle Maintenance
(Research for the Department of the Army)

The Effect of Fuel Conservation Training on M-48 Tank Gasoline Consumption, by Howard C. Olson and Donald J. Baerman, Staff Memorandum, September 1955 (MOBILITY II). AD-480 547

Malfunction Indicator Lists for the M48A1 Tank, by Ronald C. Kelsay, Ronald G. Shock, and Donald F. Haggard, Staff Memorandum, May 1958 (MOBILITY VI). AD-480 551

A Survey of Organizational Maintenance of the Medium Tank, by Darvin L. Winick, Carson Y. Nolan, and Benjamin B. Berstein, Technical Report 45, May 1958 (MOBILITY III). AD-202 156

As one step in improving the maintenance of armor equipment, a study was made of organizational maintenance, and of tank maintenance problems and training methods. The M48 tank equipment system, types of maintenance operations, and maintenance activities of organizational personnel in four tank battalions were analyzed. It was found that (a) unit maintenance records were not a satisfactory index of maintenance activity; (b) checking, inspecting, and servicing constitute the bulk of organizational maintenance; (c) the activities of turret and track vehicle mechanics overlap; (d) equipment problems were mentioned most often, and training problems least often; (e) supervised job practice was the preferred training method.

"Gasoline Economy for Armor," by Howard C. Olson, *Armor*, vol. LXVIII, no. 2, March-April 1959 (MOBILITY II).

The Development of Performance Criteria for Turret Mechanics by Jack Mumford and John P. Smith, Research Memorandum, July 1961 (MOBILITY X). AD-477 647

The Effectiveness of Visual Demonstrations of Signs of Malfunction and Wear in Equipment, by Donald F. Haggard and Ronald G. Shock, Research Memorandum, June 1962 (MOBILITY VI). AD-489 892

The Performance of Organizational Maintenance by Track Vehicle Mechanics and Maintenance Sergeants, by John P. Smith, Technical Report 87, March 1964 (For Official Use Only) (MOBILITY IV-V). AD-478 720

As one step in improving vehicle maintenance in armor units, an 8-hour performance test on troubleshooting, testing, adjusting, and inspecting was given to 413 track vehicle mechanics (TVMs) and 69 maintenance sergeants. Average successful test performance by the TVMs was lower than had been expected and was not significantly affected by amount of job experience. The men who had had a TVM course showed no more gain in proficiency from job experience than did those who had not had such a course. The results were confirmed by a questionnaire given to 46 Ordnance Corps civilian maintenance technicians. For diagnostic purposes, errors were analyzed by types and suggestions for improving training were derived from the test results. (U)

Research By-Products resulting from this research effort are listed in Part III.

MOONLIGHT–Division No. 4

Improved Methods for Training the Soldier Under Limited Visibility Conditions (Research for the Department of the Army)

MOONLIGHT II: Training the Infantry Soldier to Fire the M1 Rifle at Night, by Francis E. Jones and CWO William F. Odom, Technical Report 15, December 1954 (MOONLIGHT II). PB-116573 AD-57 972

The objective of this study was to develop a realistic method for training individuals to fire effectively at night, particularly with the M1 rifle. Of five experimental methods tested, the best was based on alignment of the rifle without the use of sights. Under starless and starlight natural illumination, use of this method resulted in a 60% to 210% (depending on target type) increase in accuracy over the standard (day) method.

MOONLIGHT IV: Training the Rifle Squad in Night Technique of Fire, by Edgar L. Shriver, John Sivy, and Henry S. Rosenquist, Technical Report 17, May 1955 (MOONLIGHT IV). PB-118434 AD-72 721

Methods for training rifle squads in controlled fire for offensive and defensive night operations were developed. Squads trained by the experimental methods were two to three times as effective as squads not so trained. In addition, several alternative combinations of rapid-fire weapons were compared with TOE weapons; TOE-equipped squads performed as well as, or better than, squads otherwise armed.

"Nighttime Coordination of Rifle Fire by Systematic Rules Rather Than by Control of a Leader," by Edgar L. Shriver, John Sivy, and Henry Rosenquist, paper for American Psychological Association convention, San Francisco, September 1955 (MOONLIGHT IV).

An Investigation of Individual Night Rifle Firing Under Illumination Ranging From No Moon Through Full Moon, by John Sivy and John E. Taylor, Staff Memorandum, August 1956 (MOONLIGHT XI). AD-627 219

MOONLIGHT *(Cont.)*

Experimental Training in Night Technique of Fire and Squad Tactics, Research Memorandum, November 1959 (MOONLIGHT XII). AD-627 220

Identification of Stationary Human Targets, by John E. Taylor, Research Memorandum, December 1960 (MOONLIGHT I). AD-627 217

Research By-Products resulting from this research effort are listed in Part III.

MOSAIC—Division No. 1 (System Operations)
Studies on Organization and Operation of Electronics Maintenance Units
(Research for the Department of the Army)

A Description of Work Flow in Support of a HAWK Missile System, by Edgar L. Shriver, Robert C. Trexler, Frank L. Hibbits, Robert Lodge, Peter Gillson, and Arnold Pressgrove, Research Memorandum, November 1961 (MOSAIC I). AD-153 923

This report describes in a block diagram format the flow of work which occurs in electronics maintenance in a Hawk missile Direct Support Unit (DSU) and Battery. The description is based on detailed observation of a single unit, confirmed by observations of other units, supported by discussion with unit personnel, literature review, and empirical simulation of the work flow process. In addition to job flow charts and diagrams for the entire system, individual job flow charts are presented for the battery mechanic, the battery supply clerk, the direct exchange clerk, the job order clerk, the ordnance repairman, and the technical supply clerk.

"Ten New Concepts for Maintaining Electronic Systems," by Edgar L. Shriver and Robert C. Trexler, paper for meeting of Army Maintainability Group, Washington, July 1965.

A Description and Analytic Discussion of Ten New Concepts for Electronics Maintenance, by Edgar L. Shriver and Robert C. Trexler, Technical Report 66-23, December 1966. AD-647 229

Ten new concepts of electronics maintenance are described and analyzed in this report. These concepts differ from the conventional approach in that they advocate an equipment analysis for troubleshooting be made once by experts, then transmitted to the repairman, with appropriate supporting data, to obviate the need for repeated analyses by maintenance personnel on the job. Evidence from experimental evaluations of some of the concepts indicates the potential for marked increases in proficiency and/or decreases in training time as compared to current practice. Comparative evaluation of these concepts should consider system-wide implications rather than any single index, such as reduced training time or cost of preparation of manuals. It would appear that some maintenance situations would be best served by a combination of features from several of the new approaches, in other cases it is possible that one of the concepts is uniquely suited to the particular circuitry or equipment configuration.

Research By-Products resulting from this research effort are listed in Part III.

NCO—Division No. 3

Research in Support of Training of Potential Noncommissioned Officers (Research for the Department of the Army)

Observations on a Number of Noncommissioned Officer Academies, by Richard P. Kern, Staff Memorandum, May 1958 (NCO I). AD-480 234

Ten Noncommissioned Officer Academies were visited; programs of instruction were reviewed; and staff members, graduates, and company commanders of graduates were interviewed. Students in any one class may reflect considerable heterogeneity as regards age, rank, length of service, basic Military Occupational Specialty, knowledge and experience in current MOS, type of leadership position held, amount of experience in leadership positions, educational background, and general and intellectual ability. The predominant emphasis in the orientation of the training programs is towards the role of the noncommissioned officer as an instructor.

A Critical Incident Study of Infantry, Airborne, and Armored Junior Noncommissioned Officers, by Morris Showel and Christian W. Peterson, Staff Memorandum, July 1958 (NCO I). AD-480 232

In the development of a junior noncommissioned officer training program, approximately 1600 critical incidents were listed by interviewing 135 persons subordinate to and 135 persons superior to junior NCOs. Researchers divided the incidents into some 4000 specific behaviors which appeared to contribute to the subjects' evaluations ("good" or "bad") of the incidents. These behaviors were classified into nine general areas: planning and foresight, informal teaching and briefing, supervising and checking, correcting and rewarding or punishing, manner of dealing with subordinates, concern with welfare of men, attitude toward job, deportment, and technical job knowledge and ability.

"The Use of Follower Stooges for Field Evaluation of Leadership Ability," by Paul D. Hood, paper for American Psychological Association convention, Cincinnati, Ohio, 1959.

Results of this experiment indicate that economies may be introduced through the use of follower stooges who simultaneously serve as evaluators. Global evaluations of "leader potential" provided by follower stooges correlated .89 with standardized behavior checklists of leader behavior. Reliabilities of the global ratings were .9. When only global evaluation is desired and only minimal attention need be directed to highly specific behavior, it seems feasible to dispense with both the development of behavior checklists and trained observer-raters. This practice seems questionable for administrative assessment but may have utility in certain research applications.

"Interpersonal Knowledge and Rated Leader Potential," by Morris Showel, *Journal of Abnormal Social Psychology*, vol. 61, no. 1, July 1960.

Relationship between possession of interpersonal knowledge about others and the ratings received as to leader potential was studied in two platoons of soldiers completing a six month tour of duty. The more interpersonal knowledge nonleader trainees had, the higher the leader potential ratings they received from trainee leaders and trainee nonleaders. It is hypothesized that the ratings given by trainee sergeants and guides are more valid than the ratings given by the cadre, by trainee squad leaders, and by trainee nonleaders. Trainee squad leaders had more interpersonal knowledge and received higher leader potential ratings than trainee nonleaders. Trainee squad leaders and trainee nonleaders did not differ significantly in regard to intelligence.

Research on the Training of Noncommissioned Officers. Progress Report—NCO I, by Paul D. Hood, Research Memorandum, July 1970 (NCO I). AD-486 305

This report covers the first year of work in research designed to improve the caliber of noncommissioned officer performance in the Army by establishing appropriate curricula and techniques for the development of NCOs as early as possible in their Army careers. The report includes an extensive examination of the Army's training system for enlisted personnel and methods of selecting and training NCOs, notes on a comprehensive literature review, formulation of a detailed job description of NCO leadership functions, and development of a textbook reference manual which evolved into USCONARC Pamphlet 350-21, *A Guide for the Infantry Squad Leader*.

"Task NCO: A Report on Some Army Research in the Leadership Training Area," by Paul D. Hood, paper for Leadership Conference, U.S. Air Force Academy, Colo., April 1961.

This paper presents an outline of the general mission of HumRRO Division No. 3, significant past work, research in progress at that time, problems for leadership research, and current and projected research for Work Unit NCO.

"The Design for a Parametric Study of a Leadership Training System," by Paul D. Hood, paper for American Psychological Association convention, New York City, 1961.

A five-year research program, now nearing completion, has undertaken a parametric investigation of factors involved in evaluating a leadership preparation system for potential Army small unit leaders. The factors under experimental control include: aptitude and interpersonal effectiveness of leader candidate input, duration of leadership preparation phase, methods of leadership training, cost of training, amount of training given OJT instructors, and differences in job requirements. The experiment involves approximately 500 trainee leaders and 5,000 followers who train together in squads and platoon units for eight weeks. The interaction of several organization levels on leadership is also under study.

Report of the Assessment Study Area of NCO II, by Paul D. Hood, Research Memorandum, February 1963 (NCO II). AD-486 303

The problems of leadership selection, prediction, and evaluation were examined in collaboration with the Personnel Research Branch (PRB) of the Adjutant General's Office. Provisional measures of leadership potential among recruits were applied as such measures emerged from ongoing PRB research. Data were collected on 230 Reserve trainees during their BCT, AIT, and BUT cycles. Information was obtained on consistency of sociometric and superiors' ratings as measures of leader potential; nature of performance tests as indicators of military proficiency; value of written tests as selection and evaluation measures; value of the Army Classification Battery as possible selection measures; usefulness of self-evaluation measures; and problems of assessing motivation interests and attitudes relevant to NCO leader training.

Report of the Leadership Orientation and Motivation Study Area of NCO II, by Morris Showel, Research Memorandum, April 1963 (NCO II). AD-480 233

This study considered two interrelated general problems: (a) how to impart to the inexperienced soldier in basic training a positive attitude and motivation toward leadership training; and (b) how to cope with the practical problems of motivating the Army basic trainee to enter willingly into a leader development program, train in it, and continue under his own motivation. Orientation and motivational materials were developed.

Report of the Integrated and Informal Leadership Training and the Fundamental Leadership Skills Study Areas of NCO II, by Samuel Sloan, Eddie Syx, Warren Weiss, and Paul D. Hood, Research Memorandum, May 1963, (NCO III). AD-628 962

These studies were concerned with the means available for introducing or expanding upon opportunities for junior NCO preparation training that might be integrated with the normal training context. In addition, a set of elementary skills which all junior leaders should possess was defined, the contributions of these skills and methods of teaching them were developed, and the problems of introducing such training methods into the AIT program were examined.

Leadership Climate for Trainee Leaders: The Army AIT Platoon, by Paul D. Hood, Research Memorandum, August 1963 (NCO III). AD-628 962

This interim report describes leadership climate measures and how they interact with other measures collected in a field experiment related to the development of a Leader Preparation Program for potential junior noncommissioned officers. The several measures of trainee leaders' and trainee followers' morale and esprit displayed among themselves and with the cadre leadership input measures an intricate and subtle pattern of relationships involving several correlations. There was no evidence of a direct relationship between platoon leadership climate and trainee performance on the AIT Graded Proficiency Test. Implications for further analyses of the field experiment data are discussed.

The Effect on Training and Evaluation of Review for Proficiency Testing, by Richard P. Kern and Paul D. Hood, Research Memorandum, August 1964 (NCO II). AD-607 545

A pilot study was conducted to assess aspects of the end-of-cycle (Advanced Individual Training) Graded Proficiency Test of military proficiency, used to evaluate experimental training for the potential noncommissioned officer. The primary purposes of the study were (a) to assess the effects of concentrated review for the test, and (b) to estimate the effects of such review on retention and learning in Basic Unit Training. The results of the study suggest the desirability of using review techniques other than those narrowly focused on test content.

Research on the Training of Noncommissioned Officers, A Summary Report of Pilot Studies, by Paul D. Hood, Richard P. Kern, and Morris Showel, Technical Report 65-17, December 1965 (NCO II). AD-631 208

As part of a continuing research effort on junior NCO leadership preparation training for advanced basic trainees, exploratory studies were conducted on: (a) problems of selection and assessment of potential leaders among new recruits, (b) feasibility of course compression within the Light Weapons Infantryman MOS training to permit introduction of leadership preparation material, (c) development of an orientation program and motivational techniques for prospective leadership candidates, (d) definition of leadership skills fundamental to job performance at the junior NCO level and appropriate for training at the AIT level, and (e) exploration of methods for introducing junior NCO preparation within the Advanced Individual Training program. The studies yielded preliminary information relative to junior NCO leadership training on aptitude and sociometric ratings as promising selection factors, possible improvements in training methods, the need for development of criteria to assess technical proficiency and leadership skills, and the relation between training environment and effective leadership performance.

"The Apprentice Leader Preparation for a Role," by Paul D. Hood, paper for symposium at American Psychological Association convention, New York, September 1966, included in *Goal-Directed Leadership: Superordinate to Human Relations?*, Professional Paper 11-67, March 1967.

Automated Leadership Training Program: Instructor's Guide, and *Equipment Requirements*, by Morris Showel, Elaine Taylor, and Paul D. Hood, Research By-Product, December 1966.

This material was prepared to provide guidance to U.S. Army Training Centers in the Army's implementation of the automated instruction portion of the Leader Preparation Program. The two volumes include:

A. Instructor's Guide
B. Equipment Requirements.

Automation of a Portion of NCO Leadership Preparation Training, by Morris Showel, Elaine Taylor, and Paul D. Hood, Technical Report 66-21, December 1966 (NCO III). AD-646 771

A method of presenting roughly one-seventh of the Army's two-week Leader Preparation Course (LPC) through automated instruction was developed. The automated instruction method included the use of tape-recorded lectures, supported by visual aid frames, and programed workbooks. Automated presentation proved to be at least as effective as conventional instruction in imparting the leadership knowledge covered by automation. In addition, those students who learned through the automated method appeared to retain their knowledge better than the conventionally trained students. The automated method also exhibited practicality in reduction of instructor requirements, flexibility of scheduling, and consistency of level of presentation. The automated program was adopted for use at Army Training Centers presenting the LPC.

Implementation and Utilization of the Leader Preparation Program, by Paul D. Hood, Technical Report 67-2, March 1967 (NCO III). AD-649 256

As a result of research and development efforts conducted under HumRRO Work Unit NCO, a Leader Preparation Program (LPP) for advanced basic Army trainees was developed and subsequently implemented by the Army to meet the needs of its partial mobilization in 1961. HumRRO's technical advisory services to the Army in implementing the LPP are described, as well as other applications of the LPP. Also included are descriptions of visual and written materials and preparatory orientation courses developed and used to aid in the implementation.

Leadership Preparation Program Implementation Package, by Paul D. Hood, Research By-Product, March 1967 (NCO III).

This package comprises six volumes (Tabs A through F), each concerned with a separate phase of a leadership preparation program for BCT graduates:

Tab A: "Description of the Leadership Preparation Course." AD-699 318

Tab B: "Orientation and Implementation Materials for Leadership Preparation Course." AD-699 319

Tab C: "Contents of Leader Preparation Package and Guides for Leader Training Program." AD-699 320

Tab D: "Lesson Plan Guides for Technical Classes in Leader Preparation Course." AD-699 321

Tab E: "Information Booklets and Guides for Students of Leader Preparation Course." AD-699 322

Tab F: "Leader Selection and Assessment Materials." AD-699 323

Preliminary Assessment of Three NCO Leadership Preparation Training Systems, by Paul D. Hood, Morris Showel, John E. Taylor, Edward Stewart, and Jacklyn Boyd, Technical Report 67-8, June 1967 (NCO III). ED-014 653

Three alternative leadership training systems were studied as a preliminary to formal evaluation of what might be the most feasible method of meeting Army needs for identifying and training potential junior NCOs as early as possible in their Army careers. Training objectives were defined for each system along with training materials and methods. A second, coordinated activity was directed toward developing assessment devices to support training or to evaluate training accomplished in each system. Considerable information was obtained regarding the kinds of environmental conditions which are most conducive to successful leadership training, factors which affect trainee leader morale and attitudes, acceleration or compression of some technical instruction, relation of selection variables to subsequent performance, and the relative merits of three different methods of presenting leadership training in connection with the Advanced Individual Training (AIT) program. Overall, it was determined that presentation of formal leadership training in a separate course between Basic Combat Training and AIT, followed by practical, on-the-job leadership training in the AIT cycle showed the most value and promise as a leadership training system.

"A Program for Developing Potential Noncommissioned Officers," by Morris Showel, paper for NATO Conference, London, England, August 1967; issued as Professional Paper 45-67, 13 pp., October 1967; based on a paper for Inter-University Seminar on Armed Forces and Society, University of Chicago, June 1967. AD-663 784

As a result of research and development efforts conducted under HumRRO Work Unit NCO from 1957 to 1961, a Leadership Preparation Program for advanced basic Army trainees was developed and was subsequently implemented by the U.S. Army. This paper presents background information and an overview of the research effort and describes the leader training program in relation to the Army Training Program. Utilization of the junior leader program is also discussed.

Evaluation of Three Experimental Systems for Noncommissioned Officer Training, by Paul D. Hood, Morris Showel, and Edward C. Stewart, Technical Report 67-12, 58 pp., with Appendix Supplement, 248 pp., September 1967 (NCO III). AD-661 613 ED-017 821

In research on junior NCO leadership preparation for advanced basic Army trainees, a large-scale experiment contrasted three leadership training treatments and two control treatments. These were systematically applied to each of five companies in a single Battle Group at an Army Training Center in 1961. The study involved more than 400 trainee leaders, 4,000 followers, and 145 cadre organized in more than 20 cycles and 80 platoons. Intensive analysis of 21 selected criteria indicated that, among other findings, trained leaders received higher ratings; they and their followers performed better on military proficiency tests; their squads showed higher esprit; they prepared, briefed, and controlled their squads better on a tactical field exercise. They also held more favorable attitudes toward the Army, although their followers tended to be less favorable toward the Army and toward trainee leaders in general. Among the leader training treatments, both criterion measures and administrative considerations, indicated that a Leader Preparation Course (LPC) training system was preferred over leadership training integrated with AIT.

Research By-Products and other related research materials are listed in Part III.

NICORD—Division No. 1 (System Operations)
Training of Ordnance Guided Missile Maintenance Personnel
(Research for the Department of the Army)

Troubles Reported by Electronics Repair Personnel in Nike Ordnance Detachments, Staff Memorandum, March 1957. AD-482 315

Ordnance Nike Detachment Electronics Maintenance Personnel: Analysis of Activities With Implications for Training, by William E. Montague and Ralph H. Kolstoe, Staff Memorandum, May 1957. AD-628 165

Progress Report on Task NICORD, by A. James McKnight, briefing booklet, June 1962. AD-638 308

"Analysis of Electronic Maintenance Tasks," by A. James McKnight and Patrick J. Butler, paper for American Psychological Association convention, Philadelphia, 1963.

Maintenance tasks imposed by the Nike missile system were subjected to a systematic analysis to determine appropriate training requirements. The method of analyzing tasks involved the prediction of equipment failures together with the determination of human imputs and required outputs. From this analysis the most appropriate mediating knowledges were identified. An experimental training program based upon results of this analysis was constructed and administered in comparison with the standard Army training program. The result was a 25% reduction in average time required for repair, and a 40% reduction in overall training time.

Identification of Electronics Maintenance Training Requirements: Development and Evaluation of an Experimental Ordnance Radar Repair Course, by A. James McKnight and Patrick J. Butler, Research Report 15, December 1964. AD-457 167

To identify the requirements most appropriate for Ordnance electronics maintenance training, methods of analyzing electronics maintenance tasks were developed. The process included system, task, and knowledges and skills analyses, and determination of training objectives. A representative MOS, Nike Track Radar Repairman, was analyzed by these methods and the results reflected in a 22-week experimental course; more emphasis was placed on practical maintenance procedures and certain technical aspects, and less on circuit operation theory. Graduates of the experimental course surpassed graduates of the 39-week standard course on an overall job-sample measure, and on troubleshooting the radar system and components. They ranked almost as well as field-experienced repairmen in troubleshooting radar components, but somewhat below them in other areas tested. It was concluded that the kinds of content identified in the NICORD analysis need to be given greater emphasis in current electronics maintenance training.

NIGHTSIGHTS—Division No. 2

Training Techniques for New Night Vision Devices (Research for the Department of the Army)

A Pictorial Program for the Starlight Scope, by Richard J.D. Frank, William N. Gipe, and William L. Warnick, Research By-Product, May 1969 (NIGHTSIGHTS IV).

The information contained in this document was collated to provide a basis for determining efficient methods and procedures for local fabrication of pictorial guides. The report presents the current status of methodology in pictorial publications.

The Effects of Interruption of Dark Adaptation on Performance of Two Military Tasks at Night, by David L. Easley, Donald L. Wright, William N. Warnick, and William N. Gipe, Technical Report 69-20, 44 pp., December 1969 (NIGHTSIGHTS I). AD-699 489

To determine how interruption of dark adaptation (by using an intensifier) affected performance of military tasks with unaided vision at night, two series of studies were conducted. Interruption of dark adaptation with a simulated monocular intensifier in the shooting eye or both eyes just before the task was begun decreased the horizontal distance at which the guideline was followed. A readaptation interval of two to three minutes after interruption of dark adaptation by a binocular intensifier restored performance to the level under dark-adapted vision. Interruption of dark adaptation just before rifle firing lengthened time to first round and duration of fire, but did not lessen accuracy.

A Prototype Pictorial Program for a Ground Surveillance Radar Set Operator, by Joseph P. Militello and G. Gary Boycan, Research By-Product, December 1969 (NIGHTSIGHTS IV). AD-716 246

This document was prepared as preliminary material for training personnel in the SEA NITEOPS Program, and as a basis for the later development of resident training programs. However, subsequent to the development of this pictorial training program, it was decided that this device would not be obtained for operational use. This pictorial program has been made available as an illustration of a type of training guide which might be useful either as an operator performance aid or as a classroom training aid.

NIGHTSIGHTS *(Cont.)*

A Prototype Pictorial Guide for the Night Observation Device-Long Range, AN/TSS-7 Operator, by Richard Frank and John D. Engel, Research By-Product, February 1970 (NIGHTSIGHTS IV). AD-813 869

This publication was developed as a training and/or performance aid, and contains the essential operator procedures for the Night Observation Device-Long Range, AN/TSS-7.

Preliminary Lesson Plans for Operation and Operator Maintenance of the Iroquois Night Fighter and Night Tracker (INFANT), by William L. Warnick, Research By-Product, May 1970 (NIGHTSIGHTS IV).

This document contains a set of 14 preliminary lesson plans covering classroom training in (a) nomenclature, location, and function of controls and displays, (b) operator procedures, and (c) operator maintenance, of the Iroquois Night Fighter and Night Tracker (INFANT).

Preliminary Lesson Plans for Operation and Operator Maintenance of the Airborne Searchlight System, by William L. Warnick, Research By-Product, June 1970 (NIGHTSIGHTS IV). AD-877 529

This document contains preliminary lesson plans covering instruction in the nomenclature, location, and function of controls and displays, and in operator maintenance, of the Airborne Searchlight System.

Preliminary Lesson Plans for Operators of the Far Infrared Target Indicator (FIRTI), Surveillance Set Infrared AN/VAS-1-( )-(V), by William L. Warnick, Research By-Product, December 1970 (NIGHTSIGHTS IV).

This document contains preliminary lesson plans covering classroom training in (a) nomenclature, location, and function of controls and displays, and (b) operator procedures, of the Far Infrared Target Indicator (FIRTI) Surveillance Set Infrared AN/VAS-1-( )-(V).

"Hardware Parameters Related to Operator Training Capabilities," by Harold P. Bishop, paper for 16th Annual Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970; issued as Professional Paper 9-71, 8 pp., June 1971.

The research reported here is part of a larger effort to identify critical human factors problems in the use of new night observation devices, and to develop effective techniques of training men in the use of these devices. Two techniques for training operators of the AN/TSS-7 long range night observation device are described and compared. Pictorial training aids were developed and evaluated; traditional platform instruction was compared with a videotaped instructional sequence.

NSF-IDM—Division No. 1 (System Operations)
Research on Instructional Decision Models
(Research for The National Science Foundation and the James McKeen Cattell Fund)
(see also IMPACT)

"Theories and Strategies Related to Measurement in Individualized Instruction," by Robert J. Seidel, paper for American Psychological Association meeting, Miami Beach, Fla., September 1970; issued as Professional Paper 2-71, 15 pp., March 1971. AD-725 566

One of the basic problems in relating learning theories to instructional strategies is that traditionally learning theory has researched the micro unit whereas the instructional environment studies the macro unit. Traditionally, instructional strategy research and development takes the learner as he comes, an integrated organism. In learning theory research, there is control and limitation on the structure of the learning materials, whereas instructional subject-matter is rich in potential organization and hierarachical orderings. Moreover, learning theory research deals in a subset of factors relevant to instruction. This paper addresses problems in bridging gaps between learning research and instructional development by considering the relevance of the premises of learning theory and identifying some promising directions that draw on the concepts of cybernetics and information processing.

"Who Should Develop Instructional Materials for CAI?", by Robert J. Seidel, paper for Computers in Instruction Conference, University of California, Los Angeles, October 1970.

The non-profit special organization with its mission orientation, internal organization, and reward structure is proposed as the candidate for developing CAI materials. Universities are not basically mission oriented; their organization and mode of operation do not lend themselves to instructional product development. Faculty members engaging in such efforts do so on a part-time basis and in competition with higher priority concerns. Also, universities and their faculties tend to be relatively self-centered and have no incentive structures or interest to promote compatibility and widespread dissemination for their instructional products. While commercial publishing houses have such interest, their profit-making necessities militate against expensive cyclical product developments aimed at maximizing instructional effectiveness.

OBSERVE—Division No. 6 (Aviation)[1]
Improved Methods for Training Aerial Surveillance Personnel
(Research for the Department of the Army)

§"Research Strategy in Investigating Aerial Surveillance Systems," by George D. Greer, Jr., and John A. Whittenburg, paper for American Psychological Association convention, 1958 (OBSERVE I). (Subcontractor: Human Sciences Research, Inc.).[2]

A Field Test of Visual Detection and Identification for Real and Dummy Targets, by John A. Whittenburg, Alvin L. Schreiber, and CPT B.F. Richards, Research Memorandum, April 1959 (OBSERVE I). (Subcontractor: Human Sciences Research, Inc.).[3] AD-637 244

"A Field Study Comparison of Visual Search Methods in Aerial Observation," by Francis H. Thomas, Paul W. Caro, Jr., and James M. Hesson, paper read at meeting of APA, 1959.

An earlier study suggested that aerial visual search was made relatively ineffective by prolonged fixation upon sighted target objects. When the observer possessed the goal-set to "find a target," upon the realization of this goal, his search activity momentarily ceased. By reorienting the observer's goal-set "to visually cover all the search area," it was assumed more targets could be sighted. By emphasizing this latter goal and by providing the observer with techniques for its accomplishment, previously untrained aerial observers were able in in-flight observation to match their classroom proficiency in target recognition accuracy.

[1] This Work Unit was initiated at Division No. 1 (System Operations) The symbol § indicates an item prepared at Division No. 1.

[2] George D. Greer, Jr., was on the staff of Division No. 1 (System Operations) and John A. Whittenburg was an employee of the subcontractor.

[3] John A. Whittenburg and Alvin L. Schreiber were employees of the subcontractor, Captain Richards was the HumRRO Military Advisor.

OBSERVE *(Cont.)*

Research on Human Aerial Observation. Part I: Summary, by John A. Whittenburg, Alvin L. Schreiber, John P. Robinson, and Peter G. Nordlie, Research Memorandum, July 1960 (OBSERVE I). (Subcontractor: Human Sciences Research, Inc.). AD-479 196

Research on Human Aerial Observation. Part II: Description of Tactical Field Test, by John A. Whittenburg, Alvin L. Schreiber, and CPT Barton F. Richards, Research Memorandum, July 1960 (OBSERVE I). (Subcontractor: Human Sciences Research, Inc.).[1] AD-637 147

Research on Human Aerial Observation. Part III: Summary Data From Tactical Field Tests, by John A. Whittenburg, Clive Barlow, Kenneth L. Deveney, Robert D. Warne, and Alvin L. Schreiber, Research Memorandum, July 1960 (OBSERVE I). (Subcontractor: Human Sciences Research, Inc.).[2] AD-452 708

"Requirements for Research on Uses of the Unaided Eye in the Collection of Battlefield Information," by Francis H. Thomas, paper for Visual Search Symposium, meeting of NRC Vision Committee, Washington, April 1961; in *Visual Problems of the Armed Forces*, Milton A. Whitcomb (ed.), National Academy of Sciences, National Research Council, April 1961 (OBSERVE I).

"Aerial Observer Problems," by Francis H. Thomas, paper for 7th Annual Army Human Factors Engineering Conference, University of Michigan, October 1961.

"Let's Take a Look at the Basic Skills of Aerial Observers," by LTC Arne H. Eliasson, *Army Aviation*, vol. 10, no. 11, November 1961.[3]

Training Research on Low Altitude Visual Aerial Observation: A Description of Five Field Experiments, by Francis H. Thomas and Paul W. Caro, Jr., Research Memorandum, July 1962 (OBSERVE I). AD-624 015

Low Altitude Aerial Observation: An Experimental Course of Instruction, by Francis H. Thomas, Technical Report 80, October 1962 (OBSERVE I). AD-287 158

A field test, in which combat situations were simulated, was administered to aerial observers as a means of identifying the basic skills involved in low altitude aerial observation. The main skill areas were found to be visual search, target recognition, geographical orientation, and target location. Methods and techniques for teaching the identified skills were developed and evaluated in five field experiments, and were incorporated in an aerial observer training course. In a final evaluation, students trained under the experimental course performed as well as experienced observers who had been trained in the conventional program.

Training Materials for Aerial Observer Instruction in Basic Visual Skills, by CPT James M. Hesson and Francis H. Thomas, October 1962 (Supplement to Technical Report 80, *Low Altitude Aerial Observation: An Experimental Course of Instruction)* (OBSERVE I). AD-808 662

"Programmed Learning and Low Altitude Observation," by Peter B. Dawkins, paper for American Psychological Association convention, Philadelphia, September 1963.

An Army training course on low altitude aerial observation was converted into programed format. The programed content consisted of both verbal material and perceptual material, i.e., photographs and maps. Criterion testing of an experimental group (N=10), who took instruction, and a control group (N=10), not taking instruction, revealed learning gains in Target Location accuracy of approximately 50%. A 47% reduction in Target Location response time accompanied the gains in accuracy. Study time was less for programed compared to conventional instruction (15 versus 16 hours) despite increased content in the programed course.

[1] John A. Whittenburg and Alvin L. Schreiber were employees of the subcontractor; Captain Richards was the HumRRO Military Advisor.

[2] John A. Whittenburg and Alvin L. Schreiber were employees of the subcontractor, SP 4 Clive Barlow, SP 4 Kenneth L. Deveney, and PFC Robert D. Warne were assigned to the Aviation Unit.

[3] Colonel Eliasson was Unit Chief of the U.S. Army Aviation Human Research Unit.

OBSERVE *(Cont.)*

"Automated Education in the Training of Low Altitude Aerial Observers," by Peter B. Dawkins, paper for 10th Annual Army Human Factors Research and Development Conference, Fort Rucker, Ala., October 1964 (OBSERVE II).

Programed Instruction and Low Altitude Aerial Observation, by Peter B. Dawkins, Research Report 14, December 1964 (OBSERVE II). AD-456 738

An Army training course on low altitude aerial observation was converted into programed format. The programed content consisted of both verbal and visual (i.e., photographs and maps) material, on four basic aerial observer skills. Criterion testing on target location indicated that the group of students receiving the experimental training made reliable learning gains, in comparison with a control group which did not receive the training. A reduction in time required to locate targets accompanied the increase in accuracy. On the average, study time for the self-paced programed course was less than that required for the classroom version of the course (15 hours vs. 16 hours).

"Human Factors in Complex Systems," by Francis H. Thomas, paper for symposium at annual meeting of Southeastern Psychological Association, Atlanta, Ga., April 1967; included in *Human Factors Research in Support of Army Aviation*, Professional Paper 27-67, June 1967.

Research By-Products resulting from this research effort are listed in Part III.

OC LEADER—Division No. 4

Systems Engineering of Leadership Training for Officer Candidate Programs (Research for the Department of the Army)

An Analysis of First-Tour Duty Positions for Infantry Officer Candidate Graduates, by James A. Caviness, Technical Report 70-15, 28 pp., October 1970. AD-714 463

This report describes research concerned with the first operation involved in job analysis, identifying the job, which was performed as the initial substep in the development of systems engineering of leadership training courses in the Infantry Officer Candidate (IOC) program. The sample population consisted of 385 officers attending the Infantry Officer Advanced Course, all graduates of the IOC program. Written records of their duty assignments were taken from the Officer Qualification record, and their duty positions and MOS numbers were tabulated and assigned to fewer, more general categories. Results showed initial assignments included 66 different duty positions and 47 different MOS numbers, and that the series of assignments throughout the mandatory tour of duty produced tour profiles for the majority of individuals.

OCS—Division No. 3

An Investigation Into the Characteristics of Qualified Applicants for Officer Candidate Schools and the High Attrition in These Schools (Research for the Department of the Army)

Attitude and Information Patterns of OCS Eligibles, by Milton G. Holmen and Robert V. Katter, Research Memorandum 2, October 1953 (OCS I). PB-112382 AD-19 544

To determine reasons for the low application rate and the high attrition rate in officer candidate schools, attitudes of eligibles toward OCS schools were assessed and the amounts and accuracy of their information about the schools were surveyed. It was learned that (a) most eligibles overestimated the academic requirements and underestimated the leadership requirements; (b) longer service obligation was the most important deterrent to applying; (c) personal advancement and self-improvement were the most important attractions.

Infantry OCS Evaluations and Combat Performance, by Robert V. Katter and Milton G. Holmen, Technical Report 8, June 1954. PB-115120 AD-39 552

To determine which OCS evaluation techniques are useful in predicting performance of lieutenants in combat divisions, ratings by commanding officers were obtained on the performance of Infantry OCS graduates who served as officers in combat divisions in Korea. These ratings were compared with eight OCS ratings and four pre-OCS ratings. Performance in combat divisions was predictable, though not accurately, from student, platoon leader, and company commander ratings, and final class standings. However, academic scores in OCS, physical efficiency scores, rifle marksmanship scores, or number of demerits did not prove to offer a basis for prediction. The findings emphasize the need for developing measures which will predict combat performance with accuracy for use in OCSs.

The Effect of Different Methods of Motivating Men to Apply for OCS, by Irving F. Richardson and Milton G. Holmen, Technical Report 9, July 1954 (OCS II). PB-118879 AD-72 744

The effects of different methods of motivating men to apply for Officer Candidate School were investigated. The experimental motivating conditions were (a) an intensive information program, (b) a buddy nomination procedure, and (c) a combination of conditions (a) and (b). These methods were compared with concurrent normal recruitment results. The study indicates that the rate of application is lower for eligibles when they have received extensive orientation than when they have not. The use of buddy nomination procedure tended to increase the rate of application for OCS.

The Relationship Between Leaders' Course Evaluations and OCS Evaluations, by Ann M. Jones, Staff Memorandum, August 1954 (OCS I). AD-486 300

During 1952 and 1953 approximately one half of the men attending the Army officer candidate schools had completed one to eight weeks of a Leaders' Course prior to entering OCS. The Leaders' Schools were intended primarily for leadership training at the noncommissioned officer level, and were available to men who had made a good record during basic training. OCS records and Leaders' Course records were obtained on 155 graduates of the Fort Ord Leaders' Course and 161 graduates of the Camp Roberts Leaders' Course. Composite ratings obtained at both Leaders' Courses were found to be valid predictors of OCS success. The part-score of greatest predictive value was the peer rating.

Research on Motivation and Attrition Problems of the Army Officer Candidate Schools, by Milton G. Holmen, Robert V. Katter, Ann M. Jones, and Irving F. Richardson, interim report, September 1954 (OCS II). AD-486 301

This summary of the research findings on Officer Candidate School (OCS) problems includes implications for OCS policy. Also included in this review are the areas of attitude and information patterns of OCS eligibles; the effect of different methods of motivating men to apply for OCS; branch preferences of officer candidates; the Military Interest Blank as a predictor of motivation to complete OCS training; the officer candidate applicant assessment center; research on the OCS evaluation system; relationships between the attrition rate and composite ratings, situational tests, and leadership scores.

Relationships Between School Preference and Success in OCS, by Milton G. Holmen and Irving F. Richardson, interim report, December 1954 (OCS I). AD-486 302

There is a weak overall trend at all officer candidate schools for candidates attending the school of their first or second choice to be more likely to graduate. This trend is somewhat more pronounced at the combat arms OCSs than at the technical service OCSs. Of the candidates questioned at the technical service OCSs, about one out of five had expressed preference for a combat arms OCS on his application form.

Predicting Motivation to Complete OCS With Interest Inventories, by Milton G. Holmen and Robert V. Katter, Staff Memorandum, May 1955. AD-486 299

This study was concerned with whether interest items could predict motivational failure in the Army Officer Candidate Schools and, if so, what kind of items are the best predictors and how the item should be scored to improve predictions. Scales for three OCSs were developed in two separate interest tests: a commercially available interest blank and a test using specially written military items. The scales produced very useful predictions at two of the three schools.

"Predicting Success in Officer Candidate School With an Assessment Program," by Robert V. Katter and Milton G. Holmen, paper for American Psychological Association convention, San Francisco, Calif., September 1955.

See Technical Report 26.

An Assessment Program for OCS Applicants, by Milton G. Holmen, Robert V. Katter, Ann M. Jones, and Irving F. Richardson, Technical Report 26, February 1956 (OCS III). PB-122208 AD-991 213

This study investigated factors affecting the prediction of OCS success and failure by procedures which might be useful in screening candidates. Assessment procedures were developed which had some success in evaluating the candidates tested, and in addition appeared to have orientation and training effects useful to the candidates. There did not seem to be much relationship between measurable personality characteristics and the OCS criteria.

OFFTRAIN—Division No. 4[1]

Studies in Leadership and Leadership Training (Research for the Department of the Army)

§ "Training Leaders With Sound Films and Group Discussion Techniques," by Carl J. Lange, Carl H. Rittenhouse, and Richard C. Atkinson, paper for American Psychological Association convention, September 1955; issued as Professional Paper 3-69, 7 pp., February 1969 (OFFTRAIN I). AD-684 205

A leadership course for Army officers utilized sound films for the presentation of officer problems, based on descriptions of leadership situations collected from Army officers and NCOs in combat and non-combat areas. Each film terminated at the point where the leader was faced with making a decision and taking action; a small group discussion followed. A manual for instructors included the purpose of the course, the technique used, the function of the instructor, and narrative descriptions of the leadership problems. The course was used for leadership training, with control groups taking conventional classes. Analyses indicated that the experimental training was superior to the conventional training.

§ *Films and Group Discussions as a Means of Training Leaders*, by Carl J. Lange, Carl H. Rittenhouse, and Richard C. Atkinson, Technical Report 27, March 1956 (OFFTRAIN I). PB-122875 AD-89 278

A technique for training junior officers in military leadership, using sound films depicting characteristic leadership problems followed by small group and panel discussions of the films, was developed and evaluated. In comparison with students who received the regular training, students who received this special training showed greater improvement in the quality of their solutions to leadership problems, and were better able to evaluate leadership in others.

[1] This Work Unit was initiated at Division No. 3. The symbol § indicates an item prepared at Division No. 3.

§"Relationships Among Leader Effectiveness Ratings, Intelligence and Job Knowledge," by Vincent Campbell, Carl J. Lange, and Fred J. Shanley, paper for annual meeting of Western Psychological Association, Spring 1957.

Two rating questionnaires were administered as criteria of overall effectiveness of leadership. One superior and an average of seven subordinates rated each of 42 junior officers serving as platoon leaders of infantry platoons. Within the population studied, variation in intelligence was found to be unrelated to leader effectiveness using the criteria concerned. Technical job knowledge was found to be a small source of variation in platoon leader effectiveness.

§"A Method for Studying Leadership," by Carl J. Lange, Robert V. Katter, Vincent N. Campbell, and Fred J. Shanley, paper for American Psychological Association convention, September 1957.

A method was developed for studying behavior of the formal leader in small groups. The method was designed to provide a set of behavior description variables which were comprehensive and stated in terms of overt behavior. Descriptions of observed leader behavior were obtained in interviews with subordinates. A set of behavior variables was formulated, and trained scorers transformed the interview data into quantitative information on these variables according to an objective set of rules. Final scores derived from this quantitative information yielded distributions showing substantial variation among leaders for most variables.

§"Experimental Design for Field Studies in Leadership," by Carl J. Lange and Francis H. Palmer, paper for 3d Conference on Design of Experiments in Army Research, Development and Testing, Washington, October 1957.

Two exploratory field studies using correlational design are discussed with special emphasis on methodological problems commonly faced.

§ *A Study of Leadership in Army Infantry Platoons*, by Carl J. Lange, Vincent Campbell, Robert V. Katter, and Fred J. Shanley, Research Report 1, November 1958 (OFFTRAIN II). PB-142579 AD-209 142

The purpose of this study was to obtain information about the on-the-job leadership behaviors which distinguish between effective and ineffective infantry platoon leaders. Sources of data included (a) interviews with 281 platoon members to provide detailed descriptions of leader behaviors in specific situations, (b) a questionnaire in which platoon members rated platoons and platoon leaders, (c) ratings of platoon leaders by company commanders, (d) tests of intelligence and military information given to platoon leaders. Considerable agreement exists between subordinate and superior ratings. The effective leader emphasized performance as the basis of reward and punishment, uses punishment instructively and for motivational failures, and communicates clearly about the standards desired, providing precise information about needed improvement when reacting to below-standard performance.

"The Social Desirability Variable in Behavior Description," by T.O. Jacobs and C.J. Lange, paper for annual meeting of Southeastern Psychological Association, Spring 1960 (OFFTRAIN III).

Leadership in Army Infantry Platoons: Study II, by Carl J. Lange and T.O. Jacobs, Research Report 5, July 1960 (OFFTRAIN III). PB-149966 AD-240 895

A Leader Activities Questionnaire (LAQ) was developed to measure leader behavior variables found in an earlier study to be associated with judgments of leader effectiveness. The LAQ was planned for use as a measure of the effectiveness of experimental platoon leader training based on the leader behavior variables identified earlier. Results of the tryout indicated that most of the LAQ scoring categories were satisfactory as to internal consistencies and the extent to which platoon members agreed in describing behavior of their platoon leaders. Validities of parallel variables in the two studies were in substantial agreement. The close agreement between the two sets of results increases the confidence with which the findings of the earlier study can be used as a basis for training platoon leaders.

"Identifying and Measuring Leadership Characteristics of the Officer," by Carl J. Lange, paper for symposium at American Psychological Association convention, September 1961.

OFFTRAIN *(Cont.)*

"Leadership in Small Military Units: Some Research Findings," by Carl J. Lange, paper for NATO Defence Psychology Symposium of Group Productivity, Paris, France, August 1960, published in *Defence Psychology*, Frank A. Geldard (ed.), Pergamon Press, New York, 1962; also issued as Professional Paper 24-67, June 1967. AD-654 345

The effect of a leader's actions on his followers in small military units was the subject of several research studies conducted to explore the nature of the leadership process. The results of the studies emphasized the leader's active role in facilitating and motivating effective performance and minimizing disrupting influences. A framework for leadership training concepts was formulated.

Basic Problems in Small-Unit Leadership, by T.O. Jacobs, Research By-Product, February 1962 (OFFTRAIN IV). AD-637 727

This student textbook is part of a program of instruction to help junior officers acquire the skills necessary for effective military leadership during both combat and non-combat situations.

A Program of Leadership Instruction for Junior Officers, by T.O. Jacobs, Technical Report 84, June 1963 (OFFTRAIN IV). AD-409 096

A leadership course for junior officers was developed, based on research findings that identified effective and ineffective leader actions and on leadership training methods of demonstrated effectiveness. The course emphasised study of the leader's interactions with his men in the accomplishment of assigned tasks, and the effect of his actions both on the motivation and morale of his men and on the unit's ability to perform assigned tasks. Student reactions to the course immediately after its completion were good. Follow-up data from the final evaluation group indicate that these favorable reactions do not diminish significantly over a period of four months.

"Leadership at Small Unit Level," by T.O. Jacobs, paper for meeting of Georgia Psychological Association, Jekyll Island, Ga., February 1965.

"The Man in the Middle—A Mixed Role," by T.O. Jacobs, paper for symposium at American Psychological Association convention, New York, September 1966; included in *Goal-Directed Leadership: Superordinate to Human Relations?*, Professional Paper 11-67, March 1967.

"Leadership in Small Military Units," by T.O. Jacobs, paper for Fourth International Congress on Applied Military Psychology, The Hague, The Netherlands, September 1967; issued as Professional Paper 12-68, 26 pp., December 1968. AD-682 349

The development of a 16-hour military leadership training program for junior officers is described. The course was based in part on data from questionnaires used to measure leader behavior variables. Considerations such as leader-follower relationships and interaction, differences between emergent and appointive leaders, the training value of the situational approach and small group discussions, are presented.

Additional Research By-Products and other related research materials are listed in Part III.

ORIENT–Motivation, Morale, and Leadership Division

Orientation Procedures for Airborne Trainees (Research for the Department of the Army)

Effects of Four Orientation Procedures on Airborne Trainees, by Raymond Fink and George Gray, Research Memorandum 1, October 1953. AD-19 191

A study was made to determine the relative effectiveness of different orientation procedures for Airborne trainees. The men were divided into four groups; three were given different types of pretraining orientation ("Standard," "Non-fear," and "Glory") and the fourth was given no orientation. No statistically significant differences were found among the four groups in proportion of men successfully completing the course, reasons for noncompletion, and rate of washout. Occasional statistically significant differences were found among groups in certain attitudinal areas.

OVERDRIVE–Division No. 1 (System Operations)

Analysis of Training Requirements for Operation of an Amphibious Air Cushion Vehicle (Research for the Department of the Army)

"Human Factors in the Air Cushion Vehicles (ACV)," by John W. Lewis and A. James McKnight, paper for meeting of Human Factors Society, New York, November 1962.[1]

An Analysis of Skill Requirements for Operators of Amphibious Air Cushion Vehicles (ACVs), by A. James McKnight, Patrick J. Butler, and Richard D. Behringer, Technical Report 69-18, 56 pp., November 1969. AD-698 458

This report describes the skills required in the operation of an amphibious Air Cushion Vehicle (ACV) in Army tactical and logistic missions. The research involved: (a) An analysis of the ACV characteristics, operating requirements, and environment, and (b) results of a simulation experiment. The analysis indicates that ACV operation is complicated by (a) An inherently slow vehicle response in certain control dimensions, (b) a need for complex control coordinations in performing certain necessary maneuvers, and (c) the ACV's sensitivity to various aspects of the natural and man-made environment. The ACV also poses unique requirements for navigation, maintenance, and collision avoidance. The simulator study showed that ACVs vary considerably in operability as a function of their control configuration and pointed to the need for further attention to the control problem in developing ACV use overland.

[1] Mr. Lewis was on the staff of the Army Human Engineering Laboratories, Aberdeen Proving Ground, Md. Dr. McKnight was on the staff of Division No. 1 (System Operations).

PACE—Division No. 7 (Social Science)

Research Concerning Factors Relating to the Active Service and Reserve Service Performance of Project 100,000 Men and Other Military Separatees (Research for the U.S. Air Force)

Army "New Standards" Personnel: Relationships Between Literacy Level and Indices of Military Performance, by Allan H. Fisher, Jr., (HumRRO Technical Report 71-6), Technical Report MD-TR-71-12 (in press), Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 30 pp., April 1971.

In 1966 the Department of Defense lowered entrance standards for military service. Men who enter the service as a result of this action are called "New Standards" men. In this research the relationship between literacy status of a sample of New Standards men after 23 months of Army service and various indices of military performance was determined. A second objective was to develop an equation for predicting 23-month literacy status. Literacy status at 23 months was found to be only slightly, although positively, related to most of the performance and status indices. A regression equation was developed for predicting 23-month literacy status on the basis of entry characteristics using half the sample.

Army "New Standards" Personnel: Effect of Remedial Literacy Training on Performance in Military Service, by Allan H. Fisher, Jr., (HumRRO Technical Report 71-7), Technical Report MD-TR-71-13, Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 33 pp., April 1971.

In 1966 the Department of Defense lowered entrance standards for military service. Many of the "New Standards" men who then entered the service were placed in remedial training programs (Army Preparatory Training, APT), designed to upgrade their literacy status to a fifth-grade level or higher. This research sought to determine whether "success" in remedial literacy training was associated with superior military performance. Another objective was to develop an equation for predicting terminal literacy scores. It was found that men who were successful and unsuccessful, respectively, in literacy training did not differ greatly in performance. A multiple regression equation was developed for predicting success in the literacy training course.

PATROL—Division No. 4

Methods for Increasing Accuracy, Extent, and Reliability of Information Obtained From Reconnaissance Patrols (Research for the Department of the Army)

Improving the Ability of the Individual Soldier to Employ a Map and Compass in Land Navigation, by Henry S. Rosenquist and John E. Taylor, Staff Memorandum, January 1957 (PATROL I). AD-488 024

Spring 1956 Research on "Reconnaissance Patrolling: A Basic Course in Individual Skills," by Joseph F. Follettie, John E. Taylor, and Henry S. Rosenquist, Staff Memorandum, April 1957 (PATROL I). AD-627 227

Fall 1956 Research on "Reconnaissance Patrolling: A Basic Course in Individual Skills," by Joseph F. Follettie, Henry S. Rosenquist, and John E. Taylor, Staff Memorandum, May 1957 (PATROL I). AD-627 228

Basic Instruction in Land Navigation, Proficiency Test Manual, Research Memorandum, December 1958 (PATROL I). AD-488 021

This report presents the test which was used to evaluate the adequacy of the twelve-hour training program in land navigation for both day and night conditions appropriate to the basic training level of instruction. The test was administered to approximately 300 basic trainees, all of whom had received the training program.

Possible Combat Application of Experimental Stealth Measuring Device, by Frank L. Brown, Research Memorandum, January 1959. AD-639 190

PATROL *(Cont.)*

Capabilities and Limitations of the Lensatic Compass, by Henry S. Rosenquist, Research Memorandum, October 1959. AD-488 023

Instructor's Guide, PATROL I, Land Navigation: Basic Instruction, Research Memorandum (revised), November 1959 (PATROL I). AD-488 401

This report represents an experimental program of basic instruction in land navigation under day and night visibility conditions. The program stresses the acquisition of a degree of skill appropriate to the Basic Individual Combat Training level. Included in the Instructor's Guide are descriptions of the instruction, training aids, physical facilities required for training, a subject schedule and detailed lesson plans.

A Performance Requirement for Basic Land Navigation, by Joseph F. Follettie, Research Report 4, March 1960 (PATROL I). PB-148318 AD-237 952

This report presents the rationale and supporting data that were the basis for establishing a performance requirement and a proficiency standard to be used in evaluating a program of instruction in basic land navigation. The combat reference situation in which navigation ability ultimately will be required was described, and the performance requirement and the means for accomplishing it were assessed. Generation of the requirement was based on characteristics of position defense by a ROCID division.

Development and Evaluation of a Program of Instruction in Basic Land Navigation, by Joseph F. Follettie, Technical Report 70, May 1961 (PATROL I). AD-256 392

This report describes development and evaluation of a 12-hour Program of Instruction in basic land navigation, for use in Army Basic Combat Training (ATP 21-114). The specification of a performance requirement for basic land navigation by enlisted personnel is summarized in an appendix. The experimental program of instruction, which was built around instruction in dead reckoning and map-terrain association, is outlined. A sample of basic trainees was trained by the POI and tested on a night proficiency test, with about 75% of the sample meeting the performance requirement.

Research By-Products resulting from this research effort are listed in Part III.

PIONEER

Development of Methods and Concepts for Training and Motivation Research

This Work Unit was the original vehicle for HumRRO's basic research work, which became programed as separate Basic Research Studies beginning FY 1965. The PIONEER Sub-Units I-X have been presented as correspondingly numbered Basic Research Studies and reporting is listed in the Basic Research section.

PLATTRAIN—Division No. 4

Experimental Development of Procedures and Methods Designed to Improve the Tactical Proficiency of the Rifle Platoon
(Research for the Department of the Army)

"Chalk Talk for Platoon Leaders," by COL Henry E. Kelly [USA Ret.], *Army Combat Forces Journal*, vol. 6, no. 3, October 1955.

"'Verbal' Defense," by COL Henry E. Kelly, USA Ret., *Military Review*, vol. XXXV, no. 7, October 1955.

PLATTRAIN: Premises and Training Implications Related to Improving the Tactical Proficiency of Rifle Platoons, by John E. Taylor, John B. McKay, Charles E. Hall, and Salvatore N. Cianci, Research Memorandum, April 1959. AD-270 995

Tactical doctrine, combat literature, and the literature of previous research were studied to develop premises and training implications to serve as a base upon which subsequent programs of training research relevant to the rifle platoon could be built. A set of premise statements is presented summarizing those factors which have complicated smooth rifle platoon functioning in the past and probably will complicate smooth functioning in the future. Separate sets of statements outlining the implications of these premises for training the individual platoon member, the platoon and squad leaders, and platoons as units, are also presented.

Some Factors Which Have Contributed to Both Successful and Unsuccessful American Infantry Small-Unit Actions, by John B. McKay, Salvatore Cianci, Charles E. Hall, and John E. Taylor, Research Memorandum, April 1959. AD-260 994

A search of American infantry small-unit combat literature of World War II and Korea has yielded information concerning some of those factors in American employment of battlefield techniques that have figured in differentiating successful from unsuccessful small-unit actions. Presented in this paper is an enumeration of these factors—supporting fires, control and communications, preparation for conditions on the battlefield, information dissemination, availability of time for planning, accurate and timely reporting, security and surprise, combat losses of key personnel, choice of weapons and personnel for specific missions, and dispersion and tactical utilization of terrain.

POLICY—Division No. 1 (System Operations)

An Analysis of Committee Problem-Solving Techniques at the National War College
(Research for the Department of the Army)

Committee Problem-Solving Techniques at the National War College, by Frank Restle, Technical Report 10, September 1954. PB-132402 AD-83 857

The problem-solving methods of student committees of the National War College were assessed with a view to determining how the committees should operate, how they do operate, and how their operation might be improved. Information was obtained through observation, questionnaire, and interview techniques. Specific suggestions for improving the usefulness of the committee method were made.

PREDICT—Division No. 6 (Aviation)
Correlational Analysis of Aviator Performance
(Research for the Department of the Army)

"Factors in Predicting Army Aviator Performance: Birth Order and Participation in Dangerous Sports and Activities," by Peter R. Prunkl, paper for annual meeting of Southeastern Psychological Association, New Orleans, La., February 1969; issued as Professional Paper 13-69, 13 pp., May 1969. AD-688 812

From previous research it was hypothesized that firstborns would tend to avoid the potential dangers of Army aviation, but that firstborn-volunteers would not differ from later-born volunteers in terms of previous participation in dangerous sports and activities. Data were used from the Background Activities Inventory of 395 aviation warrant officer trainees, to test for birth-order effect by comparing first- and second-borns from the same-size families. Although there were significantly more first- than second-borns, reasons that the finding may be spurious are discussed. First- and second-born trainees did not differ on measures of exposure to dangerous sports and activities or confidence. Neither pass-fail from flight training nor previous college attendance showed a birth-order effect.

"Combat Aviator Criterion Development," by Wiley R. Boyles, Peter R. Prunkl, and James L. Wahlberg, paper for symposium at American Psychological Association convention, Washington, September 1969; issued as Professional Paper 34-69, 13 pp., November 1969. AD-703 510

Factors that must be considered in the development of criteria for proficient performance of a complex job are discussed in the context of the Army aviation combat situation. Ratings of aviators by peers, subordinates, and superiors on pertinent job behaviors have been collected following identification of the pertinent behaviors by the critical incident method. Moderator variable effects on the ratings are described, as are some alternative strategies for future research.

"Peer Ratings as Predictors of Success in Military Aviation," by James L. Wahlberg, Wiley R. Boyles, and H. Alton Boyd, paper for annual meeting of Alabama Psychological Association, Destin, Fla., May 1970; issued as Professional Paper 1-71, 17 pp., March 1971. AD-724 695

Three experimental peer rating forms were developed for use in research in prediction of the aviation training performance criterion—completion/attrition—from the training program for Aviation Warrant Officer Candidates at the U.S. Army Helicopter School. This paper describes the construction of the ratings, the "Potential Aviator Rating" forms, and compares the validity of these forms with the Contemporary Evaluation Form (CEF) used by the U.S. Army Helicopter School. The basic comparison involved validity between absolute scale and ranks. The original validity coefficients were sufficiently high to anticipate that the use of peer ratings may increase predictive accuracy in a multivariate system.

"Prediction of Army Aviator Performance: Description of a Developing System," by Wiley R. Boyles and James L. Wahlberg, paper for annual meeting of Alabama Psychological Association, Destin, Fla., May 1970; issued as Professional Paper 5-71, 12 pp., April 1971. AD-724 696

In this paper the development of a multivariate prediction system aimed at having useful predictors available early in the training of potential Army aviators is discussed. Using this system, supervisors will be able to relate a predictor score to a probability table, thus enabling administrators to make early decisions involving further training of Army aviators.

PREP-MPC—Division No. 3

The Monterey Peninsula College Transition-Prep Program
(Research for the Monterey Peninsula College)

"The PREP Program at Monterey Peninsula College," by Hilton M. Bialek, paper for American Association of Junior Colleges convention, Washington, March 1971; issued as Professional Paper 10-71, 7 pp., June 1971.

An informal account of the establishment and operation of a U.S. Army Predischarge Education Program in which HumRRO aided a Junior College in providing high school graduates with significant preparation for college work is given in this paper. The PREP program is designed to help and encourage soon-to-be discharged servicemen and women to take advantage of available education benefits. PREP offers disadvantaged students the opportunity to develop skills and self-confidence.

PRESSURE—Division No. 1 (System Operations)

An Experimental Study of the Relationship Between Anxiety Level and Performance in a Military (Rifle Firing) Situation
(Research for the Department of the Army)

"Rifle Marksmanship as a Function of Manifest Anxiety and Situational Stress," by Joseph C. Hammock and Albert I. Prince, paper for American Psychological Association convention, September 1954.

A Study of the Effects of Manifest Anxiety and Situational Stress on M-1 Rifle Firing, by Joseph C. Hammock and Albert I. Prince, Staff Memorandum, October 1954. Ad-625 919

PROFICIENCY–Division No. 2

Proficiency Testing: The Development of Performance Proficiency Tests for Basic Trainees (Research for the Department of the Army)

Development of Proficiency Tests for Basic Combat and Light Infantry Training, by Robert A. Baker, Guy Scott, and Eugene F. MacCaslin, Technical Report 19, July 1955. AD-85 829

After an intensive study of current proficiency testing practices, ATPs, and combat reports, performance tests were developed to measure proficiency attained by trainees in basic and advanced infantry training. The Individual Proficiency Test: Basic Combat and the Individual Proficiency Test: Light Infantry were developed for administration at the end of the Basic Combat Training Program (ATP 21-114) and the Advanced Light Infantry Training Program (ATP 7-600) respectively. Each test consisted of 17 subtests of critical combat skills. Each test was evaluated for its validity, reliability, objectivity, ease of administration, and ease of scoring.

Research By-Products resulting from this research effort are listed in Part III.

PROTECT–Division No. 1 (System Operations)

The Performance of Military Personnel Wearing Protective Masks (Research for the Department of the Army)

The Effects of Protective Masking Upon Smoke Generator and Fuel Supply Team Performance: An Analysis of an Experiment Conducted by the U.S. Army Chemical Corps, by Richard I. Moren and William E. Montague, Research Memorandum, April 1959 (PROTECT I). AD-628 146

The Effects of Wearing the CBR Protective Mask Upon the Performance of Selected Individual Combat Skills, by William E. Montague, Robert D. Baldwin, and Andrew H. McClure, Technical Report 57, June 1959. PB-143538 AD-220 171

The effects of wearing the protective mask on individual combat skills were measured during the first hour and after five consecutive hours of masking. Performance test scores of masked soldiers were compared with their scores when tested under comparable conditions without masks. Military activities tested were: driving vigilance, radio communication, target detection with unaided vision and with binoculars, firing shoulder weapons, cross-country running, and unaided voice communication. During the first hour, performance by masked troops was lower than for unmasked, losses ranging from 1 to 36%. With one exception, five-hour effects of masking also produced lower scores, average losses ranging from 2 to 41%. The greatest decrement appeared in tests of unaided voice communication, indicating a need for additional emphasis on the use of other means of communication in combat.

"The Effects of Wearing the CBR Protective Mask Upon the Performance of Selected Individual Combat Skills," by William E. Montague, paper for American Psychological Association convention, Chicago, 1960 (PROTECT I).

The effects of wearing the protective mask on individual combat skills were measured. Performance test scores of masked soldiers were compared with their scores when tested under comparable conditions without masks. Military activities tested were: driving vigilance, radio communication, target detection with unaided vision and with binoculars, firing shoulder weapons, cross-country running, and unaided voice communication. Average losses due to masking ranged from 1 to 41%. The greatest decrement appeared in tests of unaided voice communication, indicating a need for additional emphasis on the use of other means of communication in combat.

Human Factors in CBR Operations: The Effects of CBR Protection Upon the Performance of Selected Combat Skills in Hot Weather, Technical Report 71, by William E. Montague and Richard I. Moren, May 1961 (PROTECT I). AD-323 672

Troops were tested in hot weather under three conditions of CBR protection: in normal field uniform (no protection), wearing the model E13R9 mask, and wearing the entire permeable protective uniform (including the mask). The tests were: setting up and taking down smoke generators, road marching, running, rifle loading and unloading, rifle disassembly and assembly, rifle bore cleaning, spark plug changing, carbine marksmanship, radio communication, and unaided voice communication.

PSYFREE—Psychological Warfare Division
Communist Indoctrination and Use of Prisoners of War for Psychological Warfare Operations (Research for the Department of the Army)

"Were They Really Brainwashed?" by Julius Segal, *Look*, vol. 20, June 1956.

Factors Related to the Collaboration and Resistance Behavior of U.S. Army PW's in Korea, by Julius Segal, Technical Report 33, and supplement, December 1956. AD-116 845

This study was designed to identify factors which differentiated those U.S. Army PWs who resisted Communist exploitation in Korea from those who participated in the captor's program of exploitation. A sample of 579 PWs was selected for study from the population of 3,323 repatriated Army PWs, and three distinct groups of PWs—Participators, Resisters, and Middle—were contrasted on over 300 items of information drawn from interrogations conducted by the Army. Recommendations for the content of troop orientation programs are made, and the specific resistance skills and attitudes required for resistance are identified.

"Factors Related to the Collaboration and Resistance Behavior of U.S. Army PW's in Korea," by Julius Segal, paper for annual meeting of Eastern Psychological Association, Spring 1957.

"Correlates of Collaboration and Resistance Behavior Among U.S. Army POWs in Korea," by Julius Segal, *Journal of Social Issues*, vol. 13, no. 3, September 1957.

American prisoners in Korea, under continuing threat of punishment for resistance to their captors, could either submit to the enemy's demands and get preferential treatment, or resist and suffer the consequences. Few understood that the enemy was primarily seeking psychological warfare gains in their efforts to win prisoners to collaboration. A small proportion (15%) of the American POWs in Korea capitulated, and another 5% refused to submit although threatened with personal danger and abuse, deprivations, and imprisonment. Approximately 80% of the men managed to maintain a neutral position.

PSYJOB—Psychological Warfare Division
Determination of Training Requirements for Propaganda Personnel (Research for the Department of the Army)

Psychological Warfare Job Requirements and Training: An Evaluation of the Psychological Warfare School Curriculum, by Lawrence Schlesinger and Harriet Beckwitt, Staff Memorandum, August 1956. AD-484 337

Interviews and questionnaires conducted with personnel active in psychological warfare were utilized to obtain descriptions of required job behavior, and these data were compared with the emphases and subject areas in the Army Psychological Warfare School curriculum. There was general agreement that instruction should be geared to prepare trainees for a variety of assignments in psychological warfare, with more instruction in the techniques of interviewing indigenous personnel and prisoners of war.

QUIZ—Division No. 3

Psychological Techniques for Facilitating and Countering Interrogative Processes (Research for the Department of the Army)

Exploratory Efforts Concerned With a Study of the Interrogation Process: Survey Activities, Conceptualization and Pilot Studies, by Hilton M. Bialek, Jerald N. Walker, and Joanne J. Hood, Research Memorandum, May 1962 (For Official Use Only) (QUIZ I).

This paper includes a survey of potential problems in the areas of interrogation and resistance, a working conceptualization of the interrogation process, and the informal results of a number of pilot studies originating from the conceptualization. These activities resulted in a proposal for a formal research effort. (U)

An Experimental Approach to Tactical Interrogation, by Hilton M. Bialek, Jerald N. Walker, and Joanne J. Hood, Research Memorandum, February 1963 (QUIZ II). AD-487 575

The purpose of this study was to determine whether experimental simulation of a tactical interrogation situation was feasible. The report describes the experimental situation, the derivation and description of scores measuring interrogation input and output, and the basis and limits for generalizing from the specific experimental setting. Effects of variations in interrogator technique and arousal of source resistance on the amount and accuracy of information obtained are reported. Both variables are shown to have significant effects under particular conditions. The salient finding is that almost three-fourths of potentially available information is lost under the best of conditions. Suggestions for implementation and further research conclude the report.

An Evaluation of Three Screening Procedures for Interrogation, by Jerald N. Walker and Joanne J. Hood, Research Memorandum, May 1963 (QUIZ II). AD-487 576

The purpose of this experiment was to determine the relative effectiveness of screening sources individually, in 4-man groups, and in 12-man groups. It was concluded that screening is most efficient when sources are dealt with in groups of four; however, this conclusion is restricted to cases where the interrogator is dealing with cooperative enlisted sources and has essential elements of information about as specific as in this study. Although substantial variation existed, the accuracy of the interrogators' screening appeared satisfactory.

RADAR—Division No. 5[1]

Training of Radar Operators and Maintenance Personnel[2] (Research for the Department of the Army)

§*The AAFCS M-33 Mechanic: Analysis of Field Activities and Problems With Implications for Training*, by Staff, RADAR, Information Report, 305 pp., March 1954 (RADAR II). AD-448 596

This report discusses studies conducted on the AAFCS M33 radar mechanic. Topics covered include the requirement, orientation, and plan of study; field activities and problems of the M33 mechanics; field factors regulating echelon maintenance activities; implications for training mechanics; and a preliminary report of the M33 radar operator.

§*The AAFCS M-33 Operator: Analysis of Field Activities and Problems With Implications for Training*, by Donald F. Haggard and J. Daniel Lyons, Technical Report 20, 81 pp., August 1955 (RADAR I). AD-75 684

This study was designed to obtain a complete description of the activities, problems, and training of M33 radar operators in antiaircraft installations. Present training is evaluated in terms of administrative factors, curricula, instructional methods, and training materials, and specific criticisms and suggestions from trainees and instructors are included.

§"A Performance Test for the AAFCS M-33 Radar Mechanic and Observations on Trouble Shooting Behavior," by Robert Vineberg, paper for Symposium on Electronics Maintenance, Office of the Assistant Secretary of Defense, Research and Development, Advisory Panel on Personnel and Training Research, Washington, August 1955.

★The development of a performance test designed to measure ability of radar mechanics in the energizing and operation of equipment, in field adjustments and preventive maintenance, and in troubleshooting, is described. Data from the administration of the test to experienced and inexperienced antiaircraft mechanics are furnished.

§"Studies of Field Activities of Army Electronics Maintenance Personnel," by George J. Wischner, Abram M. Barch, and Joseph C. Hammock, paper for Symposium on Electronics Maintenance, Office of the Assistant Secretary of Defense, Research and Development, Advisory Panel on Personnel and Training Research, Washington, August 1955.

★In this paper a description of three studies of field activities, problems, and difficulties of Army electronics maintenance personnel offers information bearing on the methodology employed, the kind of data gathered, and their utility and implications for training. The objective of the research was to work toward job-oriented training geared more directly to field use.

§*Supplement to a Bibliography of Human Factors in Radar Operation and Maintenance*, by J. Daniel Lyons, Staff Memorandum, August 1955. AD-488 595

This supplement lists unclassified publications that appeared between September 1953, when the first bibliography was issued, and March 1955.

§"An Analysis of Problem Solving for Use in Troubleshooting Research," by Robert Vineberg, paper for symposium at American Psychological Association convention, San Francisco, September 1955.

★This paper presents an analysis of the approach troubleshooting mechanics take—ranging from symbolic processes to physical manipulations—in maintaining electronic equipment. The symptom-formulation-performance sequence is described. Research into the role of different variables affecting troubleshooting responses is suggested.

[1] This Work Unit was initiated at Division No. 1 (System Operations). The symbol § indicates an item prepared at Division No. 1.

[2] Presence of a star at the beginning of the abstract indicates that the item is one of the RADAR papers or presentations included in *Collected Papers Prepared Under Work Unit RADAR: Training of Radar Operators and Maintenance Personnel*, Professional Paper 20-68, June 1968.

§"A Three-Hour Performance Test to Evaluate Job Effectiveness of Army Radar Mechanics," by James E. Whipple, Robert D. Baldwin, Robert F. Mager, and Robert Vineberg, paper for American Psychological Association convention, San Francisco, September 1955; issued as Professional Paper 12-69, 9 pp., April 1969 (RADAR IV). AD-688 815

This test of job effectiveness was developed for a complex fire control M33 radar system used by the Army for directing antiaircraft fire. The test was conducted on the equipment and measured a mechanic's ability to keep his set operating at optimal level and to return it to operational level after a malfunction developed. The test was administered to both experienced and inexperienced mechanics, and appeared to be a satisfactory criterion instrument for evaluating proficiency.

§*The AAFCS M-33 Operator: A Manual of Operating Procedures*, by George H. Brown, Donald F. Haggard, and J. Daniel Lyons, Special Report 6, 34 pp., August 1956 (RADAR V). AD-108 197

A complete list of operationally correct AAFCS M33 radar operating procedures was developed for use within an over-all Work Unit designed to improve and standardize the training required for radar operator personnel. The list can be modified to suit the needs of a specific command area, and subdivisions by activity can be separately bound for use by trainees for each operating position. It is believed that operator trainees will more quickly achieve a satisfactory level of operating skill when their individual instruction at the controls is supplemented by the study of this manual of step-by-step procedures.

§*The AAFCS M-33 Mechanic Proficiency Test: Part I—Comparison of Mechanics With and Without Field Experience. Part II—Development and Cross-Validation*, by Robert D. Baldwin, Robert F. Mager, Robert Vineberg, and James E. Whipple, Technical Report 38, 58 pp., May 1957 (RADAR IV). PB-129373 AD-133 219

As part of long-range research in electronics maintenance and operator training, maintenance proficiency of AAFCS M33 mechanics at time of graduation from the AAA & GM School and after on-the-job experience was assessed. Experienced and inexperienced mechanics were tested with the AAFCS M33 Mechanic Proficiency Test (14 problems in troubleshooting, adjustment, preventive maintenance, energizing and operation of the M33 radar). Results suggest that after the general improvement in skills during the first six months on the job, additional experience has little effect on the skills tested—except for troubleshooting ability, which continues to develop with field experience. Characteristic deficiencies in the performance of new mechanics were identified and steps were recommended to alleviate them.

"Diagnosis and Treatment of an Army Electronics Training Course," by James E. Whipple, Robert F. Mager, and Lloyd Hitchcock, Jr., paper for American Psychological Association convention, New York, September 1957.

★A five-stage research program resulting in Army adoption of an improved curriculum for M33 Anti-Aircraft Fire Control System maintenance mechanics is described. The sequence of research activities involved: job analysis and definition, construction of a criterion test of maintenance proficiency, critical evaluation of the training program, using data obtained from the two preceding steps, development of two revisions of the training curriculum, and experimental tryout of the revised curricula.

Development and Evaluation of an Experimental Program of Instruction for Fire Control Technicians, by Lloyd Hitchcock, Jr., Robert F. Mager, and James E. Whipple, Technical Report 46, 32 pp., May 1958 (RADAR VI). AD-200 850

As part of a long-range research in electronics maintenance and operator training, an experimental training program for AAFCS M33 technicians was developed and evaluated. Experimental curriculum modifications included a one-week introductory course in fire control system operation, a marked reduction in time spent in basic electronics theory, and a shift in over-all emphasis from electron-flow theory to signal-flow analysis of circuitry. Experimental course graduates scored much higher on a performance proficiency test than did appropriate comparison groups. Curriculum modifications were recommended to the U.S. Army Air Defense School.

Course Achievement of Students With Unsatisfactory Academic Averages in Basic Electronics, by Harry E. Anderson, Jr., and James E. Whipple, Staff Memorandum, 24 pp., September 1958 (RADAR IX). AD-633 165

This study was conducted to investigate academic achievement of students in a fire control maintenance course. Four experimental classes, involving a total of 92 trainees, for whom complete data were available, were allowed to complete the course regardless of grades and without undergoing boarding action. This experimental procedure permitted analysis of grades throughout the course for each trainee. An electronics aptitude test was given to each trainee prior to the course. The study showed that a substantial number of students, normally removed from their class as a result of deficient grades in Basic Electronics, possessed the ability to make satisfactory grades in later phases of instruction on the equipment.

Collected Papers Prepared Under Work Unit RADAR: Training of Radar Operators and Maintenance Personnel, Professional Paper 20-68, 38 pp., June 1968. AD-674 165

(RADAR items included in this Professional Paper are indicated with a star in the left margins of the abstract.)

Several aspects of research in the area of training radar operators and maintenance personnel are reported here. Studies covered include the development of a performance test to measure radar mechanic's ability; a description of three studies concerning electronics maintenance personnel, aimed at improving job-oriented training geared to field use; an analysis of the approach mechanics take to troubleshooting; and a description of a five-stage research program that resulted in improved training for M33 Antiaircraft Fire Control System mechanics.

Research By-Products and other related research materials are listed in Part III.

RADEV—Division No. 2

A Comparison of the Training Effectiveness of the Stereo Range Finder Device OROPT-T1 and the Tank-Mounted Range Finder (Research for the Department of the Army)

The Training Effectiveness of a Stereoscopic Range-Finder Trainer, by Norman Willard, Jr., Charles A. Bancroft, and John G. Reddan, Technical Report 12, October 1951. PB-116128. AD-57 326

This study assesses a device (OROPT-T1) designed to (a) identify trainees who will not benefit from range finder training, (b) facilitate remedial instruction, and (c) replace the tank-mounted range finder in training. The device will distinguish, with 300 or fewer rangings, between normally apt students and those requiring special training; it is not useful for remedial training; it can replace the tank-mounted range finder in some phases of training for the first 300 practice rangings.

RADOP–Division No. 1 (System Operations)
Improvement of Student Performance in Radio Operation Courses
(Research for the Department of the Army)

Development of a Measure of Skill at Receiving International Morse Code, by S. James Goffard, Staff Memorandum, May 1957; paper for American Psychological Association convention, September 1958 (RADOP I). AD-157 986

On the basis of earlier work, an unconventional but more general measure of skill at receiving International Morse Code has been developed. This measure, the speed score, estimates the speed at which a man can get just 90% of the characters correct. From empirically derived tables, a speed score is found for each test. The average of these is used as a measure of skill. This measure has been found useful in making experimental evaluations of programs of code practice material.

Effectiveness of Variations in Code Practice, by S. James Goffard, Staff Memorandum, May 1958 (RADOP II). AD-226 981

The practice required to increase the speed of receiving International Morse Code is monotonous; students soon find it extremely difficult to attend to the practice material, and their motivation to learn code quickly vanishes. New practice materials designed to be more interesting were devised for one course segment. Students practicing with the new material found it less boring and progressed at least as fast as those practicing with the old.

Experimental Studies of Skill in Copying International Morse Code, by S. James Goffard, Technical Report 68, December 1960. PB-154234 AD-249 915

This research was directed at improving the motivation of students practicing International Morse Code. A new method of measuring skill at copying code was used in evaluating two experimental modifications of the program of practice material. Both modifications proved more interesting than the original program, but neither produced a significant increase in the rate of learning. A new program of progressive code practice is presented for use in code courses. It is believed that this practice system would be most advantageous in a course where the amount of time each student was required to spend in code *instruction* depended directly on the rate at which he learned code.

Development of Methods of Preparing Materials for Teaching Machines, by B.F. Skinner (edited by Lola M. Zook), Professional Paper 29-68, 20 pp., September 1968; based on Subcontractor's Reports, Harvard University, 1957 (RADOP IV). AD-677 510

This paper represents a consolidation of results of research conducted during 1957 and dealing with methods and techniques in the preparation of instructional materials to be used with teaching machines. Included are suggestions for developing and framing subject matter, and generating and ordering statements for a machine program, and a discussion of techniques and principles in related matters such as student use of machines, presentation considerations, and teaching by machines.

RAID–Division No. 3[1]

Methods for Improving the Effectiveness of Small Groups Under Stress (Research for the Department of the Army)

Comparison of Random Pairs and Real Pairs on a Simple Auditory Counting Task, by Seward Smith, Donald B. Murphy, George L. Hampton, Ray Bernardo, and Harry Burdick, Research Memorandum, March 1963 (RAID I). AD-638 306

Performances of 44 subjects working together in face to face pairs (Real Pairs group) and 60 subjects working in pairs but separated from each other (Random Pairs group) were compared on a task which required the counting of long series of tones. These tone series contained from 52 to 196 tone segments presented at a constant rate of eight per second. Real Pair teams were asked to reach agreement on their estimates while the subjects of each Random Pair separately turned in their estimates which were averaged for each problem. All subjects gave individual ratings of their confidence in each problem judgment. The Real Pairs reported lower estimates of the number of tones in the problems they judged than did the Random Pairs. The confidence scores for the two groups were not appreciably different.

"Cohesiveness and Motivation," by Harry A. Burdick, Donald B. Murphy, Seward Smith, and Joan S. Nettler, paper for American Psychological Association convention, Philadelphia, 1963.

Task success and desired personality traits were varied making four subgroups. Solitary subjects were led to believe they were working with a partner on a tone matching problem. After each trial, success feedback was reported. The experimenter arbitrarily failed half of the persons. Subsequently a measure of cohesiveness, involvement, n Achievement, and n Affiliation were obtained. Success groups were higher in cohesiveness. Persons high in n Affiliation liked the partner better. Persons more attracted to the group tried harder, but only in success groups. If in failure groups, persons less attracted to the group tried harder.

"Relation of Intelligence and Authoritarianism to Behavioral Contagion and Conformity," by Seward Smith, Donald B. Murphy, and Ladd S. Wheeler, *Psychological Reports*, vol. 14, no. 1, February 1964.

This is a report on a series of experiments designed to study behavioral contagion in two-man groups. Results indicated that the California F scale *per se* did have some value in predicting conformity behavior, but that (within the limited range tested) intelligence *per se* did not.

"Behavioral Contagion," by Ladd Wheeler, Seward Smith, and Donald B. Murphy, *Psychological Reports*, vol. 15, no. 1, August 1964.

Four separate experiments on the contagion of game-playing behavior were conducted. Experiment I indicated that contagion occurred whether the game engaged in by the confederate was of high or low valence to the subject, that mere activity on the part of the experimental confederate did not lead to game playing, and that contagion tended toward specificity. Experiment II indicated specificity of contagion was not necessary, that contagion was not entirely due to a desire to compete in game playing. Experiment III failed to produce contagion of a low-valence game with no restraints against game playing. Experiment IV failed to produce contagion of a high-valence game with no restraints against game playing. Throughout the four experiments there was no relationship between contagion and Asch-type conformity. The observed contagion was mediated by reduction of restraints. The data were not adequate to specify the manner in which restraints were reduced, although several alternatives were discussed and evaluated.

[1] This Work Unit was terminated at Division No. 4.

RANGEFINDER—Division No. 2

A Study of Training and Selection of Stereoscopic Range Finder Operators for Armor (Research for the Department of the Army)

"The Relationship Between Lateral Phoria and Some Tests of Real and Apparent Depth Perception," by Norman Willard, Jr., Howard C. Olson, and Robert D. Arnold, paper for American Psychological Association convention, Cleveland, September 1953.

"The Distribution of Instrumental Diopter Settings in the Army Population and Their Relation to Pertinent Vision Variables," by Howard C. Olson and Norman Willard, Jr., paper for 34th meeting of the AF-NRC Vision Committee, April 1954.

A Simplified Method for Rating the Performance of Stereoscopic Range Finder Operators, by Howard C. Olson and Norman Willard, Jr., Technical Report 34, December 1956 (RANGEFINDER I). PB-132409 AD-117 726

Data were gathered during training of 179 men as operators of the stereoscopic range finders included in the fire control equipment of medium and heavy tanks. Analysis showed that the standard method of evaluating ranging performance in terms of Units of Error was too difficult to compute in the field and did not always give a true picture of operator error. A scoring graph involving only simple computation was developed as a simplified and accurate method of evaluating operator performance on Range Finder M12 and T46.

READ—Motivation, Morale, and Leadership Division

Studies of Morale and Motivation Factors Influencing Effectiveness of Individual Soldiers: Evaluation of the Basic Education Program (Research for the Department of the Army)

"An Evaluation of a Basic Education Program in the Army," by S. James Goffard, paper for American Psychological Association convention, San Francisco, September 1955.

An Experimental Evaluation of a Basic Education Program in the Army, by S. James Goffard, Technical Report 28, April 1956. PB-132407 AD-91 212

The effects of a brief period of special prebasic training on the potential military usefulness of marginally literate men were evaluated in this study. Three types of special training were considered: (a) instruction in academic skills—reading, writing, arithmetic; (b) instruction in military skills; (c) instruction in both academic and military skills. In comparison with marginally literate men who had received no special training, specially trained men showed negligible improvement in performance and written proficiency and no appreciable changes in attitudes.

REALISTIC–Division No. 3

Determination of Reading, Listening, and Arithmetic Skills Required for Major Military Occupational Specialties
(Research for the Department of the Army)

"Some Relationships of Mental Aptitude, Reading Ability, and Listening Ability Using Normal and Time-Compressed Speech," by Thomas G. Sticht, *Journal of Communication*, vol. 18, no. 3, September 1968; issued as Professional Paper 33-68, 18 pp., October 1968. AD-679 329

This paper reports on three studies testing the differences between reading and listening ability, and performance on comprehension and intelligibility tests using time-compressed speech, for men of high, average, and low mental aptitudes. There were no differences in reading or listening performance for men of either average or low mental aptitude. The former scored better than the latter on all tests of reading and listening comprehension, regardless of the difficulty level of the material, or whether normal or time-compressed listening materials were used. The performance of all aptitude groups declined when the speech rate of the listening material was increased, but there were no interactions of speech rate and mental aptitude. On the intelligibility tests, lower aptitude subjects did not discriminate individually presented time-compressed words as well as did the higher aptitude subjects. Some implications of these results for education and training are presented.

"Some Interactions of Speech Rate, Signal Distortion, and Certain Linguistic Factors in Listening Comprehension," by Thomas G. Sticht, paper for meeting of Psychonomic Society, St. Louis, Mo., November 1968; issued as Professional Paper 39-68, 11 pp., December 1968; *AV Communication Review*, vol. 17, no. 2, Summer 1969. AD-681 795

This paper reports an experiment designed to determine the effects of speech rate, signal distortion, and certain linguistic factors on listening comprehension. The results indicate that both speech rate and signal distortion may affect listening comprehension, with the latter effects becoming more noticeable with material of low redundancy. Linguistic cues such as inflection and syntax tended to aid listening comprehension.

"Research Approaches for Designing Prose Materials for Learning by Listening," by Thomas G. Sticht, paper for American Educational Research Association meeting, Los Angeles, Calif., February 1969.

Learning Abilities of Disadvantaged Adults, by Thomas G. Sticht, Professional Paper 9-69, 14 pp., March 1969.[1] AD-633 811

A summary of literature concerned with the learning abilities of disadvantaged adults showed no definitive evidence to suggest that they have any less ability to learn than other adults. A paucity of research relating to this problem is noted. Recommendations for future research include the development of long-term, extended training studies to explore learning in situations oriented toward life in the community.

"Comprehension of Repeated Time-Compressed Recordings," by Thomas G. Sticht, *The Journal of Experimental Education*, vol. 37, no. 4, Summer 1969; issued as Professional Paper 2-70, 6 pp., January 1970. AD-704 370

Time-compressed, tape-recorded messages were used to determine whether listening to the message twice, in the same amount of time required to listen to the uncompressed message once, would improve listening comprehension scores of high and low aptitude men. The results indicated that for both groups of men, listening twice improved comprehension scores over scores obtained by listening once. Comprehension of repeated time-compressed messages was not improved over that obtained by a single listening to the uncompressed messages.

[1] Relevant to Work Unit REALISTIC but written as a member of a non-HumRRO group preparing a review of Social and Biological Deprivation, Influences on Learning and Performance, under sponsorship of the National Institute of Child Health and Human Development.

REALISTIC *(Cont.)*

"Studies on the Efficiency of Learning by Listening to Time-Compressed Speech," by Thomas G. Sticht, paper for Second Louisville Conference on Rate and/or Frequency Controlled Speech, University of Louisville, October 1969; issued as Professional Paper 4-70, 12 pp., February 1970. AD-705 022 ED-041 225

Two experiments were performed to determine whether using the time saved by the time-compression process to repeat or extend information presented by audio tapes would increase the amount learned by listening to rapid speech. Neither repeating nor extending information improved learning over that obtained by listening to uncompressed information for an equal amount of time. This was true for high and low mental aptitude subjects. The implication that more information can be learned in a unit of time with moderate compression remains to be substantiated.

"Determining Literacy Requirements of Jobs: Progress and Prospects for Project REALISTIC," by Thomas G. Sticht, Richard P. Kern, John S. Caylor, and Lynn C. Fox, briefing for DoD Manpower Research Planning Group, Washington, October 1969; issued as Professional Paper 13-70, 13 pp., May 1970. AD-708 696

Project REALISTIC is concerned with identifying REAding, LIStening, and ArithmeTIC skills adequate for performing successfully in several military occupational specialties. This paper reports progress on this research and projects future activities. Summarized are data on the relationships of reading and listening test scores to job performance, the reading difficulty levels of job-related printed materials, and the extent of usage of reading and listening information sources by men of low, medium, and high reading ability.

"Readability, Reading Ability, and Readership," by Richard P. Kern, Thomas G. Sticht, and Lynn C. Fox, paper for 15th Annual Army Human Factors Research and Development Conference, Fort Ord, Calif., November 1969; issued as Professional Paper 17-70, 13 pp., June 1970. AD-709 629 ED-043 834

This paper presents data describing large discrepancies between the reading difficulty levels of printed materials used in certain MOSs and the relatively lower reading ability levels of men assigned to these MOSs. There are some initial data exploring the relationship between reading ability and utilization of printed materials on the job. It is suggested that the low level of on-the-job utilization of printed materials found in the data is probably related to the difficulty of the reading tasks these materials require of the reader. Finally, an approach for identifying on-the-job reading tasks and studying their reading skill requirements is outlined.

Learning by Listening in Relation to Aptitude, Reading, and Rate-Controlled Speech, Technical Report 69-23, by Thomas G. Sticht, 46 pp., December 1969. AD-701 150 ED-037 666

A series of studies was performed to explore the possibility of substituting listening for reading requirements, with special reference to marginally literate Category IV personnel. Time-compressed speech was evaluated as a means of producing listening rates comparable to silent reading rates. The results indicated that for both average and low aptitude men, listening was as effective as reading for obtaining factual information from test passages varying in difficulty level. Both high and low aptitude men learned more efficiently with moderate (36%) amounts of time compression than with no compression of the listening selections. Additional evaluations of time-compressed speech were made, and education and training implications of the research were discussed.

"Overview of Project REALISTIC," by Thomas G. Sticht, paper for meeting of Western Psychological Association, April 1970.

"Psychometric Determination of Relationships Among Literacy Skills and Job Proficiency," by John S. Caylor, paper for meeting of Western Psychological Association, April 1970.

"Reading Ability, Readability, and Readership: Identifying Job-Related Reading Tasks Performed by Cooks, Clerks, and Mechanics," by Richard P. Kern, paper for meeting of Western Psychological Association, April 1970.

"Reducing Discrepancies Between Literacy Skill Levels of Personnel and Literacy Demands of Jobs," by Thomas G. Sticht, paper for meeting of Western Psychological Association, April 1970.

"Project REALISTIC: Determining Literacy Demands of Jobs," by Thomas G. Sticht and Richard P. Kern, *Journal of Reading Behavior*, vol. 2, no. 3, Summer 1970; issued as Professional Paper 3-71, April 1971. AD-730 256

In this paper studies of the performance of different reading ability groups on various job-reading tasks are described. It is believed that the estimation of reading skill requirements for jobs and the design of job materials will be facilitated by these and similar studies. Data were collected on the relationships of reading and listening test scores to job performance, the reading difficulty levels of job-related printed materials, and the extent of usage of reading and listening information sources by men of low, medium, and high reading ability.

Literacy Demands of Publications in Selected Military Occupational Specialities, by Thomas G. Sticht, Professional Paper 25-70, 20 pp., October 1970. AD-715 640 ED-044 615

The reading difficulty levels of publications in five MOSs were determined by means of the Flesch and Dale-Chall readability formulas. The readability levels of the publications were compared with the reading abilities of low and average mental aptitude men working in the MOSs. The comparison indicates that, in all MOSs, the average readability level of the publications exceeded the average reading abilities of the low aptitude men by from two to eight years. In all but one MOS, the average readability of the publications exceeded the average reading ability of the average mental aptitude men by from one to six years. Evidence is presented to suggest that both high and low aptitude readers are hurt when the reading difficulty of materials is increased. An Appendix describes procedures for deriving the Flesch index of readability.

"Project REALISTIC: Identifying Vocational Literacy Requirements as Targeted Skill Levels for Adult Basic Education," by Thomas G. Sticht and John S. Caylor, paper for Adult Education Research Conference, New York City, February 1971.

The research reported summarizes more than two years of work and indicates the relationships of reading, listening, and arithmetic skill for nearly 1600 men to four indices of job proficiency: performance in job reading task tests; job knowledge paper-and-pencil tests; "hands-on" job sample performance tests (i.e., cooks cook, mechanics repair vehicles, etc.); and supervisor ratings.

"Effects of Speech Rate, Selection Difficulty, Association Strength and Mental Aptitude on Learning by Listening," by Thomas G. Sticht and Douglas R. Glasnapp, paper for American Educational Research Association meeting, New York City, February 1971.

In two experiments, the effects of speech rate upon the comprehension of listening materials by high and low aptitude men were studied. Experiment 1 indicated that low aptitude men appeared to learn easy material better than difficult material as a function of decreased speech rate. High aptitude men appeared to learn easy or difficult material best at around 175 wpm, independent of speech rate. In Experiment 2, high aptitude men were found to lose disproportionately more material of low association strength than did low aptitude men when the speech rate was increased from 175 to 325 wpm.

Effects of Aptitude (AFQT), Job Experience, and Literacy on Job Performance: Summary of HumRRO Work Units UTILITY and REALISTIC, by Robert Vineberg, Thomas G. Sticht, Elaine N. Taylor, and John S. Caylor, Technical Report 71-1, 82 pp., February 1971. AD-722 392 (see also UTILITY)

A series of studies was conducted to determine how Army personnel in Mental Category IV and in other mental categories compare in their job performance and in overall suitability for military service. Information is provided concerning the demands for reading, arithmetic, and listening skills in four major military occupational specialties. The performance of approximately 1800 men with Army experience ranging up to 20 years was measured by intensive job sample tests, job knowledge tests, and supervisor ratings. Information about background, personal characteristics, and military experiences was obtained through biographical questionnaires, a battery of published and experimental tests, and Army records.

Learning by Listening in Relation to Aptitude, Reading, and Rate-Controlled Speech: Additional Studies, by Thomas G. Sticht, Technical Report 71-5, 45 pp., April 1971. AD-722 480

A series of experiments explored the feasibility of substituting listening for reading requirements in Army training and jobs, with special reference to marginally literate, AFQT Mental Category IV men. Results of these experiments and related earlier research are summarized. Major findings indicate that high and low aptitude men may learn certain materials as well by listening as by reading; some poorer readers prefer to learn by listening rather than by reading. Characteristics of the recorded message that were found to affect listening comprehension include difficulty level of message, linguistic features of speech, and rate of speech. Extensive studies of the use of time-compressed and expanded recordings are described.

RECON—Division No. 2

Training Methods and Techniques for Improving Combat Readiness of the Armored Cavalry Platoon

(Research for the Department of the Army)

A Survey of Problems in the Tactical Training of Armored Cavalry Platoons, by John G. Cook, Research Memorandum, January 1963 (For Official Use Only) (RECON I). AD-480 776

Determination of Combat Job Requirements for Armored Cavalry Platoon Personnel, by William L. Warnick and Robert A. Baker, Technical Report 92, December 1964 (RECON I). AD-455 302

The objectives of this research were to formulate the job requirements of personnel assigned to armored cavalry platoons and find out the importance in combat of each job in order to know which skills should be emphasized during training. Field personnel rated prepared lists of platoon personnel job requirements for their importance in combat. Final lists included only the duties and skills the field personnel rated essential for combat or for basic performance of the job. The lists are felt to be useful for giving students a preview of their jobs, evaluating platoon efficiency, diagnosing and correcting deficiencies, and developing and standardizing proficiency tests for armor schools, training establishments, and armored cavalry units.

"The Armored Cavalry Platoon Combat Readiness Check," by LTC John G. Cook (USA Ret.) and Robert A. Baker, *Armor*, vol. LXXVI, no. 1, January-February 1967; "ACT I, The Armored Cavalry Trainer: Can Reality Be Duplicated?" by Robert A. Baker and LTC John G. Cook (USA Ret.), *Armor*, vol. LXXVI, no. 2, March-April 1967; issued as *Armored Cavalry Platoon Training and Evaluation*, Professional Paper 28-68, 14 pp., September 1968. AD-676 778

These articles are based on research in training methods and techniques for improving combat readiness of the armored cavalry platoon. Criteria to evaluate the combat-ready status of the units as a basis for action leading to specific improvements are established through a readiness check, described and illustrated in the first paper. A tactical training method bridging the gap between the classroom and the field is the subject of the second paper.

Research By-Products resulting from this research effort are listed in Part III.

REFILL—Division No. 7 (Social Science)
Survey Investigations in Foreign Language Learning
(Research for the Department of the Army)

"Foreign Language Programmed Materials: 1966," by Alfred I. Fiks, *Modern Language Journal*, vol. LI, no. 1, January 1967; issued as Professional Paper 1-67, 10 pp., January 1967. AD-647 505 ED-011 372

A list is given of foreign language programmed materials available to the educational community and to the general public as of February, 1966. Included are items of information such as title, author, publisher, supplier, price category, average hours required for completion time, course objectives, student level, format and price category of components such as texts, tapes, and records, type of response, and an index which is the ratio of number of frames to completion time.

"Some Attitudinal Factors in Foreign Language Learning," by Alfred I. Fiks, paper for meeting of Southern Society for Philosophy and Psychology, Roanoke, Va., March 1967; included in *Abstracts of the XVIIIth International Congress of Psychology*, vol. II, Moscow, U.S.S.R., 1966.

This paper covers student attitudes to foreign language learning, with emphasis on general interest, pragmatism (career or material advantage), xenophilia (identification with other cultures), and course satisfaction. Samples of U.S. military language students were studied to see if they showed similar attitudes to those resulting from other studies. It was hypothesized that attitudinal measures could contribute more to predicting course achievement than could general ability or language aptitude tests.

"Course Density and Student Perception," by A.I. Fiks and J.P. Corbino, *Language Learning*, vol. XVII, nos. 1-2, 1967; issued as Professional Paper 44-67, 8 pp., October 1967. AD-660 075

This article was prepared as a part of studies on selected factors involved in the foreign language teaching and learning process. A survey of nine schools indicated a regular relationship between vocabulary size in course objectives and duration of the course. Course density, defined as the ratio of vocabulary size to duration, was observed to be perceived fairly objectively by students.

Modern Approaches to Foreign Language Training: A Survey of Current Practices, by George H. Brown and Alfred I. Fiks, Technical Report 67-15, 165 pp., December 1967. AD-665 023

This report presents detailed, non-evaluative description of instructional methods used in a sample of outstanding language training centers. Included are 19 different training programs that represent a student age range from subteens to adults, both intensive and non-intensive courses, military and civilian students, and governmental as well as nongovernmental programs. For each program surveyed, the report presents fairly detailed description of such features as training objectives; methods of teaching phonology, grammar, and vocabulary; language laboratory activities; student evaluation procedures; and faculty characteristics. Of the language teaching programs, 15 out of 19 were characterized by their respective officials as adhering to the "audio-lingual" (A-L) methods. Two key features were shared by the training centers: primary emphasis on aural comprehension and speaking skills, and an inductive approach to grammar.

Student Attitudes and Foreign Language Learning, by Alfred I. Fiks and George H. Brown, Technical Report 69-2, 53 pp., March 1969. AD-685 413

Intellectual and aptitude factors do not wholly account for differences in achievement in foreign language classrooms. Some aspects of student attitudes and motivation were investigated to determine their role in such learning. Data were collected from about 300 military students of foreign languages in the first and again in the last third of their courses at eight military, university, and commercial language schools. Three types of data were collected: (a) attitude-motivational (Interest, Utilitarian Orientation, Xenophilic Orientation, and Course Satisfaction, by means of a 11-item Language Interest Scale; Volunteering data); (b) secondary data (biographical, aptitude, and training system factors); and (c) criterion measures (final course scores, Army Language Proficiency Test-Listening and -Reading scores, and course completion figures). These data were analyzed, associations were identified, and some student selection and course management implications were drawn.

REFLECT—Division No. 6 (Aviation)

Flight Trainer Requirements in Army Aviation Pilot Training (Research for the Department of the Army)

A Preliminary Training Study of the H-34 Cockpit Procedures Trainer, by Maurice Siskel, Jr., and Wayne D. Smith, Research Memorandum, October 1960. AD-489 301

An experiment was designed to provide preliminary information on the effects of varying amounts of training in the H-34 helicopter cockpit procedures trainer (CPT), to determine whether these CPTs were useful training devices and, if so, how much CPT training the student should receive before beginning transition training in the helicopter. Two training programs of varying length were devised for CPT training; a control group worked only with a helicopter. CPT instruction resulted in fewer errors, particularly using the longer CPT training program. Students who had practiced in the CPT made fewer errors in the helicopter initially than students who had not received such practice.

RELAY—Division No. 7 (Social Science)

The Impact of Military Service on Occupational Aspirations and Development of Skills (Research for the U.S. Air Force)

A Descriptive Analysis of the Classification, Assignment, and Separation Systems of the Armed Services, by Francis D. Harding and John A. Richards, (HumRRO Technical Report 71-8), Technical Report AFHRL-TR 71-15, (in press), Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 43 pp., May 1971.

Because of the impact of military service on occupational aspiration and career development, the purpose of this study is to develop an understanding of the interaction between the military and civilian manpower systems. The classification and assignment process applied to men entering the military services and the process for their separation from the services are described. Special attention is given to how previously acquired skills are identified and acted upon and how the occupational preferences and interests are related to classification and assignment. The nature of the counselling, training, and placement activities is the focal point of the description of the separation process. A comparative analysis was made of the procedures of the Air Force, Army, Marine Corps, and Navy.

REPAIR—Divsion No. I (System Operations)
Training of Electronics Maintenance Personnel[1]
(Research for the Department of the Army)

Summary Records of Repairs Reported by Field Radio Repairmen, I - Transmitter-Receiver RT-66, 67, 68, Components of the Standardized Series of FM Sets, Staff Memorandum, July 1956 (REPAIR I). AD-489 006

This memorandum contains information from records of repair activities performed by field radio repairmen on the RT-66, 67, or 68 transmitter-receiver. The information was reproduced from 166 Repair Activity Forms completed by 82 radio repairmen. The forms were designed to obtain specific information about characteristics of equipment referrals and repairman procedures in troubleshooting and repair. They were distributed to working repairmen with instructions to fill them out while repairing equipment items. The purpose of this staff memorandum is to provide "case histories" of maintenance jobs to serve where comprehensive information about individual maintenance jobs is required.

Summary Records of Repairs Reported by Field Radio Repairmen, II - Components of the Standardized Series of FM Sets Except the RT-66, 67, 68 Transmitter-Receiver, Staff Memorandum, July 1956 (REPAIR I). AD-489 007

This memorandum contains information from records of repair activities performed by field radio repairmen on components of the standardized series of FM sets except the RT-66, 67, or 68 transmitter receiver. The information was reproduced from 121 Repair Activity Forms completed by 84 radio repairmen. The forms were designed to obtain specific information about characteristics of equipment referrals and repairman procedures in troubleshooting and repair. They were distributed to working repairmen with instructions to fill them out while repairing equipment items. The purpose of this staff memorandum is to provide "case histories" of maintenance jobs to serve where comprehensive information about individual maintenance jobs is required.

Summary Records of Repairs Reported by Field Radio Repairmen, III - FM Transmitters and Receivers Including Manpacked Sets and Associated Components Except Those in the Standardized Series of FM Sets, Staff Memorandum, July 1956 (REPAIR I). AD-489 008

This memorandum contains information from records of repair activities performed by field radio repairmen on FM transmitters and receivers including man-packed sets except those in the standardized series of FM sets. The information was reproduced from 174 Repair Activity Forms completed by 109 radio repairmen. The forms were designed to obtain specific information about characteristics of equipment referrals and repairman procedures in troubleshooting and repair. They were distributed to working repairmen with instructions to fill them out while repairing equipment items. The purpose of this staff memorandum is to provide "case histories" of maintenance jobs to serve where comprehensive information about individual maintenance jobs is required.

Summary Records of Repairs Reported by Field Radio Repairmen, IV - AM Transmitters and Receivers and Associated Components, Staff Memorandum, July 1956 (REPAIR I). AD-489 009

This memorandum contains information from records of repair activities performed by field radio repairmen on AM transmitters and receivers and associated components. The information was reproduced from 179 Repair Activity Forms completed by 104 radio repairmen. The forms were designed to obtain specific information about characteristics of equipment referrals and repairman procedures in troubleshooting and repair. They were distributed to working repairmen with instructions to fill them out while repairing equipment items. The purpose of this staff memorandum is to provide "case histories" of maintenance jobs to serve where comprehensive information about individual maintenance jobs is required.

[1] A star at the beginning of the abstract indicates that the item is one of the REPAIR papers or presentations included in *Collected Papers Prepared Under Work Unit REPAIR Training of Electronics Maintenance Personnel*, Professional Paper 27-70, November 1970.

Summary Records of Repairs Reported by Field Radio Repairmen, V - Equipment Items Other Than AM or FM Sets and Associated Components, Staff Memorandum, July 1956 (REPAIR I). AD-489 010

This memorandum contains information from records of repair activities performed by field radio repairmen on equipment items *other than* AM or FM sets and associated components. The information was reproduced from 81 Repair Activity Forms completed by 56 radio repairmen. The forms were designed to obtain specific information about characteristics of equipment referrals and repairman procedures in troubleshooting and repair. They were distributed to working repairmen with instructions to fill them out while repairing equipment items. The purpose of this staff memorandum is to provide "case histories" of maintenance jobs to serve where comprehensive information about individual maintenance jobs is required.

Activities of Field Radio Repair Personnel With Implications for Training, by Harry A. Shoemaker, George H. Brown, and Joan M. Whittemore, Technical Report 48, May 1958 (REPAIR I). AD-200 941

Data were obtained on the activities of 1,085 field radio repairmen (MOS 296) in field units in the continental United States and the U.S. Army in Europe. Questionnaires, checklists, and interviews were used to (a) identify skills and knowledges critical to the repairman's job, (b) obtain evaluations from repair and supervisory personnel on training in relation to the job, and (c) determine field requirements to be used in developing a field-oriented proficiency test. Recommendations are given for changes in emphasis and modification in the Field Radio Repair course.

"REPAIR III: The Development and Evaluation of the Experimental Field Radio Repairman Course," by George H. Brown, briefing material, November 1958 (REPAIR III).

★A new course of instruction, developed jointly by the U.S. Army Signal School and HumRRO for the Field Radio Repairman (MOS 296) is described. To evaluate the new course, two groups of 86 men were trained, one in the experimental and one in the standard course, and compared on the Repair Proficiency Test Battery immediately after graduation. Experimental course graduates were found to be distinctly superior on four of the tests and at least equal in performance to the standard subjects on the remaining three.

Development and Evaluation of an Improved Field Radio Repair Course, by George H. Brown, Wesley C. Zaynor, Alvin J. Bernstein, and Harry A. Shoemaker, Technical Report 58, September 1959 (REPAIR II-III). PB-161321 AD-227 173

Information obtained in a field study was the basis for revising a course of instruction for Field Radio Repairmen, MOS 296.1. The new course emphasizes recognizing and correcting the most common troubles in the most frequently repaired items of equipment. In addition to providing the repairman with a systematic troubleshooting procedure, the new course incorporated "functional context training" features (e.g., theoretical material presented in a maintenance-oriented context). To evaluate the new course two groups of 100 students each were given the new course and the standard course respectively and were then administered a comprehensive battery of job-related proficiency tests. Graduates of the experimental course were superior on four of the tests (Trouble Shooting, Test Equipment, Repair Skills, and Achievement); neither group was superior on the remaining three tests.

"Development and Evaluation of an Improved Radio Repair Course," by George H. Brown, paper for American Psychological Association convention, Cincinnati, September 1959 (REPAIR III).

A new training course was developed for Army radio repairmen. The new course was characterized by: (a) the teaching of only those electronics fundamentals which could be explicitly related to the maintenance job, (b) more intensive instruction of fewer radio sets, (c) the use of a whole-to-part sequence instead of the traditional part-to-whole sequence in the instruction on specific sets. A group of 86 men trained in the new course was reliably superior to a matched group of 86 conventionally trained men on proficiency tests of troubleshooting skill, test equipment skill, and on a paper and pencil test of maintenance information.

"The Implementation of Functional Context Training in a Radio Repairman Course," by George H. Brown, paper for American Psychological Association convention, Cincinnati, September 1959.

★Functional Context Training, an instructional method that was developed through joint efforts of HumRRO and the U.S. Army Signal School is described, as is the experimental Field Radio Repair course that illustrates its use in electronics maintenance training. Principles for the development of lesson plans for the experimental course are presented.

"REPAIR IV: Comparison of Experimental and Standard Course Graduates After Field Experience," by George H. Brown, briefing to Signal Corps, [October 1959] (REPAIR IV).

★A followup study was undertaken nine months after graduation of 46 experimental course graduates and 47 standard course graduates with at least one month's full-time experience in Field Radio Repair. On the Field Radio Repair Proficiency Battery and an Experience Questionnaire, the experimental group was found to be no longer significantly superior on the most important tests, but still superior on the less important tests in the battery. Results of the tests are presented.

"The Functional Context Method of Instruction," by Harry A. Shoemaker, in *IRE Transactions on Education*, vol. E-3, no. 2, June 1960; issued as Professional Paper 35-67, 7 pp., July 1967. AD-656 939

The paper describes the functional context method of instruction for radio repair training. Although limited here to electronics, it is applicable in other types of training. The basic premise of the method is twofold: The context of the material to be learned must be meaningful to the learner and must at the same time be directly relevant to the goals of the training program. A "whole-to-part" training sequence is used rather than the conventional "part-to-whole" method. Within this framework, basic electronics is taught in the broader context of overall equipment functions and maintenance operations.

A Follow-Up Study of Experimentally and Conventionally Trained Field Radio Repairmen, by George H. Brown and Robert Vineberg, Technical Report 65, September 1960 (REPAIR IV). PB-152788 AD-245 468

Approximately 70 graduates each of an experimental and a conventional Field Radio Repair course were recontacted after about nine month's field experience to determine their relative proficiency at that time. The experimental course had emphasized recognition and correction of the most common troubles in the most frequently repaired items of equipment and provided the repairman with a systematic trouble-shooting procedure; it also incorporated "Functional Context Training" which featured, for example, presentation of theoretical material in a maintenance-oriented context. The experimental course had produced graduates who were markedly superior to the standard course graduates at the time of graduation. At the time of retesting, the two groups of graduates were substantially equivalent in their repair proficiency. It is concluded that although the instruction received by the experimental graduates was less oriented toward theory than was the standard instruction, this did not place the experimental subjects at any disadvantage as compared with the standard graduates.

"A Follow-Up Study of Experimentally Trained and Conventionally Trained Field Radio Repairmen," by Robert Vineberg and George H. Brown, paper for American Psychological Association convention, September 1960 (REPAIR IV).

★An experimental course strongly oriented towards the performance of the job in the field and embodying the application of an instructional method termed Functional Context Training was developed for Army radio repairmen. The end-of-course proficiency test battery was readministered to graduates of the experimental and standard courses after they had been in the field an average of nine months. The superiority of the experimental group which had existed at the time of graduation had largely disappeared. Initial high proficiency of the experimental group was not sustained under conditions of minimal exposure to relevant job activities.

Collected Papers Prepared Under Work Unit REPAIR: Training of Electronics Maintenance Personnel, Professional Paper 27-70, 39 pp., November 1970. AD-717 257

(REPAIR items included in this Professional Paper are indicated with a star at the beginning of the abstract.)

Papers in this collection report research in procedures in troubleshooting and repair of Army field radios that resulted in the construction of evaluations of the men and in experimental training courses.

RIFLEMAN—Division No. 3[1]

Improvement of the Combat Proficiency of the Light Weapons Infantryman (Research for the Department of the Army)

§*The Combat Subjects and Corresponding Proficiency Levels Essential to the 1962 Training Program for the Light Weapons Infantryman (MOS 111.0)*, by N.I. Fooks, John B. McKay, and John E. Taylor, Research Memorandum, December 1958 (RIFLEMAN I). AD-478 394

§*RIFLEMAN II: An Advancing Small Arms Target*, by Howard C. Sarvis, Research Memorandum, March 1959 (RIFLEMAN II). AD-478 298

§"Is This Enough?" by COL Henry E. Kelly, USA Ret., *Infantry*, vol. 50, no. 4, June-July 1960.

§*Critical Combat Skills, Knowledges, and Performances Required of the 1962 Light Weapons Infantryman (MOS 111.0)*, Research Memorandum, January 1961 (RIFLEMAN I). AD-634 513

§"The M14 Automatic?" by COL Henry E. Kelly, USA Ret., *Infantry*, vol. 52, no. 1, January-February 1962.

§"Integrative Behavior Versus Individual Skill Measurement as Predictors of Navigational Performance," by T.R. Powers, paper for American Psychological Association convention, St. Louis, 1962 (RIFLEMAN V).

Ability to navigate over unfamiliar terrain was assessed by a test which measured component skills separately and by negotiation of routes which offered three levels of navigational difficulty. Eight variables were used to define and control route difficulty. Results, based on the performance of 60 light weapons infantrymen, support the validity of the difficulty-defining variables and indicate that proficiency demonstrated on tests which measure skills separately does not necessarily predict proficiency on tasks which require an integration of skills. Scores on the Pattern Analysis test of the Army Classification Battery did not predict ability to negotiate routes.

§"Infantry Combat Training," by COL Henry E. Kelly, USA Ret., *Infantry*, vol. 52, no. 6, November-December 1962.

§*Performance Evaluation of Light Weapons Infantrymen (MOS 111.0), Graduates of the Advanced Individual Training Course (ATP 7-17)*, by T.F. Nichols, J.S. Ward, N.I. Fooks, F.L. Brown, and H.S. Rosenquist, Technical Report 81, December 1962 (RIFLEMAN III). AD-294 179

To evaluate combat readiness and to educe factors contributing to unsatisfactory performance, an evaluation exercise, which simulated the first 21 hours of combat experienced by replacements assigned to a rifle squad, was administered to 51 men upon completion of 16 weeks of basic and advanced military service. The men were evaluated individually in a variety of situations which required response to commands, decision making, and the choice and use of weapons under combat-like conditions. Acceptable levels of performance were defined by

[1] This Work Unit was initiated at Division No. 4. The symbol § indicates an item prepared at Divison No. 4.

military personnel familiar with each situation and with the conditions that prevailed during the evaluation. The results provide a detailed empirical basis for specific recommendations concerning instruction and tactical training designed to result in greater combat readiness at the end of 16 weeks of individual training.

§"The Quick or Dead," by COL Henry E. Kelly, USA Ret., and LTC Frank L. Brown, USA Ret., *Infantry*, vol. 53, no. 2, March-April 1963.

§*Instructor's Guide—Advanced Land Navigation: A Prototype Course*, Research Memorandum, July 1963 (RIFLEMAN V). AD-601 242

§"Rifleman or LWI?" by COL Henry E. Kelly, USA Ret., *Infantry*, vol. 53, no. 6, November-December 1963.

§*A Series of Experimental Investigations of the Land Navigation Process*, by Theodore R. Powers, Research Memorandum, January 1964 (RIFLEMAN V). AD-601 243

§*Advanced Land Navigation: Development and Evaluation of a Prototype Program of Instruction*, by Theodore R. Powers, Technical Report 89, April 1964 (RIFLEMAN V). AD-600 749

To enable infantrymen to acquire proficiency in advanced land navigation (ALN) techniques, an ALN performance requirement at the level of infantry advanced individual training (AIT) was developed in this study. Graduates of infantry AIT were tested on navigational routes of the level of difficulty prescribed by the performance requirement. This diagnostic assessment provided guidance for development of a 10-hour prototype program of instruction in ALN. The program was administered to 100 enlisted men whose performance was then evaluated on the prescribed navigational routes. In the experimental group, 50% of the men met the prescribed daytime performance requirement, as opposed to 5% of those without the experimental training; 76% met the performance requirement for nighttime navigation. The 10-hour program of instruction in ALN can be used to train enlisted men to navigate accurately over difficult, unfamiliar terrain under all conditions of visibility.

Development of Improved Rifle Squad Tactical and Patrolling Programs for the Light Weapons Infantryman, by Joseph S. Ward and N.J. Fooks, Technical Report 65-16, December 1965 (RIFLEMAN IV). AD-628 667

This report, on the final Sub-Unit of Work Unit RIFLEMAN, presents and evaluates the improved Rifle Squad Tactical and Patrolling training programs developed to increase the combat proficiency of the Light Weapons Infantryman in Advanced Individual Training (MOS 111.0). The specific objective was to enable the trainee (a) to integrate previously learned skills and knowledges into effective combat behaviors, (b) to coordinate their use with those of fellow squad members, and (c) to execute tactical actions on orders of squad leaders. The method of research included (a) observation of current training and interviews with experienced instructors at Army training centers in order to identify LWI performance deficiencies, (b) derivation of training content from official Army literature and RIFLEMAN I LWI job descriptions, and (c) sequencing of training content into learning units consisting of exercises to form a complete combat action, progressing from emphasis on individual skills to integration of those skills in the squad. The resulting experimental program was administered to two companies of AIT trainees at Fort Ord, California, and was rated as more, or much more, effective than existing programs.

"A Case Study of the Development of an Individual Combat Training Program," by Joseph S. Ward, paper for symposium at 12th Annual Army Human Factors Research and Development Conference, Fort Benning, Ga., October 1966, included in *Individual and Small-Unit Training for Combat Operations*, Professional Paper 21-67, May 1967 (RIFLEMAN III)

"Military Discipline and the Soldier," by COL Henry E. Kelly (USA, Ret.), *Infantry*, vol. 58, no. 3, May-June 1968

Research By-Products resulting from this research effort are listed in Part III

RIM—Psychological Warfare Division
Research on Methods of Interviewing Foreign Informants
(Research for the Department of the Army)

Research on Methods of Interviewing Foreign Informants, by Robert H. Beezer, Technical Report 30, August 1956. AD-104 751

The purpose of this study was to develop and improve methods for use in interviewing prisoners of war and refugees to obtain information of the sort useful in psychological warfare operations. Interviews were conducted with recent male refugees from the East Zone of Germany to assess the effect of four interrogation factors on the amount of information gained. The variables chosen were the educational level of the source, the interrogator, the manner of interrogation (formal or permissive), and the pattern of questioning. It was found that (a) more highly educated sources gave more information than did those with less education; (b) individual interrogators differed in their performance with sources of different educational levels; (c) the manner of interrogation had no significant effect (sources may have perceived the methods, as applied in this study, in substantially the same way); (d) variations in the pattern of questioning did not produce significant differences, but provocative statements yielded more information than related open-end questions.

RINGER—Division No. 5
Fidelity Requirements for Training Devices
(Research for the Department of the Army)

A Test of a Method of Converting Proficiency Scores to Learning Time Scores, by John A. Cox, Lynn M. Boren, and Robert O. Wood, Jr., Research Memorandum, June 1964 (RINGER 1). AD-601 943

This report describes a method of converting proficiency scores to learning time scores for use in evaluating alternate types of training devices using differences in learning times as the basis for comparison. It also recounts an empirical application of the conversion technique, and demonstrates the failure of the process to show valid prediction of learning time because of differences in the training methods used.

Functional and Appearance Fidelity of Training Devices for Fixed-Procedures Tasks, by John A. Cox, Robert O. Wood, Jr., Lynn M. Boren, and H. Walter Thorne, Technical Report 65-4, June 1965. AD-617 767

Twelve training devices of reduced fidelity were prepared. Several five-man groups were trained using each device, and then each man was given a proficiency test. Intelligence of trainees, teaching method, and instructor effects were statistically controlled. No significant differences in proficiency or length of training time were found to be associated with the training device used, regardless of degree of functional or appearance fidelity. As a field test under more realistic Army conditions, with military instructors and soldiers chosen at random, a low fidelity device was used to train one group while another group was instructed with high fidelity equipment. A comparison of proficiency levels and training times showed only chance differences between these two groups.

Research By-Products resulting from this research effort are listed in Part III.

ROCOM—Division No. 4

Development of Methods and Techniques for Improving the Output of ROTC (Research for the Department of the Army)

"The Development of a Basis for a Common Core Curriculum," by Theodore R. Powers, paper for American Psychological Association convention, Chicago, September 1965.

It was determined by a survey of General Military Science (GMS) course graduates that these junior officers are assigned many different types of duties, all showing a relatively low frequency of occurrence. The extensive range of assignments precluded the possibility of using any type of classical job analysis to identify knowledges and skills for a particular job. In partial fulfillment of the ultimate goal of determining training objectives for the GMS curriculum of the Army ROTC program, a method was developed to identify common knowledge and skill areas of various jobs that could be included under seven essential training dimensions. These common knowledge and skill areas were assigned a numerical rating based on frequency of appearance in job analysis literature and also frequency of assignment for ROTC graduates. Those areas having a high rating, and determined to be appropriate for ROTC instruction, will be expanded and clarified as a means of developing training objectives for the ROTC program. This detailed set of duty-oriented training objectives could then be used as a basis for curriculum development.

An Analysis of Initial Active Duty Assignments of Army ROTC Graduates, by Joseph W. Scott, Theodore R. Powers, and Paul Sucansky, Technical Report 66-16, 38 pp., October 1966 (ROCOM I). AD-801 363

To determine the nature and range of initial duty assignments of Army ROTC graduates, an analysis was conducted of Items 1 through 14 of the Officer Efficiency Report (DA Form 67-5) of 1,898 junior officers serving in 10 different branches. At least 520 different principal duties were identified that may be assigned to junior officers, although no one duty appeared in the total sample more than 12% of the time. Seven essential training dimensions were designated under which some 83% of the principal duties identified could be grouped.

"The Foundations for Leader Training," by Theodore R. Powers, paper for symposium at 12th Annual Army Human Factors Research and Development Conference, Fort Benning, Ga., October 1966; included in *Individual and Small-Unit Training for Combat Operations*, Professional Paper 21-67, May 1967. AD-653 845

"Infantry Platoon Leaders: A Changing Picture of Leadership," by COL Arthur J. DeLuca (USA, Ret.), *Infantry*, vol. 57, no. 5, September-October 1967.

Training Requirements for the General Military Science Curriculum of the Army ROTC Program, by Theodore R. Powers, Harry Kotses, and Arthur J. DeLuca, Technical Report 67-16, 60 pp., December 1967 (ROCOM I). AD-665 034

As part of research toward improving the effectiveness of Army ROTC training, training requirements were developed that could be used as a basis for revising the Army ROTC general military science (GMS) curriculum. On the basis of an earlier study analyzing initial duty assignments of Army ROTC graduates, the generalized instruction areas that would be appropriate for the largest number of graduates were identified, and statements of training requirements were developed. Two appendices are included, which present (a) specific knowledge and skill areas within ranked descriptive dimensions, and (b) duty-oriented training requirements for the Army ROTC GMS curriculum.

Research By-Products resulting from this research effort are listed in Part III.

ROTOR–Division No. 6 (Aviation)
Design of Rotary Wing Training Devices
(Research for the Department of the Army)

"A Review of the Analysis of Visual Discriminations in Helicopter Control," by J.R. Thielges and W.G. Matheny, paper for annual meeting of Southwestern Psychological Association, Arlington, Tex., April 1966 (Subcontractor: Life Sciences, Inc.); issued as Professional Paper 4-66, June 1966. AD-636 579

As part of the research on rotary wing training devices, an analysis was conducted of the necessary and sufficient cues for maintaining vehicle stability in pitch, roll, yaw, altitude, range, and latitude, and a model was developed that expresses the relation between the cue sources and the information they provide about stability in flight. This paper discusses that part of the analysis that deals with the cue structure of the pilot's visual environment and the development of the model.

Functional Requirements for Ground-Based Trainers: Helicopter Response Characteristics, by W.G. Matheny and L.E. Wilkerson, Technical Report 70-17, 115 pp., October 1970 (ROTOR I). (Subcontractor: Life Sciences, Inc.) AD-714 954

The overall research purpose was to develop methods for analyzing the helicopter pilot's control tasks, as a basis for deciding characteristics needed in a ground-based trainer for use in pilot training. This report covers one phase, the response characteristics of the helicopter as it reacts to control inputs and external forces. Analyses were made of (a) characteristics of each dimension of control, (b) interaction among the dimensions, (c) effect of external forcing functions such as wind, (d) information the pilot receives by kinesthetic feedback from the controls. A measure of man-machine system characteristics was postulated—the "effective-time constant," the time it takes for the displayed output of the system to rise above the pilot's threshold of perception. Dealing with the effects of interaction among the controls proved to be one of the most difficult pilot tasks; of the single dimensions, pitch control is the most difficult. The characteristics of the system were identified in such a way that they can be varied quantitatively in research on task difficulty and transfer of training.

Analysis of Visual Discriminations in Helicopter Control, by J.R. Thielges and W.G. Matheny, Technical Report 71-13, 161 pp., June 1971 (ROTOR I). (Subcontractor: Life Sciences, Inc.)

The Visual Discrimination Analysis is a method of examining the cue structure of the helicopter pilot's visual environment. It is hypothesized that the critical cue is the relationship between two referents—a fixed internal referent placed on the helicopter windscreen and an external referent located on the ground plane. Cue value is analyzed through the geometric realtionships of these referents for the six degrees-of-freedom: pitch, roll, yaw, altitude, range, and latitude. The pilot's ability to detect perturbation will depend upon its magnitude, initial state of the craft, location of the internal and external referents, and his threshold for detecting the relative motion of two points. A mathematical model is used to generate data for a sample analysis of pitch, and the data are graphed to explore referent placements that provide detectable cues. The "information density plot" is then developed as a means of examining the cue value of an entire field of external referents with respect to one or more internal referents.

SAMOFF—Division No. 5

Systematic Analysis of Training Requirements and Procedures for Surface-to-Air Missile Battery Officers
(Research for the Department of the Army)

"Job Requirements of NIKE AJAX Battery Officers," by William F. Brown, Charles L. Darby, and Charles D. Smith, paper for annual meeting of Southwestern Psychological Association, Spring 1958.

Survey of Opinions of Graduates of the Surface-to-Air Missile Officer Basic Course, by Charles L. Darby, John L. Morse, and William F. Brown, Staff Memorandum, August 1958 (SAMOFF I). AD-487 524

The Effect of Intercession and Altruistic Appeals Upon Questionnaire Return Rates, by Charles L. Darby, Ronald A. Gardner, and William F. Brown, Staff Memorandum, January 1959 (SAMOFF I). AD-487 768

The Development of Job Descriptions for NIKE AJAX Battery Officers, by Charles L. Darby, William F. Brown, Charles D. Smith, and Walter J. Fightmaster, Technical Report 54, April 1959 (SAMOFF I). PB-143565 AD-216 118

This study is the first stage of a research project designed to determine the level of skill and knowledge required of officers assigned to Nike-Ajax batteries, so that courses of instruction can be scientifically devised to train officers for maximum effectiveness. Job descriptions were developed for the positions of Battery Commander, Battery Executive Officer, Integrated Fire Control Platoon Leader, and Launcher Platoon Leader. Information was obtained from experienced battery officers, based on the job descriptions, through checklist responses indicating the training needs associated with selected activities. The activities judged most important for all four officer positions were: serving as battery control officer, insuring equipment readiness, and training and evaluating operators.

"The Advent of the Kylcystics," by C.D. Smith, *Journal of the American Society of Training Directors*, May 1959.

Weighted Scores, Ranks, and C-Scale Scores for Evaluated Activities of Job Descriptions of NIKE AJAX Battery Officers, by Charles L. Darby, William F. Brown, and John L. Morse, Research Memorandum, June 1959 (SAMOFF I). AD-488 600

"Proficiency Testing: A Tool for Training Management," by Robert G. Smith, Jr., *Armed Forces Management*, vol. 5, no. 12, September 1959.

"Research on Air Defense Missile Officers," by J.C. Rupe, paper for symposium at annual meeting of Southwestern Psychological Association, Spring 1960.

The Revision of NIKE Platoon Leader Job Descriptions: AJAX to HERCULES, by Edgar M. Haverland and Walter J. Fightmaster, Technical Report 62, May 1960 (SAMOFF I). PB-148064 AD-237 679

This report describes the sources of information and 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-Hercuues platoon leader jobs. It outlines the methods found generally useful for revising and developing job descriptions to keep them up to date, and recommends their use by training agencies. The Hercules fire control and launching platoon leader job descriptions developed in this study are included in the appendix to the report.

SAMOFF *(Cont.)*

Measurement of the Job Proficiency of Nike Ajax Platoon Leaders, by John L. Morse, William F. Brown, Robert G. Smith, Jr., and Walter J. Fightmaster, Technical Report 66, October 1960 (SAMOFF II). AD-246 769

The SAMOFF Proficiency Test was developed to provide standardized testing materials and procedures to assess the proficiency of Nike-Ajax platoon leaders. The test, which consists of eight stations with both performance and written items, was administered experimentally to students about to graduate from the Surface-to-Air Missile Officer Basic Course and to unit-experienced Nike-Ajax platoon leaders. The test was judged to be suitable for administration by Army personnel to identify areas in job performance that require more training.

"Officer Training Research and Its Implications for Executive Training," by Edgar M. Haverland, paper for symposium at American Psychological Association convention, New York City, September 1961; issued as Professional Paper 19-69, 12 pp., May 1969. AD-688 813

A pragmatic approach to the problem of training military supervisors of technical personnel is suggested for executive training in this paper. In this "end-product system performance" point of view, the job is defined and structured by detailed task descriptions. Training involves the statement of precise and specific objectives.

"The Subject-Matter Expert and the Programmer," by Edgar M. Haverland, paper for meeting of Texas Psychological Association, December 1961.

"How Much Technical Knowledge Does a Military Officer Need?" by Edgar M. Haverland, paper for meeting of Southwestern Psychological Association, 1962 (SAMOFF IV).

"Description of Supervisory Jobs," by Harry L. Ammerman, paper for meeting of Midwestern Psychological Association, 1963 (SAMOFF III).

"Job Objectives and Motivation," by Edgar M. Haverland, paper for meeting of Southwestern Psychological Association, 1963. (SAMOFF IV).

Manual of Procedures for Deriving Training Objectives for Junior Officers, by Harry L. Ammerman, prototype manual, November 1964 (SAMOFF III). AD-634 510

A Model of Junior Officer Jobs for Use in Developing Task Inventories, by Harry L. Ammerman, Technical Report 65-10, November 1965 (SAMOFF III). AD-624 048

A job description procedure was developed for use by Army service schools in identifying all of the tasks performed by junior officers in a job assignment. This procedure was based on a model of officer job behavior, illustrating the nature and sequence of tasks performed to attain specific goals within each area of responsibility. The behavior model was itself developed from considerations of existing job descriptions, the nature of job information typically provided by interviews with officers, and an information-processing view of purposive behavior. Application of the description technique to one officer job yielded 816 tasks covering troop leadership and unit management, as well as tactical and technical functions. General statements of work were effectively broken into task-level statements of job activities. The technique should provide a practical means for describing most supervisory and command jobs characterized by a high proportion of variable, nonroutine, and covert activities.

Performance Aids for Junior Officers, by Harry L. Ammerman, Technical Report 65-11, December 1965 (SAMOFF III). AD-629 301

This study summarizes the comments and suggestions of 57 air defense battery officers concerning the types of managerial aids that would be useful for junior officer performance and learning. Based on discussions, a suggested format for a handbook was developed covering what the inexperienced unit officer needs most to know about operational and system checks of electronic equipment. Suggestions about the nature and content of desired aids should be applicable in many other junior officer managerial job situations.

SAMOFF *(Cont.)*

Development of Procedures for Deriving Training Objectives for Junior Officer Jobs, by Harry L. Ammerman, Technical Report 66-3, May 1966 (SAMOFF III). AD-633 167 ED-017 759

Research was undertaken to develop a systematic method that could be used by service school personnel to prepare job-oriented training objectives for junior officers, primarily in the form of behavioral statements of student performance expected after training. The procedures developed are divided into four phases: A—Listing of all tasks for a job; B—Selecting tasks for some formal training; C—Identifying the training emphasis needed in the selected tasks; D—Specifying the knowledges and skills necessary for the selected training aspects. The procedures included administration of experimental questionnaires, both by personal interview and by mail, reviews of pertinent directives and publications, and visits to field units. As the procedures were developed, they were tried out on a sample officer job (Nike-Hercules Fire Control Platoon Leader). In the trial application, a task inventory of 452 items provided the basis for choosing, by use of definite selection rules, 101 job activities (22%) for some formal schooling, of 160 training objectives stated for these activities, 46 were performance-type objectives for which detailed activity descriptions were required. It is believed that use of these procedures by service school personnel to prepare junior officer training objectives is feasible, and that these procedures provide a method for deriving behavioral statements of relevant and essential objectives.

Development of Technical Training Materials for Nike Hercules Junior Officers, by Edgar M. Haverland, Technical Report 66-6, June 1966 (SAMOFF IV). AD-634 301

The checks and procedures necessary to determine whether the major functions of the Nike-Hercules fire control system could be satisfactorily accomplished were chosen, and programed instructional materials were written to teach junior officers the relevant technical information. Evaluation of these materials indicated (a) that they taught a substantial amount of technical information additional to that taught in the Officer Basic Course (44-A-C20) at the U.S. Army Air Defense School, and (b) that more technical information was learned from the SAMOFF IV programed instruction than was learned from directed study of existing Army reference material.

Research By-Products resulting from this research effort are listed in Part III.

SCALO—Motivation, Morale, and Leadership Division

A Further Study of Linear Segments Technique of Scalogram Analysis Including the Problem of Reliability

(Research for the Department of the Army)

"Linear Segments: A Technique for Scalogram Analysis," by Eric Marder, *Public Opinion Quarterly*, vol. 16, Fall 1952 (Subcontractor: International Public Opinion Research, Inc.).

According to the author, scalogram analysis using the wooden Guttman board and its steel balls is often tedious, expensive, and visually unsatisfactory. He proposes the use of a board that uses written erasable marks to reduce the labor involved in scale analysis. The advantages claimed for this procedure and equipment are greater ease in counting errors, ordering respondents, and combining response categories; comparative simplicity and economy of construction of the board; and simplicity in applying the visual criteria.

SCHOOL BUS SAFETY–Division No. 1 (System Operations)
Study of School Bus Safety
(Research for the Department of Transportation)

The Selection and Training of School Bus Drivers, by A. James McKnight, Carolyn M. McClelland, and Mary E. Berry, (HumRRO Technical Report 71-3), Department of Transportation Technical Report, DOT Contract FH-11-7339, 251 pp., February 1971.

A set of selection requirements and training objectives for operators of school buses was developed. The selection requirements included personal history and other background information, physical examination, written knowledge tests, an on-road performance test, and an attitude measure. Training objectives covered all aspects of school bus operation and were specified at three different levels in order that training might be adapted to the resources of individual school districts. The following sources were used: (a) A review of the literature relating individual characteristics to safe driving, (b) an analysis of the school bus operator's tasks, (c) a comparison of the background characteristics of high- and low-rated operators, (d) the opinions of pupil transportation authorities, and (e) observations of and interviews with school bus operators.

SCOPE–Division No. 1 (System Operations)
Survey of the Educational and Training Programs of the AA and GM Branch, the Artillery School, Ft. Bliss, Texas
(Research for the Department of the Army)

Survey of the Educational Program of The Artillery School, Antiaircraft and Guided Missiles Branch, Fort Bliss, Texas, Special Report 1, December 1952. PB-156350 AD-2 314

Experts in vocational education, tests and measurements, and teaching methods surveyed the Artillery School to evaluate and suggest improvements in (a) methods of instruction, training devices, and use of auditory and visual aids; (b) organization of course content for instruction and practice; and (c) methods of determining student progress and proficiency. Another objective was to identify problems that might be the subject of experimental research. Detailed recommendations were presented in connection with the various departments of the school, its organization, the grading and evaluation system, and the student body.

SHOCKACTION—Division No. 2

Evaluation and Improvement of Individual Training for Tank Crewmen (Research for the Department of the Army)

"Who Will Command Our Tanks?" by Robert A. Baker, *Armor*, vol. LXVI, no. 3, May-June 1957 (SHOCKACTION I).

The Determination of Job Requirements for Tank Crew Members, by Robert A. Baker, Technical Report 47, May 1958 (SHOCKACTION I). PB-134629 AD-202 155

As a first step in improving tank crew proficiency, a study was made of what each member of a tank crew needs to know in order to do his job. Training literature and crew activities were studied and experienced officers were consulted. Lists of job requirements covering the duties and skills for the four crew positions (tank commander, gunner, driver, loader) were established. The lists are being used in the construction of an experimental armor replacement training program and are potentially useful in various aspects of training and performance evaluation.

An Evaluation of the On-the-Job Proficiency of Trained Tank Crewmen, by Robert A. Baker, Eugene F. MacCaslin, Kenneth H. Kurtz, and Donald J. Baerman, Special Report 14, June 1958 (SHOCKACTION IV). PB-135143 AD-200 849

This study sought to determine (a) the armor knowledge and operational skill of trained, experienced tank crewmen and (b) the existing degree of crew interchangeability (i.e., how well crew members can serve in other crew positions as well as their own). Knowledge and performance tests on the essential armor skills (given to 256 TOE tank crewmen) showed that individual proficiency levels are low; job activity records showed that little time is given to training in TOE units. Paper-and-pencil tests on the four crew jobs (given to 715 TOE crewmen) showed that crew members tend to specialize rather than to be interchangeable.

The Achievement of Active-Duty and Reserve Tank Crewmen in Areas of Essential Armor Knowledge, by Robert A. Baker, Special Report 15, November 1958 (For Official Use Only) (SHOCKACTION III). AD-210 506

The purpose of this study was to determine (a) the level of fundamental armor skills of tank crew enlisted personnel in active-duty units, and (b) the status of armor training in the National Guard and the U.S. Army Reserve. The Armor Proficiency Test, a 198-item paper-and-pencil test, was administered to more than 5,000 armor personnel at five levels of training and experience: (a) armor personnel with no armor training, (b) armor personnel with eight weeks of Advanced Individual Armor Training, (c) tank crew personnel in TOE armor organizations within the continental United States, (d) tank crew personnel maintained at "combat-ready" status in Europe, and (e) tank crew personnel from National Guard and U.S. Army Reserve armor units. Information was obtained on aptitude, crew assignment, enlisted rank, previous training and experience in armor, and combat experience of the individuals tested. In addition, information was obtained from the unit commander or Army advisor, or both, at each of the reserve units on strength and training status and problems. (U)

The Effects of Increasing and Decreasing Training Time on Proficiency in the Critical Armor Skills, by Robert A. Baker, Boyd L. Mathers, and Eugene G. Roach. Technical Report 55, June 1959 (SHOCKACTION V). PB-142051 AD-218 272

As a basic step toward increasing efficiency in armor training, this study was conducted primarily to determine how the proficiency of the typical armor trainee varies, in the most important skill areas, with the amount of instruction time. Secondary purposes were (a) to identify skills not easily mastered with increased practice alone, and (b) to determine the effect of aptitude on learning these skills. Twenty subjects and skills were selected by armor training personnel as the most important subjects covered in the AIT phase of ATP 17-201. Comparable groups (120 per group) received training for the standard period or for half, twice, or three times the standard period in the selected subject matter, and were tested after completing each instruction unit. Results were compared by training time and by aptitude level, and the most difficult skills were identified. Recommendations for developing improved training methods are discussed.

SHOCKACTION *(Cont.)*

"Tank Commander Training in the Reserve Components," by Robert A. Baker, *Armor*, vol. LXVIII, no. 4, July-August 1959 (SHOCKACTION III).

An Improved Advanced Individual Training Program for Armor, by Eugene F. MacCaslin, Arnold B. Woodruff, and Robert A. Baker, Technical Report 59, December 1959 (SHOCKACTION VI). PB-145134 AD-230 320

As the final phase in research on tank crew proficiency, an experimental Armor AIT program was developed to improve training for the jobs of tank driver, loader, and gunner. Performance of a company trained by the six-week experimental program was compared with performance of a control company just completing the standard eight-week AIT program. The experimental company performed better than the control company in 11 of 21 skill areas tested, including the more complex gunnery skills essential in combat, and scored comparably in 7 skill areas. Adoption of the experimental program was recommended as requiring less time and training cost, without lessening proficiency in essential armor crew skills. The principles and techniques used in the training program for improving instruction were recommended for use, where appropriate, in other Army training programs.

The Tank Commander's Guide (3d edition), by William L. Warnick, LTC John G. Cook, USA Ret., and Robert A. Baker (eds), The Stackpole Company, Harrisburg, Pa., September 1963 (SHOCKACTION I).

Research By-Products resulting from this research effort are listed in Part III.

SIAF—Division No. 4

Selection and Training for Small Independent Action Forces
(Research for Advanced Research Projects Agency)

Selection and Training for Small Independent Action Forces: System Analysis and Development of Early Training, by Joseph A. Olmstead and Theodore R. Powers, HumRRO Technical Report 70-102, U.S. Army Missile Command, Advanced Research Projects Agency Contract Nr. DAAH01-70-C-0488, 43 pp., September 1970. AD-875 453

This report describes the analysis of Small Independent Action Forces (SIAF) operational requirements, the identification of job-relevant activities of SIAF personnel, and the development of training for certain Identified Critical Areas. The latter are Land Navigation, Delivery of Indirect and Aerial Fire Support; Human Maintenance and Survival; Use of Camouflage, Cover, Concealment, and Stealth; Tracking; and Communications. The research was performed during the first phase of a project whose objective is the development of procedures for selecting and training SIAF personnel. The analysis has provided points of departure for the development of knowledges and skills, performance standards, and selection and training procedures, which are described herein.

SIMULATE—Division No. 2

Development of New Simulation and Miniaturization Concepts to Meet Army Training Needs (Research for the Department of the Army)

Combat Job Requirements for Principal Staff Personnel: Division, Brigade, and Battalion, by Robert A. Baker, Technical Report 70-23, 134 pp., December 1970 (SIMULATE II). AD-722 248

Lists of combat job requirements for commanders and staff officers at division, brigade, and battalion levels were prepared on the basis of interviews with experienced job incumbents. The preliminary lists were reviewed by ROAD division officers, by command and instructor personnel at the U.S. Command and General Staff College, the U.S. Army Armor and Infantry Schools and the U.S. Continental Army Command (CONRAC). The lists were revised to take the review comments into account, and were revised again to reflect the consensus obtained through school staff conferences on the materials. The final criterion lists appended to this report are considered to be of use in planning, preparing, and conducting school, on-job, and field training for command and staff personnel at general and unit staff levels.

SKYFIRE—Division No. 5[1]

Training Methods for Forward Area Air Defense Weapons (Research for the Department of the Army)

Studies on Training Ground Observers to Estimate Range to Aerial Targets, by Michael R. McCluskey, A.D. Wright, and E.W. Frederickson, Technical Report 68-5, 58 pp., May 1968 (SKYFIRE I). AD-669 963

Six pilot studies were conducted to determine the effects of training on range estimation performance for aerial targets, and to identify some of the relevant variables. Observers were trained to estimate ranges of 350, 400, 800, 1,500, or 2,500 meters. Several variations of range estimation training methods were studied, including immediate knowledge of results after making an estimation, "paired associate" presentation of observed aircraft position with actual range information, and the use of an occluding object as a range estimation aid. Two variables that tended to influence performance were aircraft elevation and incoming-outgoing directions of flight.

Determination of Ground-to-Aircraft Distances by Visual Techniques, by Robert J. Foskett, Technical Report 69-22, 42 pp., December 1969. AD-701 151

The accuracies of two visual methods of determining specific ground-to-aircraft distances were compared. Using the Flyover method, training assistants signaled when the aircraft flew over markers placed at known distances from the training site. Using the Range Sight method, training assistants used a ranging device similar to a protractor to indicate when an aircraft passed each of several reference markers corresponding to known distances and angles from the training site. Comparison of the accuracy of each radar measurement of the positions indicated that, in general, the Flyover method was more accurate, although the Range Site method was of acceptable accuracy under certain conditions and was more economical. Data were also obtained on the navigational accuracy of the aircraft flying at various speeds and altitudes over ground courses marked intermittently or continuously.

accuuacy of the aircraft flying at various speeds and altitudes over ground courses marked intermittently or continuously.

[1] For earlier work in this area, see Exploratory Research 44.

Methods of Training for the Engagement of Aircraft With Small Arms, by E.W. Frederickson, Robert D. Baldwin, and Robert J. Foskett, Technical Report 70-2, 54 pp., February 1970. AD-703 507

Studies were performed to develop low-cost techniques for training infantrymen to engage low-flying aircraft with small arms. The first approach included training on estimating distance, leading, and tracking, using a special training device. After training, in live firing using a sleeve target towed at low altitudes, 16 riflemen obtained 10 hits for 960 rounds fired. It was estimated that 4% of the rounds would have hit a full-size aircraft. In the second approach, a miniaturized program used air rifles against 1/10-scale aircraft silhouettes. This training was also evaluated by a live-firing test. The 20 men who received the training achieved 13 hits for 1964 rounds fired; another group of 20 untrained riflemen obtained 4 hits for 2000 rounds. Adjusting for reduced target size, it was estimated that the hit percentages would be 2.3% and 0.7%, respectively. It was concluded that while both approaches to training were effective, the miniaturized program could be improved by incorporating the leading/tracking training device used in the initial method.

Auditory and Visual Tracking of a Moving Target, by Edward W. Frederickson and Robert A. Donohue, Technical Report 70-4, 23 pp., March 1970. AD-704 701

A test of target tracking accuracy was conducted, comparing individual performances of auditory and visual tracking. Aiming and pointing responses were compared for both tracking modalities and for approaching vs. departing target aspects. Comparison of mean auditory tracking location errors corrected (for acoustic lag) with mean visual tracking location errors showed that the mean auditory location errors increased as the target-to-observer distance increased, whereas mean visual location errors remained constant. When both constant and variable errors were combined into a measure of total human error, the Dispersion Index, total auditory tracking error was found to be greater than total visual tracking error across all treatment conditions. There were no significant differences found between mean aiming vs. pointing performances. Direction (incoming vs. outgoing and left-to-right vs. right-to-left) also did not influence tracking accuracy.

Aircraft Recognition Performance of Crew Chiefs With and Without Forward Observers, by Robert D. Baldwin, Edward W. Frederickson, and Edward C. Hackerson, Technical Report 70-12, 32 pp., August 1970. AD-714 213

A test of aircraft recognition accuracy and decision speed compared the performance of single observers and four-man crews, using miniaturized simulations of aircraft which were moved at scaled speeds, altitudes, and distances. The validity of the simulation was judged acceptable, by comparing it with results of a previous full-scale test. Approximately 50% of the observers performed more effectively when alone than when with a crew, both in accuracy and decision speed. The remaining observers performed either equally well, or more effectively when with a crew than when alone. These two groups of observers were found to prefer different communication sequences. The more effective crew observers tended to be less dependent upon other crewmen judgements than the less effective crew observers.

SKYGUARD—Division No. 5
Curriculum and Instructional Improvements for the Air Defense Artillery Officer Advanced Course
(Research for the Department of the Army)

"Work Unit SKYGUARD: Air Defense Officer Course," by Paul G. Whitmore and Harry L. Ammerman, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970.

This paper describes a joint effort between HumRRO and the U.S. Army Air Defense School to develop an improved Air Defense Officer Advanced Course with the objectives of preparing the officer to perform duties required in AD branch assignments, in branch immaterial assignments, and for achievement at the Command and General Staff College.

Research By-Products resulting from this research effort are listed in Part III.

SOJOURN—Division No. 7 (Social Science)
Overseas Military Posts and Communities
(Research for the Department of the Army)

"Some Guide to Interpretation of School Enrollment Figures Among Americans Overseas in the 1960 Census," by Harley M. Upchurch, paper for annual meeting of American Statistical Association, Washington, December 1967; issued as Professional Paper 8-68, 12 pp., March 1968. AD-667 822

Written from the point of view of a user of U.S. census data, this paper deals with interpreting and analyzing the data provided on overseas school enrollments, as well as the collection and processing functions. It is suggested that educational characteristics of children overseas be given special emphasis in future enumerations.

Toward the Study of Communities of Americans Overseas, by Harley M. Upchurch, Professional Paper 14-70, 22 pp., May 1970. AD-708 779 ED-045 480

Increased United States involvement in world affairs has been accompanied by an increase in the number of Americans living abroad in numerous American enclaves. Most of the commentary on such "overseas American communities" is impressionistic, superficial, and stereotyped, and tends to foster the notion that Americans are peculiarly ethnocentric. Such an assumption ignores the fact that whenever a fairly large number of persons from one country reside abroad, they tend to cluster into enclaves that provide havens from "culture shock." It is suggested that systematic, objective, and empirical descriptions of such communities could make a valuable contribution to the study of migration, acculturation, and communities in general. To that end, a frame of reference derived from past studies is proposed, both as a generic concept and a subcultural category. Data would be generated that would permit an analysis of the relationship between community characteristics and cross-cultural interaction and attitudes.

SPANOCON—Division No. 2

Human Factors Influencing Span of Control Within Military Organizations[1] (Research for the Department of the Army)

SPANOCON: Span of Control, 2. Effect on Reliability of Free and Forced Distributions in Rating, by Dennis Cannon and Howard C. Olson, Research Memorandum, August 1961; paper for American Psychological Association convention, New York City, 1961 (SPANOCON II). AD-488 615

In evaluating performance with a rating scale, it was questioned whether forcing the distribution of responses would affect the reliability of the responses. Seventy-nine subjects responded to 51 situational leadership problems on two tests. Three raters independently scaled the 79 subjects' responses to each problem, using a five-point scale, first rating without regard to the ultimate distribution of responses, and then forcing the distribution into an essentially normal, symmetrical shape. Reliabilities estimated by intraclass correlation ranged from .72 to .88. There were no significant differences between the reliabilities resulting from the free distribution and the forced distribution ratings.

"Simulation of the Demands on Leadership During Combat," by Howard C. Olson, paper, January 1962.

*In a simulation of the military field leadership demands of combat, officers are placed in a laboratory situation where they must issue orders and take appropriate action to accomplish the mission of a platoon of tanks. The nature of the simulation makes it possible to systematically vary the kind and quantity of information being handled. Success in management—of a tank platoon or of a business organization— is assumed to devolve to skill in information handling.

"Improvement in Performance on a Leadership Game as a Result of Training in Information Handling," by Howard C. Olson, paper, March 1962.

*In this study it was assumed that the critical element of a leader's performance is his skill in processing information, and that this skill is trainable. After 30 young Army officers were pretested on a leadership game, they were divided into two groups. One group of 15 received three days of instruction in principles of information handling; the other received no instruction. All were posttested on the game. The group that received training performed reliably better after training ($p<.02$); the group that received no training did not improve reliably in performance.

SPANOCON: Span of Control, 1. Development of a Knowledge-Free Span of Control Test, by Alfred A. Longano, L. Dennis Cannon, and Howard C. Olson, Research Memorandum, May 1962 (SPANOCON II). AD-488 614

The report describes the Knowledge-Free Span of Control Test (K-F Test), which was designed to increase knowledge of four functions of span of control in a setting in which specific knowledge will have a minimal effect on test performance. The particular functions tested were span of attention, memory, planning, and judgments. Test apparatus is described and illustrated. Appendices show construction and operation of test, test manual, and test items.

Collected Papers Prepared Under Work Unit SPANOCON: Human Factors Influencing Span of Control Within Military Organizations, Professional Paper 24-69, 12 pp., June 1969.

Problems of leadership in military situations were studied in realistic experimental settings with experienced officer-subjects, as described in papers on simulation of the demands on leadership during combat, and improvement in performance on a leadership game as a result of training in information handling.

[1] A star at the beginning of the abstract indicates that the item is one of the SPANOCON papers included in *Collected Papers Prepared Under Work Unit SPANOCON: Human Factors Influencing Span of Control Within Military Organizations*, Professional Paper 24-69, June 1969.

SPECIAL—Executive Office[1]

Training in Special Warfare, Counter-Insurgency and Related Missions (Research for the Department of the Army)

Unconventional Warfare: An Annotated Bibliography of Paperback Books, by Franklin Mark Osanka, Research Memorandum, August 1962. AD-295 022

A Bibliography on the Role of Air Power in Guerrilla and Counterguerrilla Operations, by Franklin Mark Osanka, Research Memorandum, November 1962. AD-295 020

Counterinsurgency Training: A Selected Subject Bibliography, by Franklin Mark Osanka, Research Memorandum, November 1962. AD-295 021

Guerrilla Warfare Readings, Franklin Mark Osanka (ed.), Research Memorandum, December 1962. AD-808 822

SPECTRUM—Division No. 3[2]

Development of Effective Training Across All Aptitude Levels (Research for the Department of the Army)

Differential Approaches to Training, by John E. Taylor and Wayne L. Fox, Professional Paper 47-67, 12 pp., November 1967; based on paper for NATO Conference on Manpower Research in the Defense Context, London, England, August 1967; and on paper, "Adaptation of Training to Individual Differences," for symposium at American Psychological Association convention, Washington, September 1967. AD-665 056 ED-019 624

Training tasks of varied complexity were presented under laboratory conditions to newly inducted Army basic trainees who were divided into three groups—high, middle, and low—on the basis of their Armed Forces Qualification Test (AFQT) scores. Learning performance was found to be directly and highly related to aptitude level. In some tasks, group differences were in rate of learning only; in others, the groups differed in rate and in final levels of performance. Individual performance was highly consistent across tasks. Performance was found to be related to training method for both high and low aptitude groups. The low aptitude trainees did poorly on all tasks, taking an average of two or three times as long to learn as the higher aptitude trainees.

[1] Related research is reported under Work Units CIVIC and AREA.

[2] SPECTRUM became a Basic Research effort in FY70.

SPECTRUM *(Cont.)*

Development of Two Automated Programs for Teaching Military Justice to Men of Various Aptitude Levels, by Morris Showel, Technical Report 68-8, 32 pp., June 1968 (SPECTRUM I). AD-673 038

In an effort to build programs to teach cognitive-type material to men of widely differing aptitudes, exploratory work was conducted in Military Justice, one of the more abstract subjects in Basic Combat Training. Objectives were identified and alternative tape and slide training programs developed—one Slow-paced (designed for low-aptitude men), the other Fast-paced (for high-aptitude men). The programs differed most in speed of presentation and amount of repetition. One group of trainees attended the Slow program, and a comparable group, the Fast program; both groups were made up of trainees with a similar distribution of AFQT scores. Both groups were tested immediately after the class to measure recall and again four weeks later for retention. A comparable group of trainees was tested before attending any Military Justice classes to measure entry-level knowledge. Men at all levels of aptitude learned from the programs and tended to remember what they had learned. The programs did not have differential effectiveness for men of different aptitudes. Whatever their aptitude, the trainees who took the Fast program were more favorable to it than trainees who took the Slow program were toward it.

"Aptitude Level and Performance in Simple and Choice Visual Monitoring Tasks," by Wayne L. Fox, paper for meeting of Psychonomic Society, St. Louis, Mo., October 1968; *Journal of Experimental Psychology*, vol. 81, no. 1, July 1969, issued as Professional Paper 28-69, 6 pp., September 1969. AD-696 032

The performance of 77 high- and 80 low-aptitude subjects on simple and choice visual monitoring tasks was studied under conditions designed to assess the effect of attention on response time. A Non-Alerted condition (blank stimulus display) and an Alerted condition (warning signal preceding the stimulus) were compared to a Blinking Light condition of a previous study, where the subject was confronted with a "blinking lights" stimulus display and relatively long interstimulus intervals. Results indicated highly consistent aptitude differences on both tasks.

"Training Strategies and Individual Differences," by Howard H. McFann, paper for the Adult Basic Education Research Conference, University of Chicago, March 1969. *Adult Basic Education: The State of the Art*, Department of Education, University of Chicago, March 1970; issued as Professional Paper 12-71, 16 pp., June 1971.

Various training strategies are examined in this paper and the implications of each for handling individual differences are considered. Some research findings pertinent to the strategies are given. Instructional procedures and techniques, especially for use with low-ability students, are included.

Aptitude Level and the Acquisition of Skills and Knowledges in a Variety of Military Training Tasks, by Wayne L. Fox, John E. Taylor, and John S. Caylor, Technical Report 69-6, 54 pp., May 1969 (SPECTRUM II). AD-688 263

To assess the effects of wide differences in aptitude on the acquisition of military knowledges and skills, a sample of 183 Army recruits was divided into three maximally distant aptitude groups on the basis of their AFQT scores: High aptitude, AFQT 90-99; Middle aptitude, AFQT 45-55; Low aptitude, AFQT 10-21. Each recruit was individually trained to a performance criterion in differing combinations of a battery of eight tasks representative of Army training. A variety of supplementary psychometric, scholastic achievement, and BCT attainment data were analyzed. The results were consistent in demonstrating large differences related to aptitude. As groups, high aptitude individuals excelled, low aptitude individuals did poorly, and middle aptitude groups fell in an intermediate range on all measures.

"Factors Related to Individual Training," by John E. Taylor, paper for 15th Annual Army Human Factors Research and Development conference, Fort Ord, Calif., November 1969; issued as Professional Paper 11-70, 8 pp., April 1970. AD-706 338 ED-042 126

In this paper a resume of the findings of ongoing research on the design of strategies for conducting individual training is presented. Studies being conducted, both in laboratory and operational training settings, are assessing the impact of individual difference, task, and training method variables on the design of training strategies. The findings are seen to bear directly on the Army's requirements for designing efficient instruction for a training population that now includes large numbers of trainees in all mental categories of the AFQT.

A Review of Combat Support Training, by Ernest K. Montague and Morris Showel, Technical Report 69-19, 32 pp., December 1969 (SPECTRUM I). AD-703 196 ED-044 548

Combat support training was observed at four Army training centers, with particular reference to training objectives, methods, and student evaluation, especially as these relate to increasing individualization of training. Training problems most relevant to individualization were in the areas of highly verbally-oriented objectives, a high degree of verbal instruction, and a high degree of use of written examination for evaluation of student performance. The addition of large numbers of soldiers of low academic ability has intensified these problems and has added new questions of appropriate training methods for the simultaneous training of students of a wide range of ability.

"The Interrelationships of Ability Level, Instructional System, and Skill Acquisition," by John E. Taylor, Ernest K. Montague, and Robert Hauke, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 29-70, 8 pp., December 1970. AD-717 256

This paper describes an assessment of the impact of aptitude differences on learning performance. As a result of these tests, instructional strategies are being developed to make efficient training programs for men of differing aptitude levels. Observations were that the high level group did better when left without a structured training program; that the middle range was also able to work at its own speed. Low aptitude groups, however, required a complete structured program in which the instructional sequence is kept down to small steps presented on an elementary language level.

SPUR—Division No. 5
Studies of Motivation in Technical Training
(Research for the Department of the Army)

The Effects of Group Competition Upon Student Performance, by Albert L. Kubala and Harold E. Christensen, Technical Report 68-7, 44 pp., June 1968 (SPUR I). AD-672 174

In a study to determine whether group competition is effective in improving motivation in technical training, two experimental classes were divided into four groups each, equal in size and mean aptitude. Each group competed with each of the other groups during successive two-week intervals. The winner in each pairing was the group that failed the smallest percentage of regularly scheduled school examinations during the period. Low-cost and recognition-type rewards were presented to members of winning groups. Peer ratings and an attitude questionnaire were administered before the first examination, and again after four weeks. The peer rating on desire to succeed and the questionnaire, both presumably measuring motivation, seemed to be valid predictors of success. Group competition did appear to be an effective means of improving academic performance of the lower aptitude men. The competition grouping was found to influence friendship choices on the peer ratings.

A Study of Factors Influencing the Choice of Enlistment Options, by Albert L. Kubala and Harold E. Christensen, Technical Report 69-10, 64 pp., June 1969 (SPUR I).

A study was made of various administrative and personnel factors in the recruiting process, such as recruiting policies, recruiter background, and geographical differences, that were felt to be related to the recruiting of men into enlistment options in technical occupational areas. Over a three-month period, data were collected by questionnaire on about 10,000 prospective recruits at 18 recruiting stations and on the 464 recruiters of these men. The study indicated that (a) recruiters who formerly held technical MOSs showed no preference for enlisting men into them, (b) recruiters with personnel service backgrounds tended to "sell" more specific MOS options, (c) the most-successful recruiters tended to obtain options for which qualification requirements were minimal and for which no advance quotas were required, (d) career group options were much more frequently chosen than specific MOS options in the same areas, (e) geographical differences were found in the tendency to enlist men into specific MOSs, and (f) men who initiated but failed to complete enlistment had a higher average aptitude than men who enlisted.

SQUADTRAIN—Division No. 4

Use of the Rifle Squad Field Problem for the Evaluation and Improvement of the Tactical Training of the Infantry Rifle Squad (Research for the Department of the Army)

Tactical Training of the Infantry Rifle Squad, by M. Dean Havron, William A. Gorham, Peter G. Nordlie, and Ralph G. Bradford, Technical Report 18, June 1955 (Subcontractor: Psychological Research Associates). AD-88 573

This study was designed to develop training methods to improve the effectiveness of rifle squads. A new squad-training program was developed by combining elements from four experimental methods. As tested by combat readiness performance test scores, this method was superior to standard squad-training methods.

STAR–Division No. 5
Aircraft Recognition Training
(Research for the Department of the Army)

A Classroom Method of Training Aircraft Recognition, by Paul G. Whitmore, John A. Cox, and Don J. Friel, Technical Report 68-1, 36 pp., January 1968 (STAR I). AD-666 093

A prototype classroom training program was developed to train observers to recognize 16 jet fighter/attack aircraft to a criterion performance level of 95% correct recognition at five-second exposures. Previously developed experimental 35mm color slides were used for training. The training method placed emphasis on recognition feature learning, discrimination learning by means of similarity groupings of aircraft and simultaneous paired comparisons, cumulative practice and review, periodic testing, and remedial training. The 95% level was reached during the 16th 50-minute session, an average of one aircraft per session. On a transfer test using degraded images the class averaged 61%—three times higher than a traditionally trained class in a previous pilot study. Most of this gain, however, may be due to increased training time. There was a substantial correlation between the transfer test and achievement, indicating that the recognition skill acquired during training would transfer to some other image condition. There are suggestions for improvement of the prototype program.

A Brief History of Aircraft Identification Training, by Arthur C. Vicory, Professional Paper 27-68, 11 pp., August 1968. AD-676 791

This paper presents a selective review of previous and contemporary methods of teaching aircraft recognition to personnel manning forward area air defense weapons. Methods in use since about 1940, including the WEFT System (image-analysis concept), the Renshaw System (whole-image concept), the modified WEFT-Renshaw System (learning of aircraft features), and a HumRRO method are examined. HumRRO research designed to coordinate studies of training with generalization, retention, and transfer in order to provide a better assessment of training effectiveness, is described.

Research By-Products resulting from this research effort are listed in Part III.

STINTRAC–Division No. 1 (System Operations)
Training of Scientific and Technical Information System Personnel
(Research for the Department of the Army)

Projected Manpower Needs, and Projected Training Requirements for Operators and Users of Future STINFO Systems, by C. Dennis Fink, Herbert B. Leedy, and John F. Hayes, Technical Report 66-7, June 1966. AD-635 132

Training problems which might arise due to establishment of new Department of the Army Scientific and Technical Information (DA STINFO) systems were examined with respect to projected manpower requirements, personnel supply, and training requirements. It was concluded that (a) future needs for system designers can be met through the use of contractor and senior DA STINFO personnel; (b) future needs for administrators and operators of STINFO centers and systems will not be great, provided that the DA can retain those persons now in the DA STINFO system; (c) training of STINFO system administrators and operators can be improved, and suggestions were made regarding the use of handbooks, job aids, and monthly publications; (d) training of administrators and operators for new STINFO systems should await the development of fairly precise specifications for these systems; and (e) the need to train and/or familiarize "users" of STINFO systems is a crucial problem which needs immediate attention. User training procedures and materials, to include the development of user handbooks and job aids, are discussed.

STIR–Motivation, Morale, and Leadership Division

A Study of Factors Contributing to Delinquency in the Army (Research for the Department of the Army)

"Situation and Personal Variables in AWOL Behavior," by Hobart G. Osburn, paper for American Psychological Association convention, Cleveland, Ohio, September 1953.

See Technical Report 5.

A Preliminary Investigation of Delinquency in the Army by Hobart G. Osburn, Charles Brown, Janice Chreitzberg, Wayne Hield, Edward Seidel, and Donald Watson, Technical Report 5, 161 pp., April 1954. AD-29 029

A general survey was made of the many possible factors influencing delinquency (especially AWOL) in the military service. Delinquency was found to be more highly related to background and personal characteristics than to specific Army situations, although some Army situations appear to be related to soldiers' delinquent behavior.

STOCK–Division No. 1 (System Operations)

Development of Training Management Procedures for Heterogeneous Ability Groups (Research for the Department of the Army)

"Work Unit STOCK—Development of Training Management Procedures for Heterogeneous Ability Groups," by A. James McKnight, briefing to U.S. Continental Army Command, Fort Monroe, Va., October 1968; included in *Use of Job and Task Analysis in Training*, Professional Paper 1-69, 42 pp., January 1969. AD-688 810

STRANGER—Division No. 3
Long-Term Memory of Motor Skills
(Research for the Department of the Army)

Retention of Military Skills Acquired in Basic Combat Training, by Robert D. McDonald, Technical Report 67-13, 15 pp., December 1967 (STRANGER I). AD-663 785 ED-022 103

Performance data were collected in the three general Basic Combat Training proficiency areas (rifle marksmanship, physical combat fitness, end-of-cycle tests) from independent groups of soldiers (60 per group) during BCT, during Advanced Individual Training (AIT) and Combat Support Training (CST), and for permanent-party personnel in the Army six to 12 months. These data were collected at three U.S. Army Training Centers under comparable conditions. Results on the three areas tested indicated a general performance decrement over the one-year period sampled. While these performance decrements were statistically significant, the percentage decrements from the BCT level were relatively small and their practical significance is open to question.

Acquisition, Retention and Retraining: Effects of High and Low Fidelity in Training Devices, by Douglas L. Grimsley, Technical Report 69-1, 27 pp., February 1969 (STRANGER III). AD-685 074

To examine the effects of varying fidelity of training devices on acquisition, retention, and reinstatement of a procedural task, soldiers were trained individually to operate the Section Control Indicator (SCI) console of the Nike Hercules guided missile system during preparation and firing status. Subjects with no previous experience on the equipment were trained on one of three panels differing in appearance, functional fidelity, or both, and tested immediately after training. Approximately four and six weeks later they were retested and retrained to the original level of proficiency. Results indicated that there was no difference in training time, initial performance level, amount remembered after four and six weeks, or retraining time, between individuals trained on high and low fidelity devices for procedural tasks.

Acquisition, Retention, and Retraining: Group Studies on Using Low Fidelity Training Devices, by Douglas L. Grimsley, Technical Report 69-4, 38 pp., March 1969 (STRANGER III). AD-686 741

To examine the effects of varying fidelity of training devices on acquisition, retention, and reinstatement of a procedural task, soldiers were trained in groups of four to operate the Section Control Indicator (SCI) console of the Nike-Hercules guided missile system during preparation and firing status. Subjects with no previous experience on the equipment were trained on one of three panels differing in appearance, functional fidelity, or both, and tested immediately after training. Approximately four and again six weeks later they were retested and then retrained to the original level of proficiency. Five different studies were conducted. Results indicated that groups trained for procedural tasks on high and on low fidelity devices did not differ significantly on training time, initial performance level, amount remembered after four and six weeks, or retraining time.

Slow Fronto-Occipital Potentials, Mental Category, and Laboratory Performance, by Robert D. McDonald, Professional Paper 17-69, 19 pp., May 1969 (STRANGER IV). AD-688 818

In this paper physiological measures as independent indexes and predictors of attention-demanding performance are examined. Laboratory performance tasks were individually administered to 120 pre-basic combat trainees selected on the basis of Armed Forces Qualification Battery (AFQT) classification. Assignment to tasks was representative with respect to Mental Category. Concurrent with performance on some of these tasks, slow biopotentials (mv) were recorded from the frontal and occipital emissary vein distributions on the midline scalp and were displayed on a Type R Dynograph. These biopotentials were also examined independently with respect to their ability to predict performance on selected tasks. No consistent relationships were found between the fronto-occipital potential and ongoing performance.

Acquisition, Retention, and Retraining: Training Category IV Personnel With Low Fidelity Devices, by Douglas L. Grimsley, Technical Report 69-12, 24 pp., June 1969 (STRANGER III)

Low (AFQT Mental Category IV) aptitude subjects with no previous experience on the equipment were trained individually to operate a guided missile control panel. Three panels differing in appearance and/or functional fidelity were used. Subjects were tested immediately after training, and four and six weeks later, and then retrained to the original level of proficiency. The results indicated that the higher aptitude subjects (from data presented in earlier STRANGER reports) required significantly less training time than the low aptitude subjects. For all treatment groups there were no practical differences in training time, initial performance level, amount remembered after four and six weeks, or retraining time between groups trained on high and low fidelity devices for this procedural task. Thus training device selection should be based on a careful review of the tasks to be taught in order to employ inexpensive devices where possible.

SUPPORT—Division No. 3

Development of Improved Training for Combat Support Programs (Research for the Department of the Army)

Instructor's Guide—Description of Course and Lesson Outlines for:

"1. An Integrated Modified BCT/AIT Program for Conscientious Objectors (COs) in Training for Medical Corpsmen, MOS 91A10."

"2. An AIT Program for All Medical Corpsmen, MOS 91A10."

"3. A Modified BCT Program for COs (1A0)," by Joseph S. Ward, Nelson I. Fooks, Richard P. Kern, and Robert D. McDonald, 826 pp., February 1969; supplement to Technical Report 70-1, *Development and Evaluation of an Integrated Basic Combat/Advanced Individual Training Program for Medical Corpsmen (MOS 91A10)*, January 1970. (SUPPORT II).

The principal information contained in the Instructor's Guide concerns (a) the physical requirements, (b) the training objectives, and (c) the detailed lesson outlines for each period of instruction in the three courses.

Development and Evaluation of an Integrated Basic Combat/Advanced Individual Training Program for Medical Corpsmen (MOS 91A10), by Joseph S. Ward, Nelson I. Fooks, Richard P. Kern, and Robert D. McDonald, Technical Report 70-1, 92 pp., January 1970 (SUPPORT II). AD-703 317 ED-041 227

A study was conducted to determine the effect of integrating the Basic Combat Training (BCT) and Advanced Individual Training (AIT) of the Medical Corpsman (MOS 91A10) for Conscientious Objector personnel. It was expected that the study would serve as a test of the combined BCT/AIT concept of training for broader application in the Army training system. The curriculum for COs was redesigned to provide a continuous MOS-oriented 16-week training sequence. Redesign included introduction of new training techniques, such as TV geared to the rate of learning and arrangement of instructional material in functional context. Two sample classes (N =80 each) were trained with this redesigned curriculum, and were tested against comparable classes trained in the normal two-stage sequence. In all subjects related to medical training, the experimental group performed significantly better on performance tests than trainees in the control group and did as well on written tests of military and medical knowledge.

SUPPORT *(Cont.)*

Development and Evaluation of an Improved Radio Operator Course (MOS 05B20), by S. James Goffard, Donald F. Polden, and Joseph S. Ward, Technical Report 70-8, 38 pp., June 1970 (SUPPORT I). AD-710 865 ED-044 584

This report describes the development and evaluation of an improved Radio Operator Course approved for use by the U.S. Army. Existing training was reorganized according to the principle of "Functional Context." The duties of a radio operator were examined to see how they could be arranged into specific tasks to be taught in sequence; since each successive task is embedded in a context of tasks that he has already learned to perform, the trainee learns to perform all of them with relative ease. The effectiveness of the revised course was determined by comparing 10 standard and 20 revised classes in 1967-68. The revised classes had substantially fewer trainees who had to be recycled (despite the fact that the classes were 40% larger and contained twice as many Category IV trainees). Also, the revised classes had substantially fewer trainees failing the course.

SWINGSHIFT—Division No. 3[1]

Techniques and Training Methods for Improving Individual and Squad Infantry Performance in Operations During Limited Visibility
(Research for the Department of the Army)

§"Salvage the Blind Warrior," by COL Henry E. Kelly, USA Ret., *Infantry*, vol. 50, no. 2, February-March 1960.

§*A Provisional Core Curriculum for Infantry Night Operations Training: Conceptualization and Proposed Content*, by Gilbert L. Neal, Research Memorandum, December 1960 (SWINGSHIFT I). AD-265 399

§*Review and Discussion of Tentative Operating Characteristics and Employment of Ground Surveillance Radar Authorized in the Infantry Battle Group (July 1959)*, by Gilbert L. Neal, Research Memorandum, April 1960 (For Official Use Only). AD-800 023

Moonlight and Night Visibility, by Thomas F. Nichols and Theodore R. Powers, Research Memorandum, January 1964. AD-438 001

A summary and discussion of published data and information relevant to visibility under low levels of natural illumination is presented. Those changes that occur in the nature and intensity of light between sunset and sunrise are described and related to the visibility of objects of military significance. Six field studies of night target detection are reviewed and assessed as to comprehensiveness in terms of a set of factors that affect visual perception. Procedures for the preparation of moon diagrams and charts that provide comprehensive information on the potential availability of moonlight are described.

[1] This Work Unit was initiated at Division No. 4. The symbol § indicates an item prepared at Division No. 4.

SYNTRAIN—Division No. 6 (Aviation)
Modernization of Synthetic Training in Army Aviation
(Research for the Department of the Army)

"Adaptive Training—An Application to Flight Simulation," by Paul W. Caro, Jr., paper for New England Psychological Association, Boston, November 1968; *Human Factors*, vol. 11, no. 6, December 1969; issued as Professional Paper 5-70, 10 pp., March 1970. AD-705 013

Army pilot training requirements, particularly in the helicopter area, are growing rapidly. To meet the increased training load, an Army-wide system of aircraft simulators, known as the Synthetic Flight Training System (SFTS) has been designed and is under development. A feature of the SFTS is the automation of many instructor functions normally associated with training in the flight simulators. A portion of the automation involves the application of adaptive training techniques. This paper describes the SFTS and the rationale for the incorporation in it of adaptive training. The selection of appropriate adaptive variables, techniques for error measurement and for providing feedback to trainees, and the adaptive logic employed are discussed.

Device-Task Fidelity and Transfer of Training: Aircraft Cockpit Procedures Training, by Wallace W. Prophet and H. Alton Boyd, Technical Report 70-10, 49 pp., July 1970 (SYNTRAIN II). AD-713 433 ED-047 264

The objective of the research reported here was to evaluate the training effectiveness of two cockpit procedures training devices, differing greatly in their physical fidelity (and, consequently, cost), in the teaching of ground cockpit procedures for a twin-engine, turboprop, fixed wing aircraft. One group of students received training in cockpit procedures in a computerized cockpit procedures trainer, while another group were trained in an inexpensive, low-fidelity mockup of the cockpit. Their subsequent performance in the actual aircraft was compared with that of a control group who received all of their procedures training in the aircraft. Results indicated that both training devices produced significant transfer of training, in terms of error and time reduction, in performance in the actual aircraft. There were no significant differences in training effectiveness of the two devices.

"Some Considerations for the Design of Aircraft Simulators for Training," by Paul W. Caro and Wallace W. Prophet, paper for Psychology in the Air Force Symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971.

This paper reviews recent advances in aircraft simulator design which are intended to facilitate training rather than to increase simulator fidelity. Simulators designed/delivered since January 1970 are reviewed with respect to their training-related design features. Suggestions are made for research to emphasize further training considerations in simulator design.

"An Innovative Instrument Flight Training Program," by Paul W. Caro, paper for Society of Automotive Engineers conference, Atlanta, Ga., May 1971.

The development and initial administration of an innovative flight training program is described in this paper. A commercially available training device in a twin-engine transition and instrument training course was used. The training included redefinition of the flight instructor's role, an incentive award system, proficiency-based advancement, full mission training in the device, continuity of training between the device and aircraft, and use of manuever performance records to control trainee progress. During initial administration of the program by the Army, training flight hour requirements were reduced approximately 40%.

TANKER—Division No. 2

Improved Methods for Training Tank Commanders
(Research for the Department of the Army)

Improving Tactical Training for Tank Commanders: Test Development and Performance Assessment, by Shepard Schwartz and Arthur Floyd, Jr., Technical Report 82, March 1963. AD-402 802

A test evaluating the tactical performance of tank commanders was developed and two forms were administered to 41 TCs. Subjects were scored on preparation for the mission, navigation, target detection, fire commands, gunnery, accuracy of reporting, speed of reporting, and use of phonetic alphabet. Performance varied considerably among the areas, and the results suggested where remedial training for TCs might be appropriate. Sufficient gains were made between first and second testing in four areas to suggest that the test might have considerable utility for training.

Research By-Products resulting from this research effort are listed in Part III.

TESTAID—Division No. 5

Technical Assistance in the Design and Execution of JTF-2 Test 3.1/3.5
(Research for the Department of the Army)

A Review of the Literature on Use of Tracer Observation as an Antiaircraft Firing Technique, by Robert J. Foskett, E.W. Frederickson, and Robert D. Baldwin, Technical Report 68-11, 49 pp., September 1968. AD-675 581

A survey was performed concerning the effectiveness of observing the trajectories of tracer ammunition as a method of adjusting antiaircraft firing. The survey included (a) a review of military reports and journal articles dating from the 1920s, (b) an analysis of relevant psychological research, particularly in the areas of visual perception, information processing, and man-machine dynamics, and (c) informal interviews of military personnel, scientists, and engineers. It was learned the current highly divergent opinions concerning effectiveness of tracer feedback were also held prior to and during World War II. The documents reviewed failed to show any testing in which tracer and non-tracer techniques of firing were compared for hit frequencies or any other comparative measure of effectiveness.

Research By Products resulting from this research effort are listed in Part III.

TEXTRUCT–Division No. 5
Methods of Instruction in Technical Training[1]
(Research for the Department of the Army)

"Preliminary Studies in Automated Teaching," by Robert F. Mager, paper for National IRE Convention, New York, March 1959.

***Results of preliminary studies of two methods of automatic instruction were presented, with descriptions of characteristics and programing procedures for each. Two "difficult" concepts in chemistry were automated and presented to freshman chemistry students; data indicate superiority of this instruction over standard lectures. In another study concepts of semiconductor physics were programed by each of two methods; three groups of IRE members were given instruction, one by each of the automated methods, and one by traditional lecture. Finally, results of automated teaching of college algebra to 11- and 12-year-old students were discussed.**

An Annotated Bibliography on the Automation of Instruction, by Charles L. Darby, Research Memorandum, July 1959. PB-159959 AD-228 766

"Teaching: Today and Tomorrow," by Robert F. Mager, *IRE Student Quarterly*, September 1959.

*In this paper some principles of learning and some facts about the teacher-learner situation in the modern setting are discussed. Purposes and methods of automating instruction so that students will be able to learn more—and teachers teach better—are presented. There are descriptions of several teaching devices.

"Developing New Instructional Techniques," by P.G. Whitmore, paper for symposium at annual meeting of Southwestern Psychological Association, Spring 1960.

*This paper describes research techniques dealing with the problems of specifying criteria of training, developing procedures for guiding and assessing learning during training, and engineering known principles of learning into the training context. The emphasis is on what should be learned and how it should be learned.

The Automation of Instruction, by R.R. Ridenour, brochure for International Science Exhibit, El Paso, Tex., March 1960.

*This pamphlet was designed to acquaint the reader with automated instruction.

"Automated Instructional Methods for Technical Training," briefing by Paul G. Whitmore, December 1960.

* This paper explains attempts to obtain a basis on which to estimate the scope of applicability of automated instructional techniques to Army technical training. Experiments, training procedures, and problems are described and illustrated.

"The Effectiveness and Implementation of Instructional Closed-Circuit Television," paper by Staff Members of Division No. 5, [April 1960].

*A means for evaluating the applicability of television to Army training programs is given in this paper, which discusses factors involved in both construction and management of training programs that the training agency should incorporate into its courses before considering the utilization of closed-circuit television.

An Evaluation of an Experimental Meter Reading Trainer, by Robert G. Smith, Jr. and Richard R. Ridenour, Research Memorandum, October 1960 (TEXTRUCT I). AD-815 861

[1] A star at the beginning of the abstract indicates that the item is one of the TEXTRUCT papers or presentations included in *Collected Papers Prepared Under Work Unit TEXTRUCT – Methods of Instruction in Technical Training*, Professional Paper 34-70, December 1970

TEXTRUCT *(Cont.)*

Results of Exploratory Investigations Conducted for the Purpose of Planning a Research Program on Instructional Methods, Research Memorandum, March 1961 (TEXTRUCT I). AD-253 395

Exploratory studies of military training were conducted in order to aid the development of a systematic program for more efficient and less time consuming technical instruction. The studies dealt with group instruction and response, and automated instruction. Developing a systematic research program involved studying training objectives and content, programing and sequencing, and training administration, including appropriate techniques for student motivation and evaluation.

Teaching Machines and Programmed Instruction—Some Factors to Consider in Implementation, by Robert G. Smith, Jr., Research Memorandum, August 1961 (TEXTRUCT II). AD-632 188

"Deriving and Specifying Instructional Objectives," by P.G. Whitmore, paper for symposium at American Psychological Association convention, September 1961 (TEXTRUCT II).

*This paper stresses the necessity for statements of instructional objectives in the construction of mass automated teaching programs, and also the need to develop rationales and procedures for contriving terminal behavior patterns. The efficiency of instructional control is also determined by the behavior capabilities of the student prior to instruction. An example of a verbal hierarchy is given.

"Military Control—A Frequently Missed Training Opportunity," by Robert G. Smith, Jr., paper for American Psychological Association convention, September 1961.

*Advantages of military control in motivating students to be rapid learners in self-paced programmed instructional courses are discussed. Examples of techniques to control student learning behavior are given.

"A Rational Analysis of the Process of Instruction," by Paul G. Whitmore, *IRE Transactions on Education*, December 1961 (TEXTRUCT II).

*This paper provides the lay reader with a general understanding of the process of instruction, and an appreciation of the problem areas that must be resolved before a complete and adequate technology of instruction is obtained.

"Some Research Needs in Selecting and Training Programmers," by William H. Melching, paper for symposium at Texas Psychological Association meeting, Dallas, Tex., December 1961.

*The full potentialities of automated instruction can be achieved only if competent programers can be selected and trained. Personality components such as relatively high intelligence, interests, attitudes, and flexibility are discussed.

A Procedural Guide to the Programming of Instruction: Preliminary Report, by William H. Melching, Research Memorandum, March 1962 (TEXTRUCT II). AD-279 569

"Research Problems Related to the Implementation of Programmed Instruction," by Robert G. Smith, Jr., paper for annual meeting of Southwestern Psychological Association, Fort Worth, Tex., Spring 1962. (TEXTRUCT II).

*This paper points out the necessity for certain kinds of research for data pertinent to the decision process, selection, training, and supervision of programers, and to the management of the learning process. Research is also needed in the areas of student motivation, disciplinary management of students, and instructor scheduling, and in the use of simulators, training devices, and equipment as part of the training program.

TEXTRUCT *(Cont.)*

The Text of an Orientation Workshop in Automated Instruction, by William H. Melching, John A. Cox, Jesse C. Rupe, and Robert G. Smith, Jr., Consulting Report, July 1962 (TEXTRUCT II). AD-637 117

A series of orientations on teaching machines and programed instruction was given to military and civilian personnel responsible for making decisions and directing actions to be taken regarding programed instruction. The text gives a comprehensive description of programed instruction and what is involved in developing it, its advantages and problems, useful information for determining its applicability to specific training situations, and general knowledge to assist in realistic evaluations and decisions regarding programed instruction. Appendices list pertinent objectives, terms, tests, and slides.

"Programmed Instruction—Where We Are Today in the Military," by William H. Melching, paper for symposium at meeting of Texas Psychological Association, San Antonio, December 1962.

*Acceptance and application of programmed instruction to the training problems of the Air Force and the Army are discussed in this paper. Programmer training workshops are described.

Studies of Fixed Procedures Training: A Preliminary Test of Self-Instructional Method, by Paul G. Whitmore, Research Memorandum, July 1963. AD-420 453

A Handbook for Programmers of Automated Instruction, by William H. Melching, Robert G. Smith, Jr., Jesse C. Rupe, and John A. Cox, procedural guide, September 1963 (TEXTRUCT II). AD-632 558

Evaluation of an Auto-Instructional Program on the First Week of a Basic Electronics Course, by William H. Melching, Harold E. Christensen, and Albert L. Kubala, Research Memorandum, March 1964 (TEXTRUCT II). AD-601 681

Collected Papers Prepared Under Work Unit TEXTRUCT: Methods of Instruction in Technical Training, Professional Paper 34-70, 96 pp., December 1970. AD-722 128

(TEXTRUCT items included in this Professional Paper are indicated with a star at the beginning of the abstract.)

*Research directed toward the development of efficient and effective instructional techniques that would be applicable to the extensive program of Army technical training is presented. The papers in this collection were presented at military and professional meetings or appeared in professional journals during the course of the research on Work Unit TEXTRUCT (1958-64). Other publications under this Work Unit are listed.

Research By-Products resulting from this research effort are listed in Part III.

TICK–Psychological Warfare Division
A Study of Communist Motivation
(Research for the Department of the Army)

Wang Tsun-Ming, Anti-Communist An Autobiographical Account of Chinese Communist Thought Reform, Staff Memorandum, November 1954 (TICK II). AD-488 598

Methodological Considerations Involved in an Exploratory Study of the Motivations of Soldiers From the Chinese Communist Forces in Korea, by William C. Bradbury, Staff Memorandum, October 1956 (TICK I). AD-135 515

Motivations of Chinese Communist Soldiers A Basis for Research in Support of Military Psychological Warfare, by William C. Bradbury, Staff Memorandum, May 1958 (For Official Use Only) TICK II). AD-808 661

The Political Behavior of Korean and Chinese Prisoners of War in the Korean Conflict A Historical Analysis, by Samuel M. Meyers and William C. Bradbury, Technical Report 50, August 1958 (For Official Use Only) (TICK III). AD-203 606

The behavior and motivation of groups of Chinese and Korean prisoners of war during the Korean conflict were studied to provide a basis for control and utilization of oriental Communist prisoners of war in the event of future hostilities. The report deals primarily with the period from June 1950 to June 1952 and is based on interviews with PWs and key custodial personnel, and various Army and PW documents. The development of PW organization and activities is traced, and their relations to PW behavior and the conflict with the U.N. custodial authority are analyzed.(U)

The Role of Traditional Orientations Toward Social Relations in Chinese Responses to Communist Military-Political Control, by Samuel M. Meyers, Staff Memorandum, November 1958 (TICK II). AD-483 127

Adjustment of Chinese Soldiers to the Communist Demand for Ideological Participation An Exploratory Study Based on the CCF in the Korean War, by Jeane J. Kirkpatrick and Pio D. Uhassi, Staff Memorandum, February 1959 (TICK II). AD-637 836

TRACE–Division No. 1 (System Operations)
Development of Improved Electronic Trouble Shooting Procedures and Teaching Methods
(Research for the Department of the Army)

Methods and Devices for Teaching Data Flow to Electronics Maintenance Personnel, A. James McKnight (ed.), Research Memorandum, November 1962 (TRACE I). AD-298 699

Pilot studies were conducted on a brief course in general principles of trouble shooting logic for electronics maintenance training. It was found that, after prolonged periods dealing with a particular signal-flow pattern, students tended to concentrate on specific symptom-cause relations rather than on principles. This experience suggested that important general aspects of trouble shooting logic should be covered before training in any particular system, and that prolonged practice on a particular system should be confined to those the man being trained will use. Several signal-flow simulators were developed for training and training research.

TRACK–Division No. 2

The Training Effectiveness of the Track and Suspension Trainer Device (Research for the Department of the Army)

The Training Effectiveness of the Track and Suspension Trainer, Device 29-FA-61, by Victor H. Denenberg, Information Report, January 1954. AD-488 588

The objective was to compare the level of knowledge of Armor trainees receiving ATP tank instruction with that of trainees instructed by means of both lecture and a track and suspension trainer (Device 29-FA-61). Two groups of Armor trainees were tested on the maintenance of the M47 tank following instruction by the two methods. It was found that trainees acquired at least as much information, and possibly more, when the trainer was used than when tanks alone were used.

TRADER–Executive Office[1]

Developing Guidance for Establishing Requirements and Characteristics of Training Devices (Research for the Department of the Army)

Application of a Method of Evaluating Training, by John A. Cox, Research Memorandum, November 1962; paper for meeting of Texas Psychological Association, December 1962 (TRADER 1). AD-288 251

"Application of a Method of Evaluating Training," by John A. Cox, *Journal of Applied Psychology*, vol. 48, no. 2, April 1964 (TRADER 1).

Data were processed with Ward Edwards' formulation of value of training which includes estimates of proficiency level attained, worth of a trained man in dollars, and training costs in dollars. Difficulties which were encountered and techniques of overcoming them are reported. Results of the evaluation, which appear to be realistic, are reported.

[1] Research under Work Unit TRADER was performed at several HumRRO research divisions, items listed reflect research performed by Division No. 5

TRAINCREW–Division No. 2
Methods for Improving Tank Crew Performance
(Research for the Department of the Army)

Tank Crew Effectiveness in Relation to the Supervisory Behavior of the Tank Commander by Shepard Schwartz, Technical Report 68-12, 67 pp., September 1968. AD-679 918

The purpose of this study was to determine the extent to which team performance of a tank crew is related to the tank commander's (TC's) performance of command and supervisory functions, and increase understanding of factors which affect the organization of individuals into effective teams. Research on small groups was reviewed and tests of tank crew functions (maintenance and tactical employment) were developed. The tests were administered to some 40 tank crews. Half of the crews were led by specially trained TCs who supplied crewmen with only minimum instructions and supervision, and half were led by their regular TC's, who were free to supervise as they saw fit. During the maintenance test, crew member interactions were recorded. Relationships of crew scores to crew interactions, and to background, job knowledge, and TC actions suggested several factors that may influence crew effectiveness. Patterns of communication and the distribution of TC supervisory support appeared to influence crew effectiveness.

Research By-Products resulting from this research effort are listed in Part III.

TRAINER–Division No. 2
An Evaluation of the Prototype Model of a Tank Hull Trainer
(Research for the Department of the Army)

The Training Effectiveness of a Tank Hull Trainer, by Victor H. Denenberg, Technical Report 3, February 1954. PB-113463 AD-26 012

Tank Hull Trainer 3-T-3 was used to teach three phases of tank driving and maintenance: (a) Starting and Stopping Procedures, (b) Driver's Instruments and Controls, and (c) Track and Suspension System. A mock-up of the instrument panel and driver's controls was used as a second training aid for the first two lessons. The effectiveness of these aids in comparison with the ATP method was determined by written and performance tests. For the first lesson, the mock-up was better than the hull trainer and almost as good as the ATP method; costwise, the mock-up gave optimum results. For the second lesson, no significant difference was found among the three procedures; again, the mock-up appeared to be the most economical. Trainees acquired more information on track and suspension system from the hull trainer than from working with M47 tanks.

TRAINFIRE—Division No. 4

Experimental Development of Improved Proficiency Tests and Training Methods for Improving the Effectiveness of Combat Riflemen
(Research for the Department of the Army)

The Effect of Personalized Stocks on Rifle Marksmanship, by Charles K. Ramond, Howard H. McFann, and Seward Smith, Staff Memorandum [April 1954](TRAINFIRE I). AD-479 106

Target Placement on a Detection Proficiency Course, by Charles K. Ramond and Charles R. Mighell, Staff Memorandum [June 1954](TRAINFIRE I). AD-489 292

A Comparative Test of Accuracy and Speed of Fire With the Improved Loop Sling, With the Combat Rifle Sling, and Without a Sling, by John A. Hammes, Howard H. McFann, and Albert A. Ward, interim report, August 1954 (TRAINFIRE I). AD-489 295

A Comparative Test of Accuracy of Fire With the Loop Sling, the Combat Rifle Sling, the Hasty Sling, and Without a Sling, Parts II and III, by John A. Hammes, Howard H. McFann, John E. Taylor, and John O. Cooper, interim report, February 1955 (TRAINFIRE I).

Realistic Targets for the Training and Testing of Combat Riflemen, by Howard H. McFann, John E. Taylor, Seward Smith, and John A. Hammes, Staff Memorandum, April 1955 (TRAINFIRE I). AD-489 296

TRAINFIRE I: A New Course in Basic Rifle Marksmanship, by Howard H. McFann, John A. Hammes, and John E. Taylor, Technical Report 22, October 1955 (TRAINFIRE I). AD-89 606

This study was designed (a) to develop a practical basic course of rifle marksmanship instruction which will prepare the soldier to use his rifle effectively in combat and (b) to develop proficiency tests, based upon combat criteria, to measure the adequacy of this training. As measured by the ability to detect combat-type targets, and the ability to hit those targets, once detected, the experimental training course, without increasing training time, better prepares the soldier for effective use of his rifle in combat than does the conventional course.

"The TRAINFIRE Marksmanship Training," by Henry E. Kelly, paper for Tripartite Conference, Fort Benning, Ga., November 1956.

"TRAINFIRE Zero," by LTC Edgar S. Sanders, *American Rifleman*, vol. 105, no. 1, January 1957.

"More About TRAINFIRE I," by COL Henry E. Kelly (USA Ret.); Combat Developments Office, USAIS; and Weapons Department, USAIS; *Infantry*, vol. 47, no. 2, April 1957 (TRAINFIRE I).

"From TRAINFIRE I to TRAINFIRE II," by LTC E.S. Sanders, *Army*, vol. 7, no. 10, May 1957.

"Shoot Fast and Straight," by COL Nelson I. Fooks, *Army Information Digest*, vol. 12, no. 6, June 1957.

TRAINFIRE II: A New Course in Basic Technique of Fire and Squad Tactics, by John A. Hammes, Henry E. Kelly, Howard H. McFann, and Joseph S. Ward, Technical Report 41, July 1957 (TRAINFIRE II). PB-129411 AD-140 445

As part of research to improve the effectiveness of combat riflemen, an experimental course in Technique of Fire and Squad Tactical Training was designed and compared with conventional training. Two hundred twenty inductees were trained in two groups, one by the standard program and the other by the experimental course. Comparisons following training were made by means of three proficiency tests: Squad in Day Defense, Squad in Day Attack, and Squad on Day Combat Patrol. In all three areas the experimental program better prepared the rifle squad than did the conventional program.

"Operation TRAINFIRE: A New Idea in Troop Training," by Francis E. Jones, *Armed Forces Management*, vol. 4, no. 11, August 1958.

Improved Silhouette Targets for Marksmanship Training, Research Memorandum, October 1958. AD-480 147

Extension of Research in TRAINFIRE I Basic Rifle Marksmanship Course, Research Memorandum, December 1958 (TRAINFIRE I). AD-479 630

An Aiming Point Comparison Study, Research Memorandum, July 1959 (TRAINFIRE I). AD-489 599

TRAINFIRE V: Extension of Research on TRAINFIRE I Rifle Marksmanship Course (Subsequent to Technical Report 22, October 1955), Research Memorandum, November 1959 (TRAINFIRE V). AD-479 631

"The Last Few Yards," by COL Henry E. Kelly [USA Ret.], *Infantry*, vol. 50, no. 3, April-May 1960 (TRAINFIRE II).

"Terrain Searching," by COL Henry E. Kelly [USA Ret.], *Infantry*, vol. 50, no. 6, October-November 1960 (TRAINFIRE I).

"What's Wrong With the Squat?" by COL Henry E. Kelly [USA Ret.], *Army*, vol. 12, no. 1, August 1961 (TRAINFIRE I).

"Defending Those Wide Gaps," by COL Henry E. Kelly [USA Ret.], *Army*, vol. 12, no. 2, September 1961 (TRAINFIRE II).

"Assembly Areas," by COL Henry E. Kelly [USA Ret.], *Army*, vol. 12, no. 4, November 1961 (TRAINFIRE II).

"Control of Combat Rifle Fire," by COL Henry E. Kelly (USA Ret.), *Infantry*, vol. 57, no. 4, July-August 1967 (TRAINFIRE II).

TRAINMAN—Division No. 2

Development of an Instructional Program in Training Technology and Training Management (Research for the Department of the Army)

An Experimental Program of Instruction on the Management of Training, by Donald F. Haggard, Norman Willard, Jr., Robert A. Baker, William C. Osborn, and Shepard Schwartz, Technical Report 70-9, 346 pp., June 1970. AD-711 948 ED-047 195

A course on management of training developed for presentation to Advanced Officer classes included construction based on job task statements, a systems engineering approach to training, and state-of-the-art technology; repeated presentation of course materials, and modification by training research personnel on the basis of student and instructor appraisals.

"An Approach to the Development of Synthetic Performance Tests for Use in Training Evaluation," by William C. Osborn, paper for 12th Annual Military Testing Association Conference, French Lick, Ind., September 1970; issued as Professional Paper 30-70, 9 pp., December 1970. AD-719 265

This paper describes an approach to the selection of inexpensive alternatives to fully job-relevant performance tests. Based on the concept of content validity, the approach is to utilize the skill and knowledge required of the trainee as a criterion for assessing the cost and job-relevance of fabricated alternatives to performance tests. Two job tasks are analyzed to illustrate the concept.

TRANSITION—Division No. 3

Research on Factors of Civilian-Military Transition of Army Recruits (Research for the Department of the Army)

A Follow-up Study of the Performance of Army Recruits in Their First Tour, by John S. Caylor and Howard H. McFann, Professional Paper 10-68, 12 pp., April 1968; based on a briefing to Deputy Chief of Staff for Personnel, Department of the Army, and to Deputy Chief of Staff for Personnel, U.S. Continental Army Command, October 1967. AD-668 844

A follow-up study was conducted on the first-tour performance of 8,000 Army recruits who had been intensively studied in Basic Combat Training at Fort Ord, California in 1961. Performance was measured by data from Army administrative records: (a) *in*eligibility to reenlist; (b) a composite score reflecting terminal pay grade, and bonus and penalty points for other recorded factors. For both volunteers and draftees, satisfactory first-tour performance was reliably and positively related to age, education, GT Aptitude Area, BCT proficiency test performance, and evaluation by fellow trainees in the BCT platoon. Men low on these variables were two to three times as likely to be ineligible to reenlist. This study concludes that (a) it is the older, better-educated, higher-aptitude men—categories whose early response to the Army is least favorable—whose service is evaluated most highly by the Army during their typical single tour of duty; and (b) standard Army administrative data could be used effectively to predict or evaluate how changes in recruit selection and training affect first-tour performance.

Recruit Reactions to Early Army Experience, by Richard Snyder and John S. Caylor, Professional Paper 7-69, 23 pp., March 1969. AD-686 620

This paper reports a study made during 1960-62 in relation to possible changes in Army induction processing, early orientation, and basic training. The ultimate goal was to determine means of improving motivation, morale, and attitudes of the Army recruit. The major findings—which apply to 1960-62 and have not been updated to reflect changes in the manpower pool, Army training, Army personnel policies, and other important matters since that time—were that (1) men who were most interested in the Army as a career were not the men with the highest potential; (2) early experiences were likely to give the recruit the feeling that the Army had little interest in him as an individual; (3) the recruit experienced a lack of physical or intellectual challenge in the BCT program; (4) recruit attitudes were particularly sensitive to influence during the early weeks of training; and (5) recruits with both career interest and high potential were in a minority, and no procedures existed to reinforce the favorable motivation of these most promising recruits during the critical time of introduction to the Army.

Relationship Between Army Recruit Characteristics and First Tour Performance, by John S. Caylor, Technical Report 69-5, 36 pp., April 1969 (TRANSITION II). AD-689 015

A follow-up study of recruits, whose adaptation to the Army was initially studied in Basic Combat Training in October-December 1961, was conducted to determine their performance subsequent to BCT and their degree of success in the Army in relationship to recruit characteristics observed during BCT. Administrative data were collected on 1,782 volunteers and 2,620 draftees in 30 BCT companies by means of questionnaires completed at the time of their termination in 1963 and 1964. It was found that the older, better educated, higher aptitude recruit adapted best, performed best, and contributed most to the Army throughout his period of service. There was a positive relationship between judgments of BCT peers and subsequent performance. The more favorable the recruits' early attitude toward the Army, the less contribution they made to the Army throughout their tour of duty. Recruits from the lower ranges of age, education, and GT were more likely to have problems in adjustment, discipline, and training. Early Army performance (BCT proficiency and sociometric peer ratings) was predictive of later Army success. Early attitudes toward the Army and career orientation showed an inverse relationship to success in or contribution to the Army.

Research By-Products resulting from this research effort are listed in Part III.

TRIGGER—Division No. 2

Monitoring an M1 Training Program Designed to Reduce Flinching (Research for the Department of the Army)

The Relationship Between 1000" Range and Known-Distance Range Rifle Scores, by Frank J. McGuigan, Research Memorandum 3, December 1953. PB-132412 AD-23 851

Statistics obtained from a study of performance of basic trainees on the rifle range showed that scores on the 1000" and the known-distance rifle ranges correlate significantly for slow fire, sustained fire, and total scores. However, individual known-distance performance cannot be accurately predicted on the basis of 1000" range scores, nor can the 1000" range be substituted for the known-distance range as a measure of proficiency.

Evaluation of a Special Live-Firing Trigger-Squeeze Exercise, by Victor H. Denenberg and F.J. McGuigan, Technical Report 6, May 1954. PB-114201 AD-32 656

This study evaluated a special trigger-squeeze exercise developed at Fort Dix as a means of improving M1 rifle performance by eliminating or reducing "flinch." The procedure included extra rounds fired by the trainee during the exercise and the help of specially trained coaches, as well as the anti-flinch trigger-squeeze exercise itself. With each of these variables controlled, the analysis of the findings indicated that the trigger-squeeze exercise did not improve performance.

TUMOR REGISTRY—Division No. 1 (System Operations)

Tumor Registry Survey
(Research for Louisiana Regional Medical Program)

Staffing and Training Requirements for Tumor Registry Centers in the State of Louisiana, by C. Dennis Fink, Technical Report 69-101, January 1969. AD-684 710

This study involved a brief analysis of existing Tumor Registry Centers and exploration of training and organizational factors that might be associated with staff requirements in establishing new centers. The development of a self-instructional training package for the medical vocabulary required of a Tumor Registry secretary was recommended. Study findings covered the following: objectives, services, and procedures for a state-wide tumor registry system; centralization of tumor registry activities; alternative registry systems; relation between registry procedural alternatives and extent of physician involvement in record abstracting; training implications of a state-wide tumor registry system; and research projects relating to Tumor Registries.

Establishment of a Tumor Registry System for Louisiana: Proposals on Objectives, Capabilities, and Structure, by C. Dennis Fink, Technical Report 70-101, 41 pp., June 1970. AD-711 249

Tumor registry supervisors and secretaries, and hospital administrators at nine Louisiana hospitals and clinics were interviewed to obtain information to guide the design and development of a central tumor registry and state-wide registry system. Information was obtained on (a) local interest in the establishment of a state-wide registry system; (b) services which a central registry might provide; (c) manner in which existing local registries are utilized; and (d) conditions under which hospitals would be willing to join the central registry system. Six hospitals and one community registry were identified as candidates for incorporation into the initial registry system.

TV—Division No. 1 (System Operations)

Evaluation of Television in Army Training
(Research for the Department of the Army)

"Future Trends in Television Teaching and Research," by Joseph H. Kanner, paper for symposium at American Psychological Association convention, New York City, 1954.

"Present Status of Signal Corps Television Research," by Richard P. Runyon and Joseph H. Kanner, paper for symposium at American Psychological Association convention, New York City, 1954.

"Procedures for Improving Television Instruction," by Otello L. Desiderato, Joseph H. Kanner, and Richard P. Runyon, paper for symposium at American Psychological Association convention, New York City, 1954.

Television in Army Training: Evaluation of Television in Army Basic Training, by Joseph H. Kanner, Richard P. Runyon, and Otello Desiderato, Technical Report 14, November 1954 (TV I). PB-116695 AD-57 971

This study undertook to measure the comparative teaching effectiveness of television instruction and the Army's regular instruction for representative portions of basic training. The relative teaching effectiveness of kinescope recordings and of regular instruction were also compared. The experimental design permitted separate analysis of the effects of these methods for high- and low-aptitude trainees. Results of the study indicate that (should conditions require) instruction of the types used in this study could be presented by television with the strong assurance that there would be no loss in learning effectiveness.

UNIFECT–Division No. 4

Procedures for Increasing the Effectiveness of Small Infantry-Type Units (Research for the Department of the Army)

Some Determinants of Small-Group Effectiveness, by Clay E. George, Research Memorandum, October 1962. AD-624 204

Pilot Studies of Team Effectiveness, by Clay E. George, George R. Hoak, and John Boutwell, Research Memorandum, February 1963 (UNIFECT I). AD-627 214

"Verbal Coordination and Performance in Small Military Teams," by Adie V. McRae, paper for American Psychological Association convention, Los Angeles, September 1964 (UNIFECT I).

"Structures, Training Procedures, and Operations of Small Work Groups," by Clay E. George, paper for meeting of Georgia Psychological Association, Jekyll Island, Ga., February 1965 (UNIFECT I).

Interaction Content and Team Effectiveness, by Adie V. McRae, Technical Report 66-10, June 1966 (UNIFECT I). AD-637 311

An experiment was performed to study intrateam interaction under controlled conditions. Coordination was a prerequisite for completing a team task and verbal interaction was the sole means of coordination. All such communications were tape-recorded. Communication content was categorized into two major areas related to task demands and to organizational efforts. With time to solve held constant, number of errors correlated negatively with number of communications specifically concerned with effective response to task demands, but did not yield consistent correlations with interaction related to organizational aspects.

"The View From the Underside—Task Demands and Group Structures," by Clay E. George, paper for symposium at American Psychological Association convention, New York, September 1966; included in *Goal-Directed Leadership: Superordinate to Human Relations?*, Professional Paper 11-67, March 1967. AD-649 864

"Training for Coordination Within Rifle Squads," by Clay E. George, paper for symposium at 12th Annual Army Human Factors Research and Development Conference, Fort Benning, Ga., October 1966; included in *Individual and Small-Unit Training for Combat Operations*, Professional Paper 21-67, May 1967. AD-653 845

UNIROTE–Division No. 3
A Study of Combat Arms Unit Rotation
(Research for the Department of the Army)

A Survey of Opinions About the Unit Rotation Plan (Operation GYROSCOPE), by Victor B. Cline, Fred J. Shanley, Morris Showel, Irving Richardson, and Martin W. Spickler, interim report, January 1955. AD-488 593

Opinion questionnaires were administered to 2550 military personnel to ascertain their reactions to a newly introduced program of unit rotation (Operation GYROSCOPE). Reactions were obtained from 1200 officers and men in the first three TO&E units to be phased into the GYROSCOPE program, from 900 inductees in three reception centers, and from 450 men in six recruiting stations. The GYROSCOPE plan provided important inducements for reenlistment; over 90% of those surveyed felt that unit rotation would be an improvement over the current system. A greater proportion of men with prior service reacted favorably to GYRO than men without prior service.

A Survey of Opinions Regarding Operation GYROSCOPE in the First Division, by Victor B. Cline, Irving F. Richardson, Fred J. Shanley, and Morris Showel, Staff Memoramdum, July 1955. AD-488 592

A questionnaire dealing with attitudes about a new unit rotation plan (Operation GYROSCOPE), reenlistment intentions, and promotion policy was given to a random sample of officers and enlisted men in an infantry division overseas while the division was making final plans for rotating back to the United States.

A Comparison of Reenlistment Intentions With Later Reenlistment Behavior in Three GYROSCOPE Units, by Fred J. Shanley, Morris Showel, Victor B. Cline and Irving Richardson, Staff Memorandum, July 1955. AD-488 594

Questionnaires were administered to 1200 officers and men in three TO&E units about to enter a new program of unit rotation, Operation GYROSCOPE, to establish the number and types of men who intended to sign up for the program. Actual reenlistment behavior was then determined by examining each man's 201 file and utilizing recruiting office records and the post locator at each post. It was found that men's reactions to specific features of the GYRO plan related most highly to reenlistment behavior, followed by reactions to various aspects of life in their present Army unit (job satisfaction, personal freedom, etc.). The men's expectations regarding the new GYRO program did not seem to have much to do with their subsequent GYRO reenlistment behavior.

UNIT–Division No. 2
Evaluation and Improvement of Tank Platoon Training
(Research for the Department of the Army)

"The Miniature Armor Battlefield," by Robert A. Baker, *Armor*, vol. LXIX, no. 5, September-October 1960 (UNIT II).

"R/C Tanks for Realistic Combat Training," by Robert A. Baker, *Electronics*, vol. XXXIII, no. 45, November 1960 (UNIT II).

The Determination of Combat Job Requirements for Tank Platoon Leader and Tank Platoon Sergeant, by Eugene G. Roach and Robert A. Baker, Technical Report 69, March 1961 (UNIT I). PB-155868 AD-254 701

To analyze the job requirements for tank platoon leaders and sergeants, and to determine the relative importance of the job activities in combat, a master list was prepared on the basis of relevant literature and interviews with key personnel. The jobs in the list were rated by several hundred armor officers and noncommissioned officers in TOE units. A final list of jobs which they considered essential in combat was staffed, and prepared for use by the Army as a basis for determining the content of relevant curricula and proficiency tests, and for expanding the description for MOS 131.7.

"The Armor Combat Decisions Game," by Robert A. Baker, *Armor*, vol. LXXI, no. 1, January-February 1962 (UNIT II).

"The Tank Platoon Combat Readiness Check," by Robert A. Baker and LTC John G. Cook, (USA Ret.), *Armor*, vol. LXXI, no. 3, May-June 1962.

"$600 Tanks Embattled," by Marvin Parrott, *Army*, vol. 13, no. 6, January 1963.

The Development and Evaluation of the Tank Platoon Combat Readiness Check, by Robert A. Baker and John G. Cook, Research Memorandum, April 1963 (UNIT I). AD-405 840

Development and Evaluation of Systems for the Conduct of Tactical Training at the Tank Platoon Level, by Robert A. Baker, John G. Cook, William L. Warnick, and James P. Robinson, Technical Report 88, April 1964 (UNIT II). AD-438 845

To provide favorable learning conditions under which to conduct tank platoon tactical training, and to overcome the training difficulties of space and cost, a series of tactical training exercises and two training systems—a Miniature Armor Battlefield (MAB) and an Armor Combat Decisions Game (CDG) (portable war gaming devices)—were developed and evaluated. Tank platoon leaders and crews trained for a week on the MAB performed better (by 18% and 23% respectively) on a field performance test than comparable officers and crews not so trained; platoon leaders trained for a week on the CDG performed better (by 25%) than comparable officers. Both systems will effectively prepare tank platoon personnel for field training with operational equipment. The advantages and disadvantages of the systems are discussed.

Research By-Products resulting from this research effort are listed in Part III.

UPGRADE–Division No. 6 (Aviation)
Improving Aviation Maintenance Training Through Task and Instructional Analysis
(Research for the Department of the Army)

"Work Unit UPGRADE–Improving Aviation Maintenance Training Through Task and Instructional Analysis," by Wallace W. Prophet, briefing to U.S. Continental Army Command, Fort Monroe, Va., October 1968; included in *Use of Job and Task Analysis in Training*, Professional Paper 1-69, 42 pp., January 1969. AD-688 810

UPSTREAM–Division No. 5
Procedures for Anticipating Training Requirements for Future Air Defense Guided Missile Systems
(Research for the Department of the Army)

"Human Resources Research in Managing the Weapons System," by W. Loren Williams, Jr., paper for symposium on Reliability of Weapons Systems, held by the Western Electric Co., Winston-Salem, N.C., September 1958.

"Anticipating Training Requirements for Future Weapon Systems," by J.C. Rupe, paper for symposium at annual meeting of Southwestern Psychological Association, Spring 1960.

Some Problems in Predicting Training Requirements for Future Weapon Systems, by Robert A. Goldbeck and Emanuel Kay, Research Report 6, November 1960 (Subcontractor: American Institute for Research) (UPSTREAM II). PB-153288 AD-246 880

This study included: (a) A review and summary of several earlier AIR studies concerned with prediction of job and training requirements, delineating problem areas for which solutions must be found if a complete and systematic procedure for predicting the training requirements of future weapon systems is to be developed; (b) an attempt to develop training requirements information for a specific missile system (Hawk) just prior to development of a complete prototype, listing sources of information available at this stage and assessing their relevance in predicting future training needs. Administrative arrangements needed with system-development agencies to facilitate effective predictions of human factor requirements are discussed.

"The Prediction of Training Requirements for Future Weapon Systems," by J.C. Rupe, paper for symposium at annual meeting of Rocky Mountain Psychological Association, Spring 1961.

"Procedures for Obtaining Human Factors Information as an Intergral Part of Weapon System Design and Development," by J.C. Rupe, paper for 7th Annual Army Human Factors Engineering Conference, University of Michigan, October 1961 (UPSTREAM III).

"The Prediction of Training Requirements for Future Weapon Systems," by J.C. Rupe, paper for meeting of Human Factors Society, New York, November 1962 (UPSTREAM III).

The Prediction of Training Requirements for Future Weapon Systems: A Personnel Support System Research and Development Process, by J.C. Rupe, Technical Report 83, April 1963 (UPSTREAM III). AD-403 280

The current state of the art particularly that of the Army for predicting personnel and training requirements during weapon system design and development was determined by means of a literature review. The main object of this study was to develop procedures for effectively and economically providing human factors data, and products based upon them, needed for concurrent building of a Personnel Support System (conceived to be the operator and maintenance personnel for a weapon system and the basic job data, equipment, and materials required for selecting and training these personnel).

Research By-Products resulting from this research effort are listed in Part III.

UTILITY—Division No. 3

Study of Men in Lower Mental Categories: Job Performance and the Identification of Potentially Successful and Potentially Unsuccessful Men (Research for the Department of the Army)

"Progress Report on Work Unit UTILITY," by Robert Vineberg, Elaine Taylor, and John S. Caylor, briefings to U.S. Department of Defense, September and October 1969; issued as Professional Paper 6-70, 29 pp., March 1970. AD-705 730

This paper summarizes and illustrates some of the early findings of HumRRO research to determine how soldiers in Mental Category IV and in other mental categories on the Armed Forces Qualification Test compare in the performance of jobs. Tests are described and results shown with data gathered from five selected MOSs—Armor Crewman, General Vehicle Repairman, Unit and Organizational Supply Specialist, Cook, and Medical Corpsman.

"Performance in Four Jobs: The Role of Mental Ability and Experience," by Robert Vineberg and Elaine N. Taylor, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 31-70, 17 pp., December 1970. AD-722 272

This paper is based on data from Work Unit UTILITY research on job performance of men at different ability levels. The paper deals with data testing performance in four jobs; Armor Crewman, Vehicle Repairman, Supply Specialist, and Cook, of various Armed Forces Qualification Test (AFQT) levels over specified periods of time.

"Marginal Manpower: Job Capability as a Joint Function of Aptitude and Experience," by Elaine N. Taylor and Robert Vineberg, paper for 26th Military Operations Research Symposium, Monterey, Calif., November 1970.

In this paper, research is reported on men with marginal mental ability (Category IV, 10-30 Armed Forces Qualification Test scores) as compared to non-category IV men, in several different kinds of jobs—Armor Crewmen, Vehicle Repairmen, Supply Clerks, and Cooks. Both groups show job growth with the Non-IVs performing somewhat better. While the differences between mental groups tend to remain for a considerable length of time, such differences are probably not critical since both Category IVs and Non-IVs perform satisfactorily relatively early in their job careers.

Performance in Five Army Jobs by Men at Different Aptitude (AFQT) Levels: 1. Purpose and Design of Study, by Robert Vineberg, Elaine N. Taylor, and John S. Caylor, Technical Report 70-18, 38 pp., November 1970. AD-715 614

To provide information about the performance and characteristics of effective and ineffective marginal personnel in the Army, a study has been made of approximately 1800 men with experience ranging up to 20 years in five MOSs (11E, Armor Crewman; 63C, General Vehicle Repairman; 76Y, Unit and Organizational Supply Specialist; 91B, Medical Specialist; 94B, Cook). The sample included a comparison group of men in the same jobs but coming from the upper (non-marginal) part of the AFQT distribution. Performance was measured by intensive job sample tests, job knowledge tests, and supervisor ratings. Information about background, personal characteristics, and military experiences was obtained through biographical questionnaires, a battery of published and experimental tests, and Army records. This report, the first in a series, describes the rationale, research design, and general chronology of research events in the study.

Performance in Five Army Jobs by Men at Different Aptitude (AFQT) Levels: 2. Development and Descriptions of Instruments, by Robert Vineberg, Elaine N. Taylor, and Thomas G. Sticht, Technical Report 70-20, 284 pp., November 1970. AD-720 216

To provide information about the performance and characteristics of effective and ineffective marginal personnel in the Army, a study has been made of approximately 1800 men with experience ranging up to 20 years in five different Army MOSs (11E, Armor Crewman; 63C, General Vehicle Repairman; 76Y, Unit and Organizational Supply Specialist; 91B, Medical Specialist; 94B, Cook). The study included a group of men with Armed Forces Qualification Test scores in the marginal range and a comparison group of men in the same jobs, but in the upper levels of the AFQT distribution. Performance was measured by intensive job sample tests, job knowledge tests, and supervisor ratings. Information about background, personal characteristics,

and military experiences was obtained through biographical questionnaires, a battery of published and experimental tests, and Army records. This report, the second in a series presenting the extensive data and analyses, describes the data collection instruments and their development and administration.

Effects of Aptitude (AFQT), Job Experience, and Literacy on Job Performance: Summary of HumRRO Work Units UTILITY and REALISTIC, by Robert Vineberg, Thomas G. Sticht, Elaine N. Taylor, and John S. Caylor, Technical Report 71-1, 82 pp., February 1971. AD-722 392 (see also REALISTIC)

A series of studies were conducted to determine how Army personnel in Mental Category IV and in other mental categories compare in their job performance and in their overall suitability for military service. Information is provided concerning the demands for reading, arithmetic, and listening skills in four major military occupational specialties. The performance of approximately 1800 men with Army experience ranging up to 20 years was measured by intensive job sample tests, job knowledge tests, and supervisor ratings. Information about background, personal characteristics, and military experiences was obtained through biographical questionnaires, a battery of published and experimental tests, and Army records. The major findings and conclusions are given in this summary report, which will be followed by several detailed reports on various research phases.

VIGIL–Division No. 5

Methods and Techniques for Improving Performance of Air Defense Missile Operator Personnel (Research for the Department of the Army)

"Research on Operators of Air Defense Systems," by Robert D. Baldwin, paper for symposium at annual meeting of Southwestern Psychological Association, Spring 1960.

The Accuracy of Two Modes of Radar Tracking for Two Visual Noise Levels, by Bruce O. Bergum, I. Charles Klein, and Robert D. Baldwin, May 1960 (VIGIL II). AD-815 517

Detectability on a PPI Scope as a Function of Target Velocity and Noise Level, by Robert D. Baldwin, Davis J. Chambliss, and A. Dean Wright, Research Memorandum, 28 pp., February 1961; published under the title, "Target Detectability as a Function of Target Speed, Noise Level, and Location," in *Journal of Applied Psychology*, vol. 46, no. 1, February 1962 (VIGIL II). AD-252 191

An experiment was conducted using a PPI radar display on which 40 subjects observed targets displayed in each of four contiguous 30-degree scope sectors at each of four radial velocities under two levels of visual noise. Analysis of variance of the mixed latin-square design did not reveal reliable differences in scores due to velocity, noise level, or velocity orders. More target designations occurred for the inner than the outer contiguous scope sectors, although the ratios of correct to total calls per sector were not different. These results were interpreted as being due to differences in scan frequency rather than reinforcement frequency.

"Vigilance Research," by Bruce O. Bergum, paper for symposium at annual meeting of Rocky Mountain Psychological Association, Spring 1961.

"Instability in Analogue-Type Target Simulators," by R.D. Baldwin, paper for NTDC Conference on Radar Simulation, Port Washington, N.Y., May 1961 (VIGIL II).

Development and Use of Proficiency Tests for Nike System Launching Platoon Operators, by James D. Hitt, Jr., and Robert D. Baldwin, Technical Report 72, August 1961 (VIGIL I). AD-263 169

The object of this study was to develop individual tests of proficiency suited to augmenting crew rating procedures used in Army Air Defense systems. Specifically, job skill and job knowledge tests were developed for two Nike-Ajax launching platoon operator positions—the Section Operating Control Indicator Operator and the Chief of Section—based on crew drill procedures prescribed for air defense alert. The tests proved to have value (a) as a quality control device, that is, they provide feedback on training needs which command personnel can use to improve subsequent training, and (b) in detecting personnel errors not observed in crew ratings made during Annual Service Practice.

Radar Tracking Accuracy as a Function of Training and Task Variables, by Robert D. Baldwin and A. Dean Wright, Technical Report 73, October 1961 (VIGIL II). AD-264 927

To evaluate the effect of selected training, personnel, and job factors on accuracy of angle tracking by radar operators, 36 subjects were briefly trained in tracking, half with simulated jamming and half without. Divided into four equal groups, they were tested with simulated targets having alternate headings of 1600 and 4800 mils. Results indicated that pattern and magnitude of tracking errors differed as a function of target heading, and tracking errors tended to increase with task duration. Differences in GT aptitude within a score range of 90-120 were not found to be related to accuracy of aided-rate azimuth tracking.

A Survey and Analysis of Vigilance Research, by Bruce O. Bergum and I. Charles Klein, Research Report 8, November 1961 (VIGIL IV). AD-267 223

Empirical data drawn from a survey of the research literature on vigilance behavior are presented in terms of the effects on vigilance of variables discussed under the groupings of task, environmental, and motivational factors. The adequacy of current interpretations of vigilance data is considered for three classes of theories: conditioning, expectancy, and motivation. Approaches to the solution of the vigilance program are discussed in terms of anticipated technological developments, and areas of research on monitoring problems associated with air defense systems are suggested.

Target Detectability on an A-Scope as Influenced by Vertical and Horizontal Video Amplification, by A.D. Wright and R.D. Baldwin, Research Memorandum, 14 pp., February 1962; presented under the title, "Target Detectability on an A-Type Radar Display as a Function of Horizontal and Vertical Video Amplification," at American Psychological Association convention, St. Louis, Mo., September 1962 (VIGIL II). AD-479 185

An experiment was conducted to determine the effect of horizontal and vertical video amplification upon time to detect targets in noise on an A-type radar display. Statistical analysis revealed a significant inverse relationship between target detection time and horizontal video amplification. In contrast, vertical video amplification by itself, or in conjunction with horizontal video amplification, did not significantly affect detection performance. The facilitative effect of horizontal video amplification was attributed to the amplification of specific target characteristics which perceptually differentiate the target from the noise. The effect of vertical video amplification was attributed to the Weber-Fechner phenomenon.

The Effects of Pairing, Rest Intervals, Signal Rate, and Transfer Conditions on Vigilance Performance, by Bruce O. Bergum and Donald J. Lehr, Research Memorandum, March 1962 (VIGIL IV). AD-605 151

An Attempt to Develop a Radar Operator Screening Test: A Report of Simulator Instability, by Robert D. Baldwin and A. Dean Wright, Technical Report 79, June 1962 (VIGIL II). AD-278 207

As a possible means of improving the effectiveness of radar operators, a short screening test—a by-product of previous research—was given to air defense missile crewman trainees in an attempt to identify individuals likely to be particularly adept at target detection. Subjects were given a proficiency test to validate the training implications of the earlier findings. The high correlations originally found between scores on the screening test and the proficiency test were discovered to have been a consequence *not* of consistent differences in human abilities, but of instability in simulator output signals. It was concluded that it is not feasible to develop any type of screening test using radar simulation equipment having tolerances in "burn through" range greater than 1% maximum radar range.

The Relation Between Radar Detection and the Observer's Concept of a Target, by Robert D. Baldwin, A. Dean Wright, and Donald J. Lehr, Research Memorandum, June 1962 (VIGIL II). AD-288 440

"Vigilance Performance as a Function of Paired Monitoring," by Bruce O. Bergum and Donald J. Lehr, *Journal of Applied Psychology*, vol. 46, no. 5, October 1962 (VIGIL IV).

Two experiments were performed to determine the effect of pairing of observers upon individual monitoring performances. Both studies employed two groups of 20 subjects each. Group 1 consisted of paired monitors and Group 2 consisted of isolated monitors. Experiment I employed a rate of 24 signals per hour; Experiment II employed a rate of 6 signals per hour. All subjects monitored a circular light display for a period of 90 minutes. Neither experiment indicated an overall facilitation of performance resulting from pairing, but both demonstrated significant relationships between performances of the members of the pairs. It was hypothesized that the degree of conversational interaction between members of the pairs might account for the observed effect.

"Vigilance Performance as a Function of Interpolated Rest," by Bruce O. Bergum and Donald J. Lehr, *Journal of Applied Psychology*, vol. 46, no. 6, December 1962 (VIGIL IV).

Two experiments were performed on the effects of interpolated rest upon monitoring performance at both high and low signal rates. Experiment I employed two groups of 20 subjects each; Experiment II employed two groups of 10 subjects each. One group of subjects worked on a light monitoring task for three 30-minute periods separated by 10-minute rest periods. The second group worked continuously for 90 minutes on the same task. Experiment I employed 24 signals per hour; Experiment II employed 6 signals per hour. The results indicated a highly significant facilitation of detection performance as a result of interpolated rest at both signal rates and demonstrate the effectiveness of relatively brief rest intervals in maintaining high performance even with low signal rates.

"The Effects of Authoritarianism of Vigilance Performance," by Bruce O Bergum and Donald J. Lehr, *Journal of Applied Psychology*, vol. 47, no. 1, February 1963 (VIGIL IV).

An experiment was performed on the effects of authoritarian monitoring conditions upon vigilance performance. Two groups of 20 subjects each were employed. One group worked at a light monitoring task for a period of 135 minutes without rest and alone. The second group worked at the same task for the same amount of time but was observed by either a commissioned or noncommissioned officer according to a random visiting schedule. Signal rate was 12 signals per hour. The results indicated a highly significant facilitation of detection performance resulting from observation by the officers. It was suggested that these conditions represent an extreme point along a dimension of perceived threat to the monitor.

Vigilance Performance as a Function of Task and Environmental Variables, by Bruce O. Bergum and Donald J. Lehr, Research Report 11, May 1963 (VIGIL IV). AD-404 212

Experiments were conducted to compare the effects on vigilance of paired monitoring, high and low signal rates, rest periods, knowledge of pretest performance and of monitoring scores, rewards, supervision, and false signals. A final study compared four combinations of the three most effective variables—multiple monitoring, rest periods, and supervision. The results suggest that significantly high levels of performance can be maintained over fairly extended time periods, with careful selection of conditions.

A Filter Method of Adjusting PPI's, by Robert D. Baldwin and A. Dean Wright, Technical Report 85, June 1963 (VIGIL II). AD-408 374

The Defence Research Board of Canada developed a Filter Method of adjusting plan position indicators using neutral density filters. To determine how this method could be applied to U.S. Army air defense radars, and to identify the neutral density values resulting in adjustments giving optimum visibility conditions, tests were conducted using P-19 and P-7 phosphor screens on the PPIs of the Nike-Hercules and Hawk systems. It was found that no filter was needed to adjust the Sweep Intensity level. For the Hercules system, using a normal receiver, a 2.0 neutral density filter provided an optimum adjustment of the Video Gain control; for the Hawk system, using moving target indicator receiver, an optimum level was achieved with a 3.0 filter. The results indicate that type of phosphor screen used does not determine filter density, whereas type of receiver circuit used does affect optimum density.

"The Influence of Task and Environmental Variables on the Maintenance of Vigilant Performance," by Bruce O. Bergum, paper read at 9th Annual Army Human Factors Research and Development Conference, October 1963.

"End-Spurt in Vigilance," by Bruce O. Bergum and Donald J. Lehr, *Journal of Experimental Psychology*, vol. 66, no. 4, October 1963.

Vigilance: A Guide to Improved Performance, by Bruce O. Bergum, Research Bulletin 10, October 1963 (VIGIL IV). AD-424 888

This Research Bulletin presents an informal report on the key findings or implications that have emerged so far from experimental studies of vigilance performed by various agencies. The emphasis is not upon theories of vigilance behavior but on implications for action in setting up vigilance situations. References from which material was drawn for various topics are listed at the end of the report.

"Monetary Incentives and Vigilance," by Bruce O. Bergum and Donald J. Lehr, *Journal of Experimental Psychology*, vol. 67, no. 2, February 1964 (VIGIL IV).

A visual vigilance experiment was performed in which (a) the effects of monetary incentives, and (b) the effects of removal of these incentives were tested. Twenty experimental and twenty control subjects were tested in two sessions of 60 and 90 minutes each. The experimental group received 20¢ for every signal correctly detected and had 20¢ deducted for every signal missed in the first session, but received no reward in the second session. The control group was never rewarded. The rewarded group performed better than the controls in the first period of the first session, and poorer in the final period of the second session. These effects were interpreted as resulting from experimentally induced changes in the motivational level of the reward group.

VIGIL *(Cont.)*

"Relation Between Radar Detection and the Observer's Concept of a Target," by R.D. Baldwin, A.D. Wright, and D.J. Lehr, *Journal of Applied Psychology*, vol. 48, no. 2, April 1964 (VIGIL II).

An experiment tested the hypothesis that target detectability on a PPI radar display depends on observer's knowledge of the attributes defining a target. Equal numbers of observers were given either a brightness, a form, or a combined brightness-form set during training. A fourth group was given only demonstration training. The criterion test involved detection of two target sizes in two levels of visual noise for three target speeds. Analysis of variance revealed an interaction between set and noise level, confirming the hypothesis for the high noise level only.

Radar Target Detection as Influenced by Experience and Training, by A.D. Wright, Edward W. Frederickson, and James L. Claflin, Research Memorandum, October 1964 (VIGIL V). AD-455 767

"Radar Target Detection as a Function of Search Area and Viewing Distance," by A.D. Wright, E.W. Frederickson, J.L. Claflin, *Journal of Applied Psychology*, vol. 49, no. 4, August 1965 (VIGIL V).

The detection task employed a 9¼-inch Plan Position Indicator (PPI) and simulated targets. Thirty Army trainees served as subjects. Each subject performed the nine combinations of viewing distance—6, 12, and 18 inches—and of search area—whole scope, ¼ scope, and 11/16 inch-diameter circle within the whole scope. A treatments x treatments x subjects analysis of variance indicated significant main and interaction effects: (a) As viewing distance increases, detection performance is degraded; (b) as search area increases, detection performance is degraded; (c) optimum viewing distance when searching the whole scope is approximately 12 inches, while optimum viewing distance for a small area (11/16-inch diameter) within a larger area is 6 inches or less.

"Risk-Taking Set and Target Detection Performance," by Gary W. Evans, *Journal of Applied Psychology*, vol. 49, no. 4, August 1965.

An experiment tested the hypothesis that an observer's risk-taking set is related to his target detection performance on a radar display. Subjects were given an equal number of trials under neutral, risky, and cautious sets, where differential sets were produced by instructions. As hypothesized, when instructed to adopt a risky set, subjects made earlier detections of targets and had a higher false positive identification rate than the same subjects when instructed to adopt a cautious set. These findings support the contention that radar detection performance can be regarded as a decision task.

Sources of Variability in Missile Unit Evaluations, by Robert D. Baldwin and Harry E. Anderson, Technical Report 66-13, June 1966. AD-636 776

The unit proficiency scores obtained during Missile Annual Service Practice firings during 1958 were analyzed. The objectives of the analyses were to identify the major factors affecting unit proficiency scores and to identify systematic sources of variance in the scores obtained. The analyses indicated (a) essentially no correlation existed between the Crew Performance and Firing Result Scores obtained, (b) differences in the total ASP Scores were primarily dependent upon differences in Firing Result Scores, and (c) differences in Firing Result Scores obtained were distributed in accordance with a random model.

Research By-Products resulting from this research effort are listed in Part III.

VISION–Division No. 2

Evaluation of an Experimental Armed Forces Vision Tester
(Research for the Department of the Army)

Evaluation of an Experimental Armed Forces Vision Tester, by Howard C. Olson, Information Report, February 1954. AD-488 589

As a preliminary study to aid the Armed Forces in selecting a vision testing device to effectively assess the visual abilities of service personnel, the test-retest reliability of two vision testers was determined by giving visual tests to two groups of enlisted men. Aspects tested were visual acuity, phoria (muscle balance of the eyes), and depth perception.

VOCTAX–Division No. 3[1]

The Design and Evaluation of Vocational Technical Education Curricula Through Functional Job Analysis
(Research for the Office of Education, Department of Health, Education, and Welfare)

The Design and Evaluation of Vocational Technical Education Curricula Through Functional Job Analysis, by Kan Yagi, Hilton M. Bialek, John E. Taylor, and Marcia Garman, Final Report to Sponsor, August 1968, ERIC number ED 023 913; published as HumRRO Technical Report 71-15, 86 pp., June 1971.

[1]The research was conducted by a team of HumRRO researchers, working directly for the Office of Sponsored Research, The George Washington University, while HumRRO was a part of the university.

VOLAIR—Motivation, Morale, and Leadership Division
A Study of the Comparison of Basic Trainees (Non-Airborne Volunteers) and Airborne Volunteers on Demographic, Attitude, and Personality Characteristics
(Research for the Department of the Army)

A Study of Airborne Volunteers: I. A Comparison Between Volunteers for the Airborne and Other Basic Trainees (Non-Volunteers). II. A Comparison Between Volunteers Who Successfully Complete Airborne Training and Those Who Fail, Staff Memorandum, February 1954. AD-487 399

Exploration for Guttman Scales in a Study of Airborne Volunteers, by Rita O. Hausknecht, Robert Dressel, and Janet Heilmann, Staff Memorandum, September 1954. AD-487 398

WHOLEPART–Division No. 2

A Comparison of the Whole and Part Methods of Marksmanship Training (Research for the Department of the Army)

Accuracy of M1 Rifle Scores Obtained on the Known-Distance Range, by F.J. McGuigan and Victor H. Denenberg, Research Memorandum 4, January 1954. PB-113031 AD-24 560

A comparison between scores as recorded in the pits and on the firing line disclosed discrepancies such that the firing line scores could not be used for research purposes; also, pit scores on the known-distance range indicated that marksmanship proficiency was considerably lower than that called for by Army standards.

A Comparison of Whole Versus Part Methods of Marksmanship Training, by F.J. McGuigan and Eugene F. MacCaslin, Staff Memorandum, May 1954. AD-477 646

"The Relationship Between Rifle Steadiness and Rifle Marksmanship and the Effect of Rifle Training on Rifle Steadiness," by F.J. McGuigan and E.F. MacCaslin, paper for American Psychological Association convention, September 1954; published in *Journal of Applied Psychology*, vol. 39, no. 3, June 1955.

The aims of the present study were (a) to estimate the reliability of an ataxiameter test of rifle steadiness, (b) to estimate the relationship between rifle steadiness and rifle marksmanship, and (c) to determine the effect of rifle training on rifle steadiness. The study was replicated twice, each time at a different military installation, once with 148 subjects, once with 200 subjects. Target scores were used as Criterion data. This study agrees with previous studies in finding the rifle ataxiameter test to be a reliable instrument. It fails, however, to find as high a relationship (.72; .61) between steadiness and marksmanship as the other studies reported. The present study finds the relationship between rifle steadiness and rifle marksmanship to be about .24 for slow fire, and generally insignificant (although consistent in sign) for sustained (rapid) fire (the coefficient is negative because the test actually measures *un*steadiness). No evidence is found that rifle training affects rifle steadiness.

"Whole and Part Methods in Learning a Perceptual Motor Skill," by F.J. McGuigan and Eugene F. MacCaslin, *American Journal of Psychology*, vol. 68, no. 4, December 1955; paper for annual meeting of Midwestern Psychological Association, Spring 1954.

"The Prediction of Rifle Marksmanship," by E.F. MacCaslin and F.J. McGuigan, *Journal of Applied Psychology*, vol. 40, no. 5, October 1956.

This study obtained multiple correlations showing the relationship between seven pretraining variables (rifle steadiness, firing experience, educational level, two measures of intelligence, mechanical aptitude, and mechanical information) and end-of-training marksmanship. It was found that two of the variables, intelligence and firing experience, predicted end-of-training marksmanship substantially as well as all seven variables taken together. It was also found that higher predictability was obtained by using the whole method than by using a part method. The average two-variable responses for the whole method were .61 for slow fire and .67 for sustained (rapid) fire; for the part method, .38 for slow fire and .32 for sustained fire.

Research By-Products resulting from this research effort are listed in Part III.

WIGWAG—Motivation, Morale, and Leadership Division
Survey of a Technical Training School
(Research for the Department of the Army)

Changes in Student Motivation at an Army Technical Training School, by Janet C. Heilmann, Hobart G. Osburn, and Rita O. Hausknecht, Technical Report 24, December 1955 (WIGWAG II). PB-132404 AD-83 860

This research was conducted in 1954 to determine the differences in motivation and morale of students at the Signal School, and the differences in their reactions to certain aspects of training, since a survey conducted in 1952. In spite of instructional changes made on the basis of the earlier study, end-of-course proficiency test scores had declined. Among the findings of the second survey were these: The educational qualifications of the students had increased; fewer of the 1954 students were motivated to receive Signal School training; the motivation of the students was related to their proficiency scores. Compared with other background groups studied, noncollege men with previous technical experience were most highly motivated for Army technical training and college men with no technical experience had the lowest motivation.

YUCCA—Motivation, Morale, and Leadership Division

Reactions of Troops at an Atomic Maneuver: (a) Study of Palmar Sweating; (b) Information and Attitudes of Troops at DESERT ROCK V[1]
(Research for the Department of the Army)

Relation Between Information Gain and Attitude Change: A Study of Participants in Exercise DESERT ROCK V [Information Report, November 1953].

An Investigation of Two Measures of Palmar Sweat Under Field Conditions, by Noel Paradise, Staff Memorandum, May 1955. AD-488 597

[1] Related research is reported under [illegible]

EXPLORATORY RESEARCH[1]

(Research for the Department of the Army)

Exploratory Research 2—Division No. 7 (Social Science)[1]
Military Assistance Program

Advisor and Counterpart Activities in the Military Assistance Program in the Republic of China, by Dean K. Froehlich and Malcolm S. Klores, Technical Report 65-5, June 1965. AD-478 352

As part of an Exploratory Study to obtain information on human factors training problems in the Military Assistance Program, a questionnaire was sent to 115 advisors and 155 counterparts in one country (Republic of China), asking about the most important problems they have encountered, obstacles to solution of these problems, sources of information that led to action on the problems, and degree of satisfaction with progress. Questionnaires were returned by 77 advisors and 77 counterparts. Advisors reported that their most important problems were in the areas of command responsibility, maintenance, and supply, and the commonest obstacle to solution of problems was the difference in values between themselves and their counterparts. Counterpart statements about problems and obstacles most often dealt with shortages of equipment and supplies. In general, advisors indicated more satisfaction than dissatisfaction with their progress. Counterparts expressed slightly more satisfaction with progress than advisors did. Personal observation constituted the primary source of information leading advisors to attempt changes, while counterparts were influenced in this respect by their advisors and their superior officers.

Exploratory Research 12—Division No. 2[2]
Tactical Command Decision Making

"The Effects of Supervisory Threat on Decision Making and Risk Taking in a Simulated Combat Game," by Robert A. Baker, J. Roger Ware, G.H. Spires, and W.C. Osborn, *Behavioral Science*, vol. 11, no. 3, May 1966.

Army officer groups performed a simulated combat task involving signal detection, decision making and risk taking. Results confirmed predictions from Herbst's theory: risk taking increased and performance generally deteriorated under stress (supervisory threat) for task-involved conditions; risk taking decreased and performance improved under stress for the non-task-involvement condition.

A Tentative Organizational Schema for Decision-Making Problems, by William C. Osborn and Barbara Ettinger Goodman, Technical Report 66-14, July 1966. AD-638 724

To take into account the psychological complexity of most real-life decision problems, and to develop a tentative organization of decision behavior that will embrace the many, highly diverse types of problems which are presumed to result in "decision," an attempt was made to delineate the component response processes that lead to these decisions. The procedure followed was (a) to identify and descriptively define the relevant stimulus and organismic factors, and (b) especially to schematize the response dimensions involved, in such a way as to derive a tentative response matrix. The result is an organizational schema for use in analyzing the response aspects of the decision-making process in terms of the pertinent psychological dimensions of decision behavior.

[1] Work Unit MAP was initiated as a result of ER-2.

[2] Basic Research Study 12 was initiated as a result of ER-12.

Exploratory Research 20—Division No. 1 (System Operations)
Driver Training

"Current Approaches to Driver Safety Training," by A. James McKnight and Richard D. Behringer, paper for mid-year meeting of the Society of Automotive Engineers, Chicago, May 1965.

This paper describes the status of efforts to improve the safety of motor vehicle operation through training. The following types of programs are described: (a) safety components of driver education and improvement courses, (b) remedial training of traffic violators, (c) programs utilizing simulation techniques, and (d) use of mass media, such as books and films. A general lack of conclusive evidence concerning various training approaches is noted. A greater research effort should be directed toward (a) better identification of means by which accidents can be anticipated and avoided, (b) methods of coping directly with driver habits and skills, and (c) techniques of maintaining safe driving behavior through periodic evaluation and retraining.

An Experimental Evaluation of a Driver Simulator for Safety Training, by A. James McKnight and Harold G. Hunter, Technical Report 66-9, June 1966. AD-636 166

The purpose of this research was to determine the effectiveness of automobile simulators in fostering the safe operation of automobiles. A 20-hour driver improvement course was administered to 238 licensed drivers at Fort Lewis, Washington. Approximately half of the trainees received a program taught entirely by conventional methods, while the other half received a program of similar content but including eight hours of simulator instruction. Results of specially constructed tests indicated that simulators were superior to conventional media for developing good driving habits but were no more effective in teaching driving knowledges or influencing driver attitudes. It was concluded that, while simulation represents a potentially valuable means of improving driver habits and skills, substantial modification of current simulator equipment and film is needed to attain this potential.

"An Experimental Evaluation of a Driver Simulator for Safety Training," by A. James McKnight and Harold G. Hunter, paper for American Psychological Association convention, New York, September 1966; issued as Professional Paper 9-66, December 1966. AD-645 962

Two groups of experienced drivers were adminstered a 20-hour driver safety course. One group received eight hours of instruction in a motion picture automobile simulator, while the other received similar material by conventional methods. Measures of driving knowledge, habits, and attitudes were administered following training. The simulator group was slightly superior on those knowledges and habits emphasized in simulator films. The conventional group was slightly superior in other driving knowledges. No differences were observed on the remaining measures. It was concluded that existing simulator programs are not well suited to the needs of experienced drivers.

Exploratory Research 24—Division No. 2[1]
Extended Operations

Summary of Literature Review on Extended Operations, by Dennis Cannon, Eugene Drucker, and Theodore Kessler, Consulting Report, December 1964. AD-634 039

This report comprises a summary of a review of psychological literature pertaining to performance for extended periods of time. The material is organized into the following topics, as they relate to performance: sleep loss, temperature, nutrition, prolonged performance, drugs, stress, vibration, confinement, rest and personnel replacements, noise, radiation, and clothing. In addition, a brief summary of vigilance literature is included. The inconclusive nature of the reviewed research precludes supporting or denying the thesis that troops can be expected to remain effective for 48 hours or longer. Endurance limits may vary significantly from one task to another.

[1] Work Unit ENDURE was initiated as a result of ER-24.

Exploratory Research 27—Division No. 3
Individual Night Training

Visual Detection, Identification, and Localization: An Annotated Bibliography, by Bernard Lyman, Technical Report 68-2, 122 pp., February 1968. AD-667 500

This literature survey was undertaken to explore information on the nature of and conditions for effective visual perception at low light levels. From the survey, 407 reports or studies were selected for inclusion in the annotated bibliography. With a few exceptions, the material falls within the areas of detection, identification, and localization. Many laboratory studies are included which could undergo appropriate modification for repetition in natural settings at low light levels. In each annotation the purpose and the results or conclusions of the study are stated; method and procedure are indicated only briefly.

Exploratory Research 30—Division No. 4[1]
Tactual Communication

"Tactual Communication," by Ronald L. Brown, paper for meeting of Georgia Psychological Association, Jekyll Island, Ga., February 1965.

"Effects of Intense Noise on Processing of Cutaneous Information of Varying Complexity," by R.L. Brown, W.D. Galloway, and K.R. Gildersleeve, *Perceptual and Motor Skills*, vol. 20, no. 3, Part 1, 1965.

Thirty-six enlisted men identified a series of electropulse messages under varying auditory noise conditions. Three levels of message complexity were combined factorially with intermittent noise, continuous noise, and no-noise conditions. Subjects in Simple message groups were asked to indicate on each trial which one of five electrode locations was stimulated. Compound message groups identified both location of stimulation (one of five loci) and pulse duration (.2, 1.6, or 2.5 sec.). Finally, subjects in Complex message groups received electropulses at one of five loci, one of three durations, and one of two intensities (1.0, or 1.3 v d. c.). The amount of information transmitted (I_t) under differing noise conditions did not differ significantly. I_t did increase significantly with an increased number of coded elements. However, discrimination accuracy was not affected by the increased code difficulty. It was concluded that intense auditory noise has little effect upon the reception and processing of cutaneously presented information.

"Effects of Time-Sharing and Body Positional Demands on Cutaneous Information Processing," by R.L. Brown, W.D. Galloway, and R.A. San Giuliano, *Perceptual and Motor Skills*, vol. 20, no. 3, Part 2, June 1965.

Twelve subjects were asked to interpret a series of coded electrocutaneous pulses while engaged in a visual discrimination task of varying complexity. All subjects performed both tasks in each of four body positions (standing, sitting, kneeling, and prone). Subjects were asked to indicate on each trial which one of four electrode locations was stimulated and whether duration of stimulation was .6 or 1.6 sec. A constant intensity of 1.5 v at 60 cps was employed. Three levels of complexity (no visual stimuli, 4x4 metric figures, and 8x8 metric figures) were employed in the visual task. In the cutaneous task, analysis of information transmitted, location errors, duration errors, and total errors indicate that time-sharing demand significantly impaired performance, whereas variation in body position had negligible effect.

[1] Work Unit COMTAC was initiated as a result of ER-30

Exploratory Research 38—Division No. 6 (Aviation)
Research in Training Requirements for Warrant Officer Aviators

"Statements of Career Intentions: Their Relationship to Military Retention Problems," by H. Alton Boyd, Jr., and Wiley R. Boyles, paper for annual meeting of Alabama Psychological Association, Birmingham, Ala., May 1968; issued as Professional Paper 26-68, 18 pp., July 1968. AD-676 790

A worldwide questionnaire survey was conducted to define the utliization of, and to determine the optimum role for, aviation warrant officers in the U.S. Army. Responses to questions regarding their career intentions, their systems of values, and their reasons for pursuing a civilian or military career were made by 1,957 aviation warrant officers. They constituted 83% of the target population. Since the survey, obligated tours of duty have expired for 635 of the men. Of these, 361 departed active duty and 274 chose to extend their active service. Comparisons of the attitudes, motivations, and values of the two different groups have implications for manpower planning in the Army aviation system. The demographic and attitudinal contrasts between these two groups, and the predictive utility of the questionnaire method in this context are discussed.

"Attitudes as Predictors of Retention for Army Pilots," by H. Alton Boyd, Jr., and Wiley R. Boyles, paper for annual meeting of Southeastern Psychological Association, New Orleans, La., February 1969; issued as Professional Paper 14-69, 9 pp., May 1969. AD-688 816

A questionnaire mailed worldwide in 1966 to U.S. Army aviation warrant officers, brought 1,957 responses, (83% of the population). Questions concerning career intentions, systems of values, attitudes, and reasons for pursuing civilian or military careers were asked. Since the survey, obligated tours of duty have expired for 891 of the respondents; of these, 218 had over 10 years' active military service, virtually insuring their choosing to remain on active duty. Of the remaining 673, 508 (75.5%) departed the Army and 165 (24.5%) stayed on active duty. Selected items from the questionnaires of 443 WOs who had already made career decisions were scored, and the scores used to generate regression coefficients to predict the career decisions of 230 other subjects. More accurate prediction (85%) was achieved for those departing the Army than for men who chose to remain (42% accuracy).

Exploratory Research 40—Division No. 7 (Social Science)
Troop Orientation in the Program of Korean Augmentation to the U.S. Army

"Human Factors in the Operation of U.S. Military Units Augmented With Indigenous Troops" by John W. McCrary, paper for 13th Annual Army Human Factors Research and Development Conference, Fort Monmouth, N.J., October 1967; issued as Professional Paper 48-67, 12 pp., November 1967. AD-665 022

The program of Korean augmentation to the U.S. Army (KATUSA) is outlined. Portions of the findings based on interim analyses of data from Human Resources Research Office's studies of the program are summarized by using selected themes. The implications these themes have for establishing similar programs in countries other than Korea are examined.

Commander's KATUSA Program Checklist, by John W. McCrary, Research By-Product, January 1969. AD-694 388

This Checklist was designed to help commanders in Korea, primarily at the company, battery, and troop level, review in detail the policies and practices involved in their units' implementation in the Program of Korean Augmentation to the U.S. Army (KATUSA). It consists of two interrelated components: the Checklist Summary, which is a memory aid in the form of brief "yes-no" questions covering the detailed topics; and the Checklist Guide which gives the commander information on where to go and what to look for in supervising his unit's KATUSA program. Official policies and required procedures are summarized and documented; inclosures provide auxiliary information or explanation. The Checklist can be used for self-instructional purposes in familiarizing or orienting personnel to the program. The format is designed so that the Checklist may be updated and revised without being republished. Potentially such a checklist system could be used for complex operational activities such as supply, maintenance, or food service, as well as on programs like KATUSA.

Exploratory Research 42—Division No. 1 (System Operations)[1]
Organization of Instruction

"Programmed Learning: Prologue to Instruction," by Robert J. Seidel, *Psychological Reports*, vol. 20, no. 1, February 1967; issued as Professional Paper 17-67, 12 pp., April 1967. AD-651 052

The paper indicates some pertinent issues in the field of programmed instruction (PI) and suggests promising directions for future growth of PI, both as a medium for the application of principles of learning and as a means of furthering understanding of learning processes. Practical and theoretical implications are touched upon and combined to give a position statement on PI as a pedagogical and psychological research tool. In this vein the utility and inevitability of computer-aided instruction are discussed.

"Computer-Administered Instruction Versus Traditionally Administered Instruction: Economics," by Felix F. Kopstein and Robert J. Seidel, paper for meeting of National Society for Programmed Instruction, Boston, April 1967; issued as Professional Paper 31-67, 40 pp., June 1967; *AV Communication Review*, vol. 16, no. 2, Summer 1968. AD-656 613 ED-014 644

In this paper an attempt is made to assay the economics of computer-administered instruction (CAI) versus traditionally administered instruction (TAI) in controlling the structure of the learner's stimulus environment in teaching and training situations. There is a discussion of the need for a sound, objective economic appraisal of the value to society as a whole of increments in the breadth and depth of education in the population, and of the influence of varying rates with which these increments are brought about. The necessity for reliable, objective information concerning cost data is emphasized. Projected cost/effectiveness comparisons based on the assumption of equal effectiveness for CAI and TAI are discussed for both civilian and military instruction.

Exploratory Research 43—Division No. 1 (System Operations)
Training Systems

"The Formulation of Training Problems," by Harold G. Hunter, paper for Human Factors Working Group at 17th Military Operations Research Symposium, Monterey, Calif., May 1966; included in *Training Models*, Professional Paper 13-66, 14 pp., December 1966. AD-646 978

[1] Work Unit IMPACT was initiated as a result of ER-42.

Exploratory Research 44—Division No. 5[1]
Training Methods for Forward Area Air Defense Weapons

"Factors Influencing the Visual Detection and Recognition of Low-Altitude Aircraft," by A.D. Wright, paper for annual meeting of Southwestern Psychological Association, Arlington, Tex., April 1966; published in *Perceptual and Motor Skills*, vol. 23, no. 3, Part I, December 1966; also issued as Professional Paper 20-67, May 1967. AD-654 125

A study of man's ability to visually detect, recognize, and estimate range to low-altitude military aircraft is described. Twenty-seven Army enlisted men, who were given training and field experience in detecting and recognizing aircraft, served as observers. Observers were randomly assigned to the nine combinations of observer offset from the aircraft flight path (head-on, 650-, and 1,400-meter offset) and use of binoculars (binoculars for detection and recognition, binoculars for recognition, and no binoculars). Jet and propeller aircraft provided the low-altitude targets. Observers were provided early warning in time and aircraft position prior to each trial. Results of the study are presented.

The Performance of Ground Observers in Detecting, Recognizing, and Estimating Range to Low-Altitude Aircraft, by A.D. Wright, Technical Report 66-19, December 1966. AD-645 537

The purpose of this test was to determine man's capability to visually detect, recognize, and estimate range to low-altitude aircraft. Twenty-seven Army enlisted men served as observers. The results indicate that man can detect and recognize low-altitude aircraft at a considerable range under near-optimum field conditions. The value of binoculars for aircraft detection was found to be dependent upon (a) observer offset from the aircraft flight path, (b) accuracy of early warning, (c) aircraft speed, and (d) exhaust smoke trail characteristics of the aircraft. Under the test conditions employed, binoculars reduced the detection range on the most potentially threatening targets, high-speed, head-on jet aircraft. The data show that large range estimation errors occurred. Filmed simulation of the recognition task appears promising as a training tool.

Aircraft Detection, Range Estimation, and Auditory Tracking Tests in a Desert Environment, by E.W. Frederickson, Joseph F. Follettie, and Robert D. Baldwin, Technical Report 67-3, March 1967. AD-650 403

Detection tests with low-flying jet aircraft were conducted to determine the effect of (a) varying the location of observers from the flight path, (b) using optical aids vs. unaided observation, and (c) varying the amount of temporal early warning. Also tested were man's ability to (a) visually estimate the distance to high-speed jets, (b) track aircraft by ear, and (c) determine the distances at which various aircraft structural features were recognized. When distant terrain masking existed, unaided and optically aided detections occurred at approximately the same time, but for near terrain masking, unaided detections occurred sooner. A change of temporal early warning did not reliably affect detection range. As offset increased detection range increased. The range estimation tests were inconclusive. The auditory tracking tests revealed that untrained observers tracked ahead of the target. The order in which structural features were recognized was consistent within each class of aircraft.

"Weber's Law Applied to Distance Estimation," by R.E. Wienke, paper for annual meeting of Southwestern Psychological Association, Houston, Tex., April 1967; issued as Professional Paper 26-67, June 1967. AD-654 346

The stimulus situation in dynamic range estimation is examined. The solid angle, taking into account the area of the target as well as the distance, is used as the visual concept, and the prediction made that range estimation would follow Weber's Law. The results support the hypothesis that absolute errors in range estimation are an inverse function of the acceleration of the increase in size of the solid angle representing the target. The study suggests that one problem in research dealing with dynamic range estimation is that the results to be expected are highly dependent on the experimental conditions.

[1] Work Unit SKYFIRE was initiated as a result of ER-44.

Exploratory Research 50—Division No. 6 (Aviation)
Aviator Stress

"Aviator Performance Under Stress," by Wiley R. Boyles, paper for symposium at annual meeting of Southeastern Psychological Association, Atlanta, Ga., April 1967; included in *Human Factors Research in Support of Army Aviation*, Professional Paper 27-67, June 1967.

"Background and Situational Confidence: Their Relation to Performance Effectiveness," by Wiley R. Boyles, paper for annual meeting of Alabama Psychological Association, Birmingham, Ala., May 1968; issued as Professional Paper 22-68, 16 pp., June 1968. AD-674 943

Inventories designed to measure confidence in dangerous situations were administered to about 3,000 potential Army aviation warrant officers from January to December 1967. These paper-and-pencil inventories are based on a clinical-experimental fractional anticipatory response conceptualization of reactions to the psychological stresses of combat. Military performances of the men are subjected to longitudinal analysis to determine the relationship of scores on these inventories to various criterion performances. In this paper relationships of scores on two of these inventories—the Background Activities Inventory and the Situational Confidence Inventory—to peer ratings, attrition during flight training, and accident information, are presented.

"A Preliminary Application of the Critical Incident Technique to Combat Performance of Army Aviators," by Peter R. Prunkl and Wiley R. Boyles, paper for annual meeting of Alabama Psychological Association, Birmingham, Ala., May 1968; issued as Professional Paper 24-68, 12 pp., June 1968. AD-675 380

This study was undertaken as part of research on aviator stress to obtain information on the varieties of ineffective combat performance peculiar to Army aviation and to obtain a preliminary list of combat aviation effectiveness criteria. A small sample—62 Vietnam returnees—completed a critical incident survey in which they described, in narrative form, their combat reactions and those of other pilots. Incidents of ineffective behavior occurring both in the air and on the ground were obtained and were categorized using Kern's conceptual model of behavior under stress.

Exploratory Research 51—Division No. 4
Human Factors in Organizational Effectiveness

Simulation of Organizations: An Annotated Bibliography, by Jon E. Roeckelein, Technical Report 67-14, 57 pp., December 1967. AD-664 861

This bibliography contains 141 annotated references on the subject of the simulation of complex social organizations. It is part of a study whose goal is to determine the feasibility of using simulation methods to conduct research upon human factors that influence organizational effectiveness. It is divided into three principal areas: man-centered simulation, man-machine simulation, and machine-centered simulation. Within each of these areas, publications are separated into those directly concerned with the simulation of organizations, and those indirectly related to the subject. A general section covers reference works and bibliographies useful as source material. A KWIC index is provided.

Exploratory Research 54—Division No. 5
Human Performance Degradation

"Some Effects of Differential Pretask Instructions on Auditory Vigilance Performance," by G.L. Neal, paper for annual meeting of Southwestern Psychological Association, Houston, Tex., April 1967; issued as Professional Paper 34-67, 8 pp., July 1967. AD-656 942

In this study of the evaluation of pretask instruction effects on vigilance performance, the researchers made an assessment of demand characteristics. Subjects were 203 students from University of Oklahoma classes who were given four possible reasons for the experiment; the treatments were called Required Chore, Important Task, Subject Important, and Combined Treatments. It was demonstrated that subject motivation level via pretask instructions can influence the course of the monitor's performance, at least in the short run.

Exploratory Research 61—Division No. 6 (Aviation)
Reconnaissance and Surveillance

"A View of Man's Role and Function in a Complex System," by Francis H. Thomas, paper for annual meeting of Alabama Psychological Association, Birmingham, Ala., May 1968; issued as Professional Paper 25-68, 12 pp., June 1968. AD-676 777

In this paper the roles and functions of man in the evolution and development of two complex specific systems within the Army operational environment are discussed. It is pointed out that throughout the course of historical development, the basic system functions and objectives have remained unchanged even though the system equipments have varied. With equipment changes, man's physical functions in system operation have also changed. In predicting the effectiveness of man in a future system operational environment, an approach independent of equipment differences is required. Such an approach, in which man is conceived as an information processor, is described. The approach is applied to the human operator roles in manned aerial reconnaissance and surveillance and in target acquisition.

Exploratory Research 66—Division No. 2[1]
Proficiency Measurement Techniques

A Revised Job Requirements Inventory for General Vehicle Repairman MOS 63C, by John D. Engel, Research By-Product, December 1968. AD-701 608

This document presents the results of a review of operator and organizational automotive maintenance task descriptions for wheeled and tracked vehicles. The review was completed by three senior automotive mechanic Warrant Officers. During the review, automotive maintenance task requirements were classified according to frequency of occurrence, urgency, and required skill level.

[1] Work Unit JOBTEST was initiated as a result of ER-66

Exploratory Research 70–Division No. 6 (Aviation)
Longitudinal Analysis

"Measures of Reaction to Threat of Physical Harm as Predictors of Performance in Military Aviation Training," by Wiley R. Boyles, paper for annual meeting of Southeastern Psychological Association, New Orleans, La., February 1969; issued as Professional Paper 15-69, 18 pp., May 1969. AD-688 817

Data from subjective reports, objective performance measures, and physiological studies indicate that flight training per se places a great deal of stress on the trainee. In military flight training additional stresses are involved that may markedly increase the importance of reaction to threat of physical harm. This paper reports effort to develop measures of reaction to physical harm threat and measures of change in confidence in ability to cope with that threat for use in the secondary selection process in U.S. Army aviation. The Background Activities Inventory (BAI) and the Situational Confidence Measure (SCM) are described. They were adapted from earlier HumRRO work on motivation for effective combat performance.

Exploratory Research 72–Division No. 1 (System Operations)
Accident Data Analysis

Analyses of U.S. Army Accident Data, by Clifford P. Hahn, Technical Report 71-11, 68 pp., June 1971. (Subcontractor: American Institutes for Research) AD-730 881

U.S. Army Accident Record data were analyzed, seeking relationships that would lead to recommendations for future routine analyses of such data which might help reduce the number and severity of accidents. Numerous computer analysis printouts were submitted to the sponsoring agency. The report describes project activities, distributional results, regression analysis results, and results from a method for comparing relative accident involvement rates. Characteristics of the existing record system and the types of analyses that can be conducted are also discussed. AD-730 881

BASIC RESEARCH STUDIES[1,2]

Basic Research 1—Executive Office
An Analysis of Army Training

A Systematic Analysis of Army Training Requirements as the Basis of More Generalized Training Research, by Francis E. Jones, Research Report 7, May 1961. AD-259 476

The training requirements of 519 Army jobs contained in *The HumRRO Training Analysis Directory* were reduced to the more elementary components of "subject matter," "subject-matter modifiers," and "proficiencies involved." Next, "basic ideas," representing potential generalized training areas, were derived by a process of determining the systemic generality of various subcomponents of the training requirements. Finally, from a single idea, TECHNIQUES/PROCEDURES/METHODS, a model was constructed to illustrate the actions and interactions of various factors within the performer as they affect his performance of a given task for which he is trained. Practical examples of the application of the TPM analysis to command decisions were given.

Research By-Products resulting from this research effort are listed in Part III.

Basic Research 6—Division No. 3[3]
Integrating and Systematizing the Findings of Military Psychotechnology

"Summary of Research in Sensory Deprivation and Social Isolation," by Howard H. McFann, paper for NATO Symposium on Defense Psychology, Soesterberg, The Netherlands, August 1961.

Tabular results of questionnaire content areas, and experimental/control responses on a subjective stress scale, an intellectual efficiency test battery, a visual task performance, and reported visual sensations measured are presented.

Experimental Assessment of a Limited Sensory and Social Environment: Summary Results of the HumRRO Program, by Thomas I. Myers, Donald B. Murphy, Seward Smith, and Charles Windle, Research Memorandum, February 1962; Symposium presented at American Psychological Association convention, New York City, September 1961. AD-653 786

Material is presented from experiments designed to appraise the potency of a limited sensory and social environment. Soldier volunteers were confined for four days in dark, quiet cubicles which were as physically comfortable as possible. Sensory and social experiences of the control group were normal. The experimental subject evidenced feelings of stress, boredom, restlessness, anger, worry, disorientation, and vague physical symptoms that were only rarely reported by his control counterpart. Evidence of intellectual inefficiency in the cubicle environment (as compared to the control condition) was obtained from tests given during isolation and from retrospective evaluations.

"Reported Visual Sensation During Brief Exposure to Reduced Sensory Input," by Thomas I. Myers and Donald B. Murphy, Chapter 10 in APA-AAAS Symposium, *Hallucinations*, Louis Jolyon West, M.D. (ed.), Grune & Stratton, New York, 1962.

Exploratory studies into the occurrence of hallucinatory phenomena were conducted under "dark cell" conditions. A total of 15 subjects experienced limited sensory environment, some for as long as four days. The results of the studies indicated that when non-psychiatric subjects are isolated in the dark for 10 minutes, they report "seeing" a variety of visual sensations. It was

[1] Basic Research Studies 1-10 originated as research efforts under Work Unit PIONEER. For convenience, all reporting on these Sub-Units is presented here rather than under PIONEER.

[2] See also FORGE and SPECTRUM Work Units.

[3] Research begun as Work Unit ENDORSE was continued as PIONEER VI, then as BR 6. The earlier reports are listed under Work Unit ENDORSE.

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found that attitudes or "sets" resulting from the instructions given a subject can affect both the number and complexity of reported visual sensations under conditions of minimal sensory deprivation.

Collected Papers Related to the Study of the Effects of Sensory Deprivation and Social Isolation, Research Memorandum by Staff, February 1962. AD-478 300

"A Preliminary Study of the Effects of Controlled Isolation," by Thomas I. Myers, Lyman M. Forbes, Jack Arbit, and Jack Hicks.

"The Reliability of a Modified Digit Span Procedure," by Thomas I. Myers, Gerald Burday, Lyman M. Forbes, and Jack A. Arbit.

"Visual Sensations Experienced in the Dark as a Function of Instruction and Prior Verbalization," by Donald B. Murphy, Edward J. Kandel, and Thomas I. Myers.

"Some Basic Factors in Sensory Deprivation Research," by Thomas I. Myers.

"Reported Visual Sensations During Brief Exposure to Reduced Sensory Input," by Thomas I. Myers and Donald B. Murphy.

"A Technique for Studying Attitude Change," by Donald B. Murphy and George L. Hampton.

"A Simple Tracking Apparatus for Classroom or Experimentation," by Seward Smith and Paul M. Haas.

"Selected References to Research in Sensory Deprivation," by Thomas I. Myers, Donald B. Murphy, and Seward Smith.

"Auditory Perception of Numerosity as Affected by Number and by Correct and Incorrect Knowledge of Results," by Richard A. Monty, *Human Factors*, August 1962.

"The Occurrence, Measurement and Experimental Manipulation of Visual 'Hallucinations'," by Donald B. Murphy and Thomas I. Myers, *Perceptual and Motor Skills*, vol. 15, no. 1, August 1962.

"Activity Pattern and Restlessness During Sustained Sensory Deprivation," by Seward Smith, Thomas I. Myers, and Donald B. Murphy, paper for American Psychological Association convention, St. Louis, September 1962.

"The Role of Expectancy in Ss' Responses to Sustained Sensory Deprivation," by Thomas I. Myers, Donald B. Murphy, and Donald F. Terry, paper for American Psychological Association convention, St. Louis, September 1962.

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"Time Estimation Error as a Predictor of Endurance in Sustained Sensory Deprivation," by Donald B. Murphy, George L. Hampton III, and Thomas I. Myers, paper for American Psychological Association convention, St. Louis, September 1962.

"Conditioning of Connotative Meaning as a Function of Sensory Deprivation and Social Isolation," by Donald B. Murphy, Seward Smith, and Thomas I. Myers, paper for American Psychological Association convention, Philadelphia, September 1963.

"The Effect of Sensory Deprivation and Social Isolation on Conformity to a Group Norm," by Seward Smith, Donald B. Murphy, and Thomas I. Myers, paper for American Psychological Association convention, Philadelphia, September 1963.

"The Effect of Sensory Deprivation and Social Isolation on Self Exposure to Propaganda and Attitude Change," by Thomas I. Myers, Donald B. Murphy, and Seward Smith, paper for American Psychological Association convention, Philadelphia, September 1963.

"Laboratory Studies of Sensory Deprivation: Findings of Interest to Human Engineering," by Thomas I. Myers, Donald B. Murphy, and Seward Smith, paper for 7th Annual Meeting, Human Factors Society, Palo Alto, Calif., October 1963.

Conformity to a Group Norm as a Function of Sensory Deprivation and Social Isolation, by Seward Smith, Thomas I. Myers, and Donald B. Murphy, Research Memorandum, November 1963. AD-439 430

Reported Visual Sensations as a Function of Sustained Sensory Deprivation and Social Isolation, by Donald B. Murphy, Thomas I. Myers, and Seward Smith, Research Memorandum, November 1963. AD-439 431

Vigilance as a Function of Sensory Deprivation and Social Isolation, by Thomas I. Myers, Seward Smith, and Donald B. Murphy, Research Memorandum, [Nover.ber 1963]. AD-439 432

"Group Consensus and Judgmental Accuracy: Extension of the Asch Effect," by Jack M. Hicks, Richard A. Monty, and Thomas I. Myers, *Psychonomic Science*, vol. 5, no. 4, 1966; issued as Professional Paper 11-66, December 1966. AD-646 158

This study demonstrated the generality of the Asch group influence effect to a new task employing auditory rather than visual stimuli, a situation in which the bogus group was not physically present, and a subject population of U.S. Army enlisted personnel.

Experimental Studies of Sensory Deprivation and Social Isolation, by Thomas I. Myers, Donald B. Murphy, Seward Smith, and S. James Goffard, Technical Report 66-8, June 1966. AD-636 478

To evaluate experimentally some of the psychological effects of sensory deprivation and social isolation, 176 randomly selected volunteers were placed in dark, soundproofed cubicles for four days, while an equal number of other randomly selected volunteers followed a normal routine. Psychological tests and measures were given both Cubicle and Control subjects before, during, and after isolation. Cubicle subjects reported the isolation experience to be unpleasant, boring and stressful. One-third of them requested early release from the cubicles. In comparison with the Control subjects, Cubicle subjects were better on simple intellectual tasks and on auditory vigilance. They were worse on more complex intellectual tasks, and under some conditions, appeared to be more susceptible to influence. They more often sought meaningful stimulation but also showed some tendency to avoid stimulation. Sensory deprivation and social isolation do have psychological effects, but they are neither simple nor clear-cut.

"Restlessness and Life-Sustaining Activities During Four Days of Sensory Deprivation," by Seward Smith, Thomas I. Myers, and Donald B. Murphy, *Psychonomic Science*, vol. 8, no. 12, August 1967.

Basic Research 7—Division No. 5
Precision of Statement and Perception of Meaning of Written Language in Military Training

An Overview of the Conceptual Structure of Subtask PIONEER VII, by Joseph F. Follettie, Research Memorandum, July 1963. AD-628 815

"Elements of a Methodology for Prose-Learning Research," by Joseph F. Follettie, paper for annual meeting of Rocky Mountain Psychological Association, Albuquerque, N.M., May 1966.

List-learning and prose-learning methodologies are compared and contrasted regarding their enumerative units, trial defining conditions, performance measures, and proficiency criteria. Problems underlying the assessment of prose-learning performance when using a comprehension criterion are touched upon. Preliminary findings are presented which suggest that data based upon a comprehension criterion may be predicted from data based upon a memorization criterion.

Effects of Grammatical Factors and Amount of Material on Memorizing Paragraphs, Sentences, and Word Lists, by Joseph F. Follettie and Ann F. Wesemann, Technical Report 67-9, June 1967. AD-656 454

The effects of certain measurable characteristics of written material upon speed of memorization were studied. These characteristics were of four general classes: (a) load factors reflecting informational density of a selection, (b) length of the selection, in grammatical units of various kinds, (c) factors dealing with alternative, grammatically equivalent ways for presenting the same semantic material, and (d) word frequency factors. Of the four types of stimulus characteristics studied, length factors were found to have the clearest and most potent effects upon rote memorization.

Basic Research 8—Division No. 2
Common Job Elements

The Feasibility of Developing a Task Classification Structure for Ordering Training Principles and Training Content, by Donald F. Haggard, Research Memorandum, January 1963. AD-628 162

"Verbal Mediation in Reverse Association: The Role of Temporal Factors," by Richard A. Kulp and John A. Robinson, *Psychonomic Science*, vol. 3, no. 10, November 1965.

A three stage reverse mediation paradigm, A-B, B-C, C-A, and its control paradigm A-B, D-C, C-A, was studied at two test list anticipation intervals to determine the effects of temporal factors on reverse mediation. Forty-eight subjects learned three word lists consisting of low-frequency five-letter words by the paired-associate method. The results indicated that temporal factors play a significant role in facilitating reverse mediation.

"Paired-Associate Transfer Between CVCs for the A-B, C-A and the A-B, B-C Paradigms Following a Low Degree of List I Learning," by Richard M. Schulman, paper for annual meeting of Eastern Psychological Association, Boston, April 1967; published under the title, "Paired-Associate Transfer for the A-B, C-A and the A-B, B-C Paradigms," *Psychological Reports*, vol. 20, no. 3, Part 2, June 1967; also issued as Professional Paper 38-67, 10 pp., August 1967. AD-658 752

Results of two experiments on transfer between paired-associate verbal lists are reported here. Army enlisted men averaging around the civilian mean were the nonvolunteer subjects. A low degree of List I learning was used, but List II was learned to one perfect trial. Trials to successive criteria showed nonsignificant negative transfer in Experiment II and nonsignificant positive transfer in Experiment I. When the upper halves of subjects of known general aptitude in the two groups in Experiment I were compared, positive transfer was barely significant (p=.05).

"Effects of Amount of Interpolated Activity in Short-Term Memory," by Richard A. Kulp, paper for annual meeting of Midwestern Psychological Association, Chicago, May 1967; published in *Psychological Reports*, vol. 21, no. 2, October 1967; also issued as Professional Paper 46-67, 9 pp., October 1967. AD-663 862

A short-term memory experiment attempted to (a) separate the effects of interference due to interpolated activity (IA, digit counting) and elapsed time in a retroactive inhibition paradigm, and (b) assess the effects of rate of information processing (rate of counting) on the retention of individual items. Word frequency, retention interval, and rate of counting were significant sources of variation. The results indicated the importance of rate of information processing, as opposed to amount of interpolated activity, and elapsed time in the retention of individual items in short-term memory.

"The Effect of Unidirectional Primary Word Associations on A-B, C-A Paired-Associate Transfer," by Richard M. Shulman, *Psychonomic Science*, vol. 8, no. 8, July 1967; issued as Professional Paper 3-68, 5 pp., January 1968. AD-673 328

This journal article reports a paired-associate transfer experiment comparing three variations of the A-B, C-A paradigm to the A-B, C-D control. Four separate groups of 20 subjects each learned both lists to a criterion of one errorless trial. In two of the experimental groups, the stimulus of List II was the primary word association to the response of List I. These were more difficult to learn than the control, but easier than the A-B, C-A paradigm without the interlist primary word-associations.

"A Comparison of Constrained and Random Metric Figures in Paired-Associated Learning," by Richard A. Kulp, *Psychonomic Science*, vol. 8, no. 12, 1967; issued as Professional Paper 42-67, 4 pp., September 1967. AD-664 396

Both random and constrained (Redundancy-I) 4 by 4 metric figures were used as stimuli and were paired with numerals. In terms of correct anticipations, perceptual learning with random figures was better than with constrained. Effects of interstimulus interval were found to be identical to those previously demonstrated in paired-associate learning situations. The results are discussed in terms of supporting and extending previous investigations in demonstrating the consistency of results when sampling rules for metric figures are employed.

"Paired-Associate Transfer as a Function of Ability Level in the A-B, C-A, and A-B, B-C Paradigms," by Richard M. Schulman, *Psychological Reports*, vol. 22, no. 1, February 1968; issued as Professional Paper 11-68, 10 pp., April 1968. AD-669 007

In two experiments with 120 subjects in each, the A-B, B-C and the A-B, C-A paired-associate paradigms were compared with an A-B, C-D control, using two levels of ability. For both lists of Exp. I and List I of Exp. II, a modified anticipation procedure in which the stimuli were not pronounced was used. For List II of Exp. II a multiple-choice procedure was also used to equate response availability between groups. List I results showed superior learning by the high ability groups. List II results showed faster learning for the A-B, B-C paradigm for the high ability groups, but were equivocal for the A-B, C-A paradigm.

"Bidirectional List 2 Learning and the A-B, C-A Transfer Paradigm," by Richard M. Schulman, *Psychonomic Science*, vol. 12, no. 6, 1968; issued as Professional Paper 31-68, 4 pp., October 1968. AD-678 236

A paired-associate transfer experiment, using CVC lists, compared the A-B, C-A paradigm to the A-B, C-D control. The second variable in the factorial design was the direction of List II learning, either forward or bidirectional. List I was practiced until learned, and List II until two successive errorless trials. Bidirectional learning was reliably slower than forward learning alone. A follow-up test of List I associative matching, using A-B, C-D as the baseline, showed reliable unlearning for the bidirectional A-B, C-A group, falling short with the forward learning group. Additional sources of List II facilitation apparently compensated for the added bidirectional interference.

Temporally Distinct Stages in Paired-Associate Verbal Learning, by Richard M. Schulman, Professional Paper 41-68, 10 pp., December 1968. AD-682 348

Two experiments to study possible differences in transfer between very early and early stages of List I learning are reported. Eight groups of Army enlisted men, 20 per group, learned one of four transfer paradigms to a List I criterion of either at least one item correct or at least half of the list correct, and a List II criterion of all correct. Paradigms used were A-B, C-A; A-B, A-D; A-B, A-B; and the A-B, C-D control for warm-up and learning to learn. In Experiment I, CVCs were used for all verbal units; in Experiment II, the List II responses were changed to high frequency of occurrence real words. Faster List II learning by the higher degree of List I learning in Experiment I, but not in Experiment II, was interpreted as supporting a two-stage conception of paired-associate learning.

"The Development of a Response Taxonomy, " by Elmo E. Miller, paper for symposium at American Psychological Association meeting, Washington, September 1969; issued as Professional Paper 32-69, 8 pp., October 1969. AD-699 479

A taxonomy of response processes has been developed to facilitate the designing of training programs; each kind of task presumably would require a different set of training methods for greatest efficiency, so classifying a task would be part of determining which methods to use. A pool of response distinctions was collected, with special attention to those commonly made in training practice. A large number of training strategies were also collected and organized into a classification scheme. The two taxonomies were then systematically interrelated to further their development and application.

A Taxonomy of Response Processes, by Elmo E. Miller, Technical Report 69-16, 49 pp., September 1969. AD-695 499

A system for classifying perceptual-motor tasks was devised for the purpose of distinguishing the kinds of training strategy appropriate for each task. A rationale is presented and various task elements are delineated in terms of cue functions, image or mediational functions, and movement tendency. The defined task elements were used in constructing two classifications: one of training strategies, and one of tasks. The classification of training strategies deals with the operational conditions of practice and the diagnosis of the underlying behavioral process. The task classification has four main divisions: reactive—adjustive; reactive—selection from a set of responses; developmental—procedural; and developmental—skilled performance. Task subclasses have been distinguished. Finally, the kinds of training strategies are related to the classes of tasks, as preliminary investigation of how well the task classification accomplished its purpose.

Basic Research 9—Division No. 2
Learning of Military Skills

"The Effects of DRL and DRH Schedules of Reinforcement in Shaping the Collective Response Rate of Two- and Three-Man Teams," by Peter C. Wolff, David D. Burnstein, and L. Dennis Cannon, paper for American Psychological Association convention, St. Louis, September 1962.

"The Use of Schedules of Reinforcement to Regulate a Collective Team Response Rate," by Peter C. Wolff, David D. Burnstein, and L. Dennis Cannon, *Psychological Record*, vol. 14, no. 1, January 1964.

"Shaping of Three-Man Teams on a Multiple DRL-DRH Schedule Using Collective Reinforcement," by D.D. Burnstein and P.C. Wolff, *Journal of the Experimental Analysis of Behavior*, vol. VII, no. 2, March 1964.

Pursuit Rotor Performance: I. Effects of Reinforcing the Longer Intervals of Continuous Tracking Within Each Trial, by Richard W. Sheldon and John F. Bjorklund, Technical Report 66-11, June 1966. AD-638 015 ED-017 763

To determine whether selective reinforcement of pursuit rotor performance facilitates acquisition of skill and promotes its retention, five groups of subjects were individually trained for ten sessions of 15 trials each. Selective reinforcement of longer than average target contacts was introduced for one group of subjects during Sessions 6 and 7 and for another during Sessions 4 to 7. Continuous reinforcement of target contacts was introduced for two other groups. A control group received no reinforcement. Dependable improvements in time-on-target scores were obtained for all experimental groups except the one which was selectively reinforced for four sessions, but the superior performances were not maintained when reinforcement was withdrawn. The results suggest that this improvement as a function of feedback was attributable to motivational rather than learning or informational effects.

Pursuit Rotor Performance: II. Effects of Reinforcing Successively Longer Intervals of Continuous Tracking Over Practice Sessions, by Richard W. Sheldon and John F. Bjorklund, Technical Report 66-22, December 1966. AD-646 799

The objective was to determine whether pursuit rotor performance would be facilitated, and the level of achievement sustained, with the use of the reinforcement technique of shaping. The procedure used in this study was progressively lengthening, from session to session, the continuous target contact required to obtain a reinforcement, keeping the duration requirement constant within each session. Two groups of four subjects each practiced under the experimental conditions for ten 15-trial sessions. Reinforcement was provided during Sessions 2-7. Half of the experimental subjects improved appreciably during the reinforced practice. When reinforcement was withdrawn, the differences between the mean performance levels of the experimental subjects and a control group of eight subjects, who practiced without any reinforcement, were negligible.

Supplementary Feedback: An Explanation and Experimental Test, by Elmo E. Miller, Richard W. Sheldon, and John F. Bjorklund, Technical Report 68-13, 17 pp., November 1968. AD-679 919

An experiment using the pursuit rotor apparatus tested two hypotheses: (a) supplementary feedback aids learning when it provides information by which to distinguish long target contacts from short ones; (b) supplementary feedback, especially if immediate, facilitates performance by providing secondary reinforcement. Five groups, of 20 subjects each, were given 60 trials, with the criterion interval adjusted for every trial to reinforce a particular proportion of target contacts for each group: 100% (immediate buzzer), 89%, 50%, 11%, and 0% (no buzzer). Analysis of covariance indicated that the buzzer significantly improved performance, with the best performance shown by the groups that had an intermediate proportion of the hits reinforced. Information theory would explain some of the results, but would not account for all of the group differences found.

Basic Research 10—Division No. 3
Nonverbal and Extraverbal Communication in Groups

"Effect of Knowledge of Test Results on Subsequent Test Performance as a Joint Function of Need Achievement and Test Anxiety," by Mitchell M. Berkun and Harry A. Burdick, paper for American Psychological Association convention, Philadelphia, September 1963.

Approximately 400 men from two randomly selected Army basic training companies were given Sarason's scale of Test Anxiety, a preliminary Coins Test, a Creative Imagination test (after McClelland) to get a measure of n-Ach, and a second Coins Test containing new problems. Subjects were given contrived positive and negative feedback regarding their performance on the first Coins Test. Following the second Coins Test, the subjects were given an opinion and attitude questionnaire. Among the low n-Ach subjects, a specific response was found to the truth or falsity of the contrived feedback information, implying that these people apparently detected the truth or falsity of the report concerning their first Coins Test performance.

Need Aggression Measurement, by Harry A. Burdick and Hiroshi Ono, Research Memorandum, October 1963. AD-638 307

This report presents a manual of instructions which was developed for scoring TAT stories for aggression imagery (n-Agg), and describes an experiment in which the manual was used on scoring stories written by subjects on six TAT pictures. The reliability of scoring with the manual was assessed during the experiment, an attempt was made to vary level of n-Agg by introducing unpleasant stimuli into the environment, and the relationship between the perception of parents and of punishment during childhood and the need for aggression was examined. Socres were found to be positively related to the introduction of mild aversive stimuli into the environment and to the memory of early socialization experiences with punishment, to perception of parents, and to more generalized aggressive feelings.

"Effect of Preceding Rosenzweig's PF Test With the TAT," by Mitchell M. Berkun and Harry A. Burdick, *Journal of Clinical Psychology*, vol. XX, no. 2, April 1964.

In a study in which moderately frustrated groups were given a series of measures of hostility or aggression, half of the 162 Army basic trainee subjects took Rosenzweig's Picture Frustration test just before taking an abbreviated modification of the TAT, and half just after the TAT. Experimental and control treatments were equally represented in both sub-groups. The n-Agg score means were the same for both groups, indicating no effect of prior intrusion of the PF. On the other hand, the group whose PF immediately followed the TAT had a significantly higher extrapunitive and significantly lower intropunitive mean score than the group whose PF came first. The PF failed to discriminate among the different levels of induced hostility. Intelligence level appeared to have no demonstrable effect. It was concluded that pre-PF administration of the TAT significantly increased the repertoire of extrapunitively aggressive responses available to the subject.

"Four Motive Measures," by Harry A. Burdick and Joan S. Nettler, paper for American Psychological Association convention, Los Angeles, September 1964.

From scoring 1308 stories written by young male recruits coming into the U.S. Army (on six Atkinson pictures and six TAT cards), some internal consistency aspects of needs for achievement, affiliation, power, and aggression were studied. Those pictures of cards which "pulled" the greatest number of negative points on each dimension are reported. A strong negative relationship between *F* scale scores and n-Ach was also found.

Basic Research 11—Division No. 5
Programed Instruction

Measures of Ability and Programed Instruction Performance, by William H. Melching, Technical Report 65-12, December 1965. AD-629 443

The results of several programed instruction studies recently accomplished by HumRRO Division No. 5 (Air Defense) at Fort Bliss were compared with regard to the relationship between measures of ability and measures of programed instruction performance. Although there were some exceptions, each ability measure tended to be substantially related to each measure of program-test performance. The contention that programed instruction eliminates achievement differences due to intellectual ability was not sustantiated.

The Influence of Practice Frames and Verbal Ability on Programed Instruction Performance, by William H. Melching and Frank B. Nelson, Technical Report 66-1, January 1966. AD-628 444 ED-021 461

The effect of special practice frames upon programed instruction performance was examined using a program in Counterinsurgency. The individuals who served as subjects represented two levels of verbal ability. Practice frames enabled subjects to proceed through the program at a faster rate per frame, make fewer program errors, and score higher on a recall type of achievement test. Subjects of higher verbal ability were able to proceed through the program at a faster rate, make fewer program errors, and exhibit higher scores on all measures of achievement.

Basic Research 14—Division No. 2
Prompting and Guidance in Training

Prompting and Guessing in Tank Identification, by Elmo E. Miller, Technical Report 70-21, 25 pp., December 1970. AD-720 892

An experimental program was conducted to explore aspects of developing effective general methods for learning to identify and name objects. Three general methods of reducing excessive guessing were evaluated (4x2x3 factorial design, 96 subjects), in terms of time to reach mastery. The comparisons were: (a) four different schedules of prompting; (b) instructions discouraging guessing and absence of such instructions; (c) an introduction pointing out the distinguishing features of the tanks being studied, an introduction naming the tanks on audio, and no introduction. None of the treatments had a statistically significant effect upon time required to reach mastery, although discouraging guessing did result in less time spent guessing and a smaller percentage of guessing on test items.

Comparison of Pictorial Techniques for Guiding Performance During Training, by Elmo E. Miller, Technical Report 71-12, 37 pp., June 1971.

An experimental program was conducted to develop effective methods for producing and utilizing filmed demonstrations and instructional manuals. Four variations on conventional filmed demonstrations were evaluated: (a) revising an Army film through repeated tryouts with novices; (b) stopping the projector after each step is demonstrated to allow practice of that step, (c) showing the complete film an extra time before practice, and (d) using an "implosion" technique in the introduction. The film variations and a pictorial book program were compared.

Knowledge of Results in Schematic Concept Formation," by A.D. Wright and T.R. Dixon, paper for annual meeting of Southwestern Psychological Association, New Orleans, La., April 1968; issued as Professional Paper 17-68, 8 pp., June 1968.[1] AD-672 853

Research on schematic concept formation (SCF) using VARGUS 7 patterns at high redundancy levels has indicated that 0% and 100% knowledge of results (KOR) does not differentially affect task performance. An experiment to determine the effect of 0%, 25%, 50%, 75%, and 100% KOR in the SCF task indicated that SCF occurred but was not differentially affected by the KOR variable. The subject's certainty of the correctness of his responses was reliably higher for correct than for incorrect responses, but was not reliably influenced by the KOR variable. These data, and earlier studies, indicate that KOR does not facilitate concept formation when the high redundancy VARGUS 7 patterns are used. There is some evidence in this study that intermediate levels of KOR may interfere with SCF.

"Displacement of Apparent Straight Ahead as an Aftereffect of Deviation of the Eyes from Normal Position," by John N. Park, *Perceptual and Motor Skills*, vol. 28, no. 2, April 1969; issued as Professional Paper 21-69, 8 pp., June 1969. AD-691 074

Helmholtz's proprioceptive theory of apparent visual direction predicts a displacement of egocentric straight ahead as an aftereffect of deviation of the eyes from normal frontal position. In a test of this prediction, 91 subjects (a) selected from a line of lighted discs one that appeared to be straight ahead, (b) fixated the eyes for 30 seconds on a point either 30° from frontal position or at the most extreme position attainable, (c) returned the eyes to what seemed to be frontal position and selected the disc that appeared to be straight ahead. Ocular deviation produced as an aftereffect a displacement of apparent straight ahead which had a mean value of 3.12° and occurred in the same meridian and in the same direction as the eyes had been deviated. The amount of displacement was not significantly affected by the degree of prior ocular deviation or by the orientation of the line of discs.

Shape Perception Judgments as a Function of Stimulus Orientation, Stimulus Background, and Perceptual Style, by Edward W. Frederickson, Technical Report 70-24, 66 pp., December 1970. AD-722 479

Two experiments tested the validity of the shape-slant invariance hypothesis. The first test used two-dimensional rectangular stimuli to obtain shape judgment responses from 20 subjects. Individual differences between subjects were found to significantly influence shape judgment, but stimulus shape did not. In the second experiment, 68 subjects judged the shape and rotational orientation of three-dimensional rectangular solids. A statistical procedure was used to control this source of variance. Shape and rotation of the stimulus objects were found to influence judgments of shape and rotational orientation.

[1] Mr. Wright was on the staff of Division No. 5, Mr. Dixon was with Texas Christian University

Basic Research 18—Division No. 2
Behavior Management

Review of Concepts and Literature on Contingency Management, by Barrie Cassileth, Professional Paper 15-68, 13 pp., June 1968. AD-672 484

This paper reviews theoretical background and recent developments in contingency management. The contingency management approach applies psychological principles of reinforcement (reward) in attempting to manage behavior (or learning) by manipulating the immediate effects, or contingencies, occurring as a consequence of performance. A survey of related literature includes studies with the retarded, with deviant behavior, and with children.

"Student Motivation," by Norman Willard, Jr., paper for USCONARC Training Innovations Conference, Fort Benning, Ga., September 1968; included in *Innovations for Training*, Professional Paper 6-69, 44 pp., February 1969. AD-685 498

"Level of performance" is assumed to be an operational indicator of motivation, and primarily a problem of management rather than a psychological problem. Pertinent management issues range from the factors involved in environmental manipulation to the administrative reorganization required. The concepts of activity level, individual and group motivation, goals and rewards, and incentive schedules are discussed, and an experimental study of the motivational effects of contingency reward schedules imposed on self-paced instructional programs is described.

Reinforcement Management: An Approach to Motivating Army Trainees, by Barrie Cassileth, Technical Report 69-17, 20 pp., November 1969. AD-701 149 ED-037 652

To study the effectiveness of reinforcement management (contingency management) as applied to a military program of instruction already in operation, 335 students in an Army clerk-typist course in which self-paced instruction is employed were given points for successive approximations to desired learning behavior. The points were exchangeable later for varying lengths of time off. Only trainees of high initial typing skill were found to have been significantly affected by the experimental program. The selective impact of contingency management found in this population is examined in terms of present military conduct of self-paced instruction, and in terms of military management of motivation and training.

Basic Research 19—Division No. 4
Definition of Learning Variables

"Intelligence Profile in the Prediction of Psychomotor Skills, Perseverance, and Leadership," by James W. Dees, *Experimental Publication System*, American Psychological Association, Issue 6, June 1970; issued as Professional Paper 22-70, 9 pp., June 1970. AD-714 534

Subjects from an Officer Candidate company were given 37 tests using the criteria of leadership (peer ratings), perseverance (completion or resignation from OCS Program), and psychomotor skill (M16 rifle proficiency test). An embedded figures test was administered as a measure of a personality variable. The data from these tests support a unified theory of human potential and should offer opportunities for prediction overlooked in the past.

Dees, O'Reilly and Sennet Embedded Figures Test, Instructions and Test Booklet, [undated].

TECHNICAL ADVISORY SERVICE

FORECAST Troubleshooting Manual for LORAN Receiving Set: AN/UPN-12 and AN/UPN-15, teaching aid, June [1964]. (Div. 1) AD-667 381

FORECAST Self-Instructional Troubleshooting Scrambled Manual for LORAN Receiving Set: AN/UPN-12, -12A, -15, -15A, scrambled book, June 1964. (Div. 1) AD-681 559

FORECAST Troubleshooting Scrambled Tax for Operation of LORAN Receiving Set: AN/UPN-12, AN/UPN-12A, AN/UPN-15, AN/UPN-15A, scrambled book, June 1964. (Div 1)

A Study of Mathematical Skills Requirements for Basic Electronics in the U.S. Army Air Defense School, by John A. Cox and Richard C. Montgomery, Consulting Report, October 1964. (Div. 5) AD-628 701

"Human Factors in Tactical Nuclear Combat," by Robert Vineberg, presentation for members of The General Staff of the Department of the Army, Washington, January 1965; issued as Professional Paper 2-67, January 1967. (Exec. Off.) AD-647 838

This paper is a brief description of an extensive study made by HumRRO on the psychological effects of nuclear warfare. The general objectives of the study were to draw together information that might provide a basis for predicting human behavior in nuclear warfare, to analyze this information for implications concerning possible preparation for such warfare, and to develop a means for estimating psychological casualties. The major findings and conclusions are presented. Emphasis is given to certain specific social, psychological, military, and training factors which affect casualty rates. There is a description of a method which was developed for adjusting casualty rates, based on psychological factors, for use in war games.

Human Factors in Tactical Nuclear Combat, by Robert Vineberg, Technical Report 65-2, April 1965. (Exec. Off.) AD-463 787

The general objectives of this study are to gather information that may provide bases for predicting human behavior in nuclear warfare, to analyze this information for implications concerning possible preparation for such warfare, and to develop a means for estimating the psychological casualties that are likely to occur on the nuclear battlefield. Part I is a description and analysis of man's response to extreme stress, based on a review of relevant literature. Part II is a description of a method developed for estimating the extent of psychological casualties to be expected in tactical nuclear combat. It is concluded that man can, in general, cope with the severest forms of stress in civilian and military life. Nevertheless, because the greater and continuing stress of nuclear combat may increase neuropsychiatric casualties, implications are that special training, given simultaneously with his training in specific skills and knowledges, would prepare the soldier to fight and survive in a nuclear environment.

The Application and Test of the FORECAST Concept of Electronics Maintenance on Navy LORAN Equipment, by Edgar L. Shriver and Robert C. Trexler, Technical Report 65-3, May 1965. (Div. 1) AD-616 753

This report describes the Technical Advisory Service rendered to the Navy in connection with Work Unit FORECAST concept of electronics maintenance. This concept is presented as a collection of policies, methods, techniques, and services integrated in a plan for improved level of electronics maintenance in the services. Special reference is made to the application of the FORECAST concept to the Navy LORAN system and to the resulting products and level of performance achieved. In implementing FORECAST procedures, Navy chief petty officers, working with FORECAST scientists, produced a technical manual and training program, using an espcially designed device and programed instruction. The same tests in identifying malfunctions in LORAN systems were given to 86 Navy electronics technicians, FORECAST trained, and to 12 graduates of a conventional Navy course. FORECAST students identified 39% of the bad parts; conventionally trained students, 13%.

"The Soldier in Nuclear Combat," by Saul Lavisky, *Army Digest.*, vol. 21, no. 8, August 1966. (Exec. Off.)

A Suggested General SOP for the Preparation of Equipment Serviceability Criteria, by Paul G. Whitmore, Jr., Technical Report 67-10, 36 pp., June 1967. (Div. 2) AD-656 808

Equipment Serviceability Criteria (ESC) are required by Army regulation on maintenance-significant, mission-essential equipment. The ESC is used to determine the combat readiness of equipment and thus of combat units. Therefore, the validity of the information provided is critical and can best be assured by a systematic method for preparing the ESC. Developing systematic procedures on an exploratory basis involved two phases. In the first, checks are selected to determine the equipment's immediate and ensuing 90-day capability to perform as required by its mission, and in the second, performance requirements are established for accomplishing the checks. Suggestions were developed for a communication system for effectively transmitting the requirements to the man who will perform the checks.

"Human Performance in the Cold," by William F. Fox, *Human Factors*, vol. 9, no. 3, June 1967; issued as Professional Paper 2-68, 21 pp., January 1968. (Div. 4) AD-665 213

The literature dealing with human performance in the cold is reviewed. Seven major areas are discussed: tactile sensitivity, manual performance, tracking, reaction time, complex behaviors, maintaining hand skin temperature (HST) as a means of maintaining operator effectiveness, and adaptation and acclimatization to low ambient temperatures. Performance decrements at low ambient temperatures appear to result principally from lowered HST and competing stimuli provided by the cold environment.

Flight Evaluation Procedures and Quality Control, by Paul W. Caro, Jr., Technical Report 68-3, 32 pp., March 1968. (Div. 6) AD-667 512

Aspects of flight evaluation data input at the Rotary Wing Department, U.S. Army Aviation School, during 1961-63, were studied with reference to formal quality control system requirements. It was found that significant agreement did exist between instructor and checkpilot evaluations, but that this agreement could be a reflection of information available to the checkpilot prior to the checkride, rather than commonality of instructor and checkpilot standards. Checkride grades were also found to reflect individual checkpilot standards and the student's stage of training. Current grading practices were studied to determine the usefulness, for quality control purposes, of the kinds of detailed diagnostic information available on individual student performance.

Instructor's Guide to Performance Counseling, by Joseph A. Olmstead, Research By-Product, 21 pp., March 1968. (Div. 4) AD-681 450

This guide presents fundamental concepts and techniques for the conduct of performance counseling by instructors, tactical officers, and other personnel who may be required to appraise the performance of students and to communicate the results of their appraisals to students. Along with specific suggestions for the counseling interview, the special responsibilities of the instructor are detailed. The materials may be applicable in a variety of instructional contexts.

The Effects of "Quick Kill" Upon Trainee Confidence and Attitudes, by Joseph A. Olmstead, Technical Report 68-15, 50 pp., December 1968. (Div. 4) AD-682 350

This study was designed to determine the effects of "Quick Kill" training on the confidence of basic combat trainees and on their attitudes toward various phases of basic rifle marksmanship (BRM), and to learn drill sergeants' opinions of Quick Kill. Groups having Quick Kill in their BRM training were compared to those who did not have it. Trainees were administered pre- and post-training questionnaires on attitudes toward BRM and Quick Kill training, and toward firing the service weapon. Subjects were 824 basic trainees at five different U.S. Army training centers. It was found that BRM *with* Quick Kill increased trainee confidence significantly more than BRM alone in ability to fire the service weapon. In most instances, Quick Kill trainees reported more favorable attitudes toward the different phases of BRM training and toward Quick Kill itself. Drill sergeants in general viewed it favorably as to efficiency and confidence-building qualities, and it was concluded that Quick Kill training exerts a positive effect on trainee confidence and attitudes.

Technical Advisory Service *(Cont.)*

The Process of Developing and Improving Course Content for Military Technical Training, by Harold G. Hunter, J. Daniel Lyons, Eugene F. MacCaslin, Robert G. Smith, Jr., and Harold Wagner, Technical Report 69-9, 72 pp., May 1969; abbreviated version in *Educational Technology*, April 1970 and May 1971; issued as Professional Paper 15-71, 15 pp., June 1971. (Div. 1) AD-689 005

Curriculum development procedures in use as of 1966 for first-enlistment technical training in the Army, Navy, and Air Force are analyzed. A model process for training curriculum development was defined from training research findings and practices: (a) Analyze the system, (b) develop task inventories, (c) develop a job model, (d) analyze its tasks, (e) derive training objectives, (f) develop the training program, and (g) monitor the trained product and modify the curriculum. A comparison between this model and the training development procedures in use in the services indicated a need for (a) better procedures for determining the adequacy of training content and the means for improvement; (b) detailed guidance for developing or conducting the first four steps of the model process, criteria for allocating training content to formal instruction or on-the-job learning, performance specifications for graduates, and feedback from training programs; and (c) more opportunities for career fields in training.

A Survey of Soldier Opinions About the Bayonet in the U.S. Army, by James W. Dees and George J. Magner, Technical Report 69-13, 32 pp., June 1969. (Div. 4)

This report presents the results of a survey conducted to determine the opinions of a sample of U.S. Army personnel regarding the present bayonet/knife. The survey indicated that the present weapon was considered to be a satisfactory bayonet but an unsatisfactory knife; bayonet combat was infrequent in both theaters of World War II, Korea, the Dominican Republic, and is infrequent now in Vietnam; more and better bayonet training would be an improvement, but present training is adequate, and at least one other skill (marksmanship) is considered to be much more worthy of additional training time; bayonet training contributes to physical conditioning, and to the instilling of motivation and discipline, but other combative training could achieve the same or greater results.

The Effects of Changes in Transition Firing Upon "Quick Kill" Proficiency, by Joseph A. Olmstead and T.O. Jacobs, Technical Report 69-14, 15 pp., July 1969. (Div. 4) AD-692 930

This study determined the effects of modifications in "Quick Kill" rifle training on the proficiency of trainees in Basic Combat Training in using Quick Kill techniques. It was concluded that (a) use of the temporary training rib on the rifle in Transition Firing produces superior results, (b) no significant loss in Quick Kill proficiency should result from reducing range and number of targets from three targets at 15, 30, and 50 meters to two targets at 20 and 50 meters, retaining the training rib, (c) reducing total number of rounds fired from 60 to 30 without a reduction in targets would result in reduced proficiency, and (d) three hours of Air Rifle practical exercises produce results superior to one and one-half hours of exercises.

"Implementation of Systems Engineering Concepts in Army Training," by D. Schley Ricketson, Robert H. Wright, and Russel E. Schulz, paper for Institute of Electrical and Electronics Engineers Symposium, Winter Park, Fla., November 1970; issued as Professional Paper 11-71, 13 pp., June 1971.

This paper is an account of a HumRRO review of systems engineering concepts as applied to training programs at an Army training school. It was concluded that through systems engineering, the programs are being reoriented toward actual job requirements, reducing the "nice-to-know" and focusing on the "need-to-know." Since the programs are being constructed by personnel relatively unskilled in systems engineering and training program design, appropriate training methods are being recommended. An Army-developed systems engineering guide (CONRAC Regulation 350-100-1, *Systems Engineering of Training*) was reviewed and reduced to outline form, and a graphic display of products of information and subproducts, or elements of work, was prepared.

A Study Manual for the Drill Sergeant Candidate, Research Product, January 1971.

This manual is for use by the drill sergeant candidate in improving or refreshing his knowledge of military topics as a prerequisite for entering the Drill Sergeant School

Research By-Products resulting from Technical Advisory Service are listed in Part III.

GENERAL

(Items Not Directly Related to Specific Elements of the Research Program or Items Related to Several Elements)

1952

"Leadership and Small-Group Behavior," by Launor F. Carter, paper for Second Conference of Social Psychology, April 1952; published in *Group Relations at the Crossroads: University of Oklahoma Lectures in Social Psychology*, Muzafer Sherif and M.O. Wilson (eds.), Harper & Brothers, New York, 1953. (Div. 3)

Some theoretical considerations are presented regarding the nature of the problem of groups and of leadership.

1953

Analysis of Variance Designs With Disproportionate Subclass Numbers, by Victor H. Denenberg, Staff Memorandum, August 1953. (Div. 2)

A Study of Groups: A Review of the Literature, by Richard Blum, Staff Memorandum, August 1953. (Div. 3) AD-645 158

A review of the evolution of and methodology in group research, including group dimensions, leadership, morale, inter-group relations, types of groups, group membership and individual stress reactions, and foreign military applications of group techniques. A bibliography of 785 references is included.

A Follow-up Study of NCO Leaders School Graduates, by Carl H. Rittenhouse, Information Report, September 1953. (Div. 3) AD-486 297

Two matched groups of enlisted men, one composed of graduates of NCO Infantry Leaders Schools, were compared on the characteristics of ranks, assignments, and awards. Although the Leaders School graduates attained a somewhat higher average final rank, received more infantry assignments, and received more combat infantry badges, little clear evidence of superior leadership among Leaders School graduates was found in the comparisons.

"Recording and Evaluating the Performance of Individuals as Members of Small Groups," by Launor F. Carter, paper for American Psychological Association convention, Cleveland, September 1953. (Div. 3)

College men were formed into groups of four or eight members and run on a reasoning task, a mechanical assembly task, and a discussion task, either in emergent-leader or appointed-leader situations. At the end of each task, two observers rated the subjects on 19 variables (such as the individual's cooperation, efficiency, confidence, prestige, insight, initiative, and leadership). In spite of considerable variation in groups, three factors emerged: individual prominence, group goal facilitation, and group sociability. These results indicated that leadership is not a single basic dimension.

1954

"A Method for Computing the Kendall Tau Coefficient," by Harold F. Bright, *Educational and Psychological Measurement*, vol. 14, 1954. (Exec. Off.)

What HumRRO Is Doing, Research Bulletin 1, March 1954. (Exec. Off.) AD-28 859

"Remark on 'A Qualification in the Use of Analysis of Variance'," by Victor H. Denenberg, *Psychological Bulletin*, vol. 51, no. 2, March 1954. (Div. 2)

F

1955

"Some Notes on Cumulative Scales," by Ira H. Cisin, *Journal of Rural Sociology*, vol. 20, 1955. (Exec. Off.)

"An IBM Application to Scaling Problems," by Arnold A. Heyl, paper for meeting of American Sociological Society, 1955. (Exec. Off.)

"Multiple Criteria in Productivity Studies of Military Groups," by Ira H. Cisin and Francis H. Palmer, paper for meeting of American Sociological Society, 1955. (Exec. Off.)

A methodological approach to generalization of criteria in studies of group effectiveness is discussed.

What HumRRO Is Doing, Research Bulletin 2, March 1955 (with supplement, April 1955). (Exec. Off.) AD-62 216

A Survey of the Basic Airborne Training Course at Fort Benning, Georgia, by Charles Windle, Special Report 4, April 1955. (Div. 4) AD-63 872

A survey of the basic Airborne training course revealed that those who completed the course successfully were well trained for parachuting into combat with minimum likelihood of injury. The report offers suggestions, based on the findings of the survey, for changes in selection and training methods which should tend to reduce attrition during training.

"The Effect of Various Interview Techniques in Evoking Fear Responses," by Charles Windle, Howard McFann, and Joseph Ward, *Journal of Clinical Psychology*, vol. XI, no. 2, April 1955. (Div. 4)

A Survey on Morale and Leadership as Affected by the ATFA-1 Armored Division, by Boyd L. Mathers, Staff Memorandum, September 1955. (Div. 2) AD-482 182

"The Planning of Program Research," by Meredith P. Crawford, paper for symposium at American Psychological Association convention, San Francisco, September 1955. (Exec. Off.)

"A Comparison Between the Peace Time Psychiatric Casualty Rates of Parachutists and Non-Parachutists," by Charles Windle and MAJ Harold E. Parker, *Journal of Clinical Psychology*, vol. XI, no. 4, October 1955. (Div. 4)

1956

What HumRRO Is Doing, 1955, Research Bulletin 3, April 1956. (Exec. Off.) AD-94 294

"Dig That Atomic Foxhole," by Henry E. Kelly, *Army*, June 1956. (Div. 4)

1957

"Twice-Told Tales About One-Tailed Tests," by Mitchell M. Berkun, *Psychology Newsletter*, no. 9, 1957. (Div. 3)

This paper presents a methodological discussion of the use of a one-tailed test based on prediction of the outcome in a reported study of conformity.

Annotated Bibliography of Research Studies in Aviation Mechanical Maintenance Training, by Robert T. Root, Staff Memorandum, March 1957. (Div. 1)

"Factors in the Recovery From Approach-Avoidance Conflict," by Mitchell M. Berkun, *Journal of Experimental Psychology*, vol. 54, no. 1, July 1957. (Div. 3)

F

An Annotated Bibliography of Research on Training Aids and Training Devices, by Robert T. Root, Staff Memorandum, August 1957. (Div. 1) AD-637 219

"A Method of Wide Applicability for Testing Hypotheses About the Structure of Qualitative Variables," by R.G. Demaree, paper for American Psychological Association convention, September 1957. (Div. 5)

What HumRRO Is Doing, January 1956-June 1957, Research Bulletin 4, December 1957. (Exec. Off.) AD-158 174

1958

The Conduct of Field Studies, by Ralph H. Kolstoe, Staff Memorandum, March 1958. (Div. 1) AD-487 525

Operational Context Training in Individual Technical Skills, papers for conference on operational context training, Washington, June 1958; issued as Professional Paper 35-69, 25 pp., December 1969. (Div. 1) AD-703 515 ED-041 233

These three papers were written within the framework of the conference objectives: To assess the current status and explore the potentialities of on-site or operational context training, and, To generate guidance for research to support effective use of on-site or operational context training. The papers are: "Operational Context Training: Its Meaning and Potential," by Arthur J. Hoehn; "Operational Context Training for Nike Operators," by Myron Woolman, and "Training in an Operational Context," by Robert Glaser.

"Are Initial Responses to a Learning Sequence Random?" by Hilton M. Bialek, paper for American Psychological Association convention, Washington, September 1958. (Div. 3)

College students, randomly placed into 24 groups of 15 each, were told to look at a panel of lights arranged in a circle and to guess which one of the lights would be turned on. They indicated their choice before the light appeared, during 60 trials. The number of alternatives was varied from three to six. In all but two cases, the groups were doing something other than random guessing from the beginning of the sequences. Randomness of initial responses to the established binary random sequence and methodological implications are discussed.

"Methodology of Establishing Military Research Requirements," by Joseph C. Hammock, paper for American Psychological Association convention, Washington, September 1958. (Div. 5)

"The Man-Rifle Weapon in Atomic War," by Howard Sarvis, *Guns*, December 1958. (Div. 1)

"Research in Army Training: Present and Future," by Meredith P. Crawford, paper for U.S. Army Infantry Conference, Fort Benning, Ga., December 1958; issued as Professional Paper 10-69, 12 pp., April 1969. (Exec. Off.) AD-688 255

This paper shows the method of application of proven research procedures to Army training and illustrates the usefulness of research techniques in making training more effective and efficient. Objective measurements of soldier proficiency in common military skills and knowledges are described.

What HumRRO Is Doing, July 1957-June 1958, Research Bulletin 5, December 1958. (Exec. Off.) AD-207 291

1959

"Further Comment on Classical and Instrumental Conditioning," by Mitchell M. Berkun, *Canadian Journal of Psychology*, vol. 13, no. 4, 1959. (Div. 3)

"Some Considerations on Human Factors in Future Combat," by John L. Finan, paper for Army War College, Carlisle, Pa., January 1959. (Exec. Off.)

"Toward Better Armor Training Management," by Robert A. Baker, *Armor*, vol. LXVIII, no. 2, March-April 1959. (Div. 2)

"Gradients of Generalization in Secondary Reinforcement," by Bruce O. Bergum, paper for annual meeting of Midwestern Psychological Association, Spring 1959; published in *Journal of Experimental Psychology*, vol. 59, no. 1, January 1960. (Div. 5)

Some Problems in the Description of Jobs for Electronic Maintenance Training, by Robert Vineberg, paper for Research Planning Conference on Job Qualifications Analysis, Office of Naval Research, Washington, May 1959. (Div. 1)

"A Conceptual Approach to Training Research," by Meredith P. Crawford, address at the Army Science Conference, United States Military Academy, June 1959; in *Proceedings of the 1959 Army Science Conference*, Army Research Office, Office of the Chief of Research and Development, Department of the Army, Washington, vol. I. (Exec. Off.)

"Focus on Man," by John L. Finan, *Army*, vol. 9, no. 12, July 1959. (Exec. Off.)

"The Role of Media in Education and Training," by William A. McClelland, paper for USAF-NRC Symposium on Education and Training Media, Washington, August 1959; in *Education and Training Media, a Symposium*, Glen Finch (ed.), Publication 789, National Academy of Sciences—National Research Council, Washington, 1960. (Div. 1)

"The Use of Part-Task Trainers and Operational Equipment as Training Devices," by William A. McClelland, paper for American Psychological Association convention, Cincinnati, September 1959. (Div. 1)

HumRRO Presentations to Third Meeting of NIKE ZEUS Training Panel, Ordnance Guided Missile School, Redstone Arsenal—(1) "Introduction and Overview," by T.R. Vallance, (2) "What Is an Adequate Task and Skill Analysis?" by Robert G. Smith, Jr., (3) "Some Comments on Content and Methods Based on Electronic Systems Training Research," by William A. McClelland—Research Bulletin 6, November 1959. (Exec. Off.) AD-628 960

"The Science of Training Soldiers," by Meredith P. Crawford, with foreword by LTG Arthur G. Trudeau, *Army Information Digest*, vol. 14, no. 11, November 1959. (Exec. Off.)

Training Methodology and Training Research: Their Application in the Development of Training Programs, by Robert Vineberg, paper for Institute for Federal Employee Development Officers, National War College, Washington, November 1959. (Div. 1)

"Research and Development in Training and Education," by Meredith P. Crawford, paper for Symposium on the Contributions of Military Research to Education and Training, Northwestern University, Evanston, Ill., December 1959; issued as Professional Paper 18-67, April 1967. (Exec. Off.) AD-651 931

This paper contains a discussion of the common problems of educational and military establishments in regard to the teaching and learning of new knowledges and skills. Developments in military research that have possible application to civilian educational fields are presented. The state of the technology of training and education is described in a six-step procedure of job analysis, specification of knowledges and skills, construction of the training program. achievement testing, construction of proficiency tests, and evaluation of training programs.

1960

"Army Research in Human Factors" [by LTC David Cooper], paper for symposium at annual meeting of Southwestern Psychological Association, Spring 1960.[1] (Div. 5)

"The Concept of a Technology of Training," by Robert G. Smith, Jr., paper for symposium at annual meeting of Southwestern Psychological Association, Spring 1960. (Div. 5)

[1] Colonel Cooper was the Unit Chief of the U.S. Army Air Defense Human Research Unit.

"The Utilization of Master's Level Personnel in Military Training Research," by Robert G. Smith, Jr., paper for symposium at annual meeting of Southwestern Psychological Association, Spring 1960. (Div. 5)

"Research in Military Laboratories," by J.D. Lyons, paper for symposium at meeting of Southern Society for Philosophy and Psychology, April 1960. (Div. 6)

What HumRRO is Doing, July 1958-June 1959, Research Bulletin 7, April 1960. (Exec. Off.) AD-236 771

Scales and Standards for Military Training Research, by Robert G. Smith, Jr., Research Memorandum, May 1960. (Div. 5) / D-815 619

"How Fast Can You Hit Him?" by Howard C. Sarvis, *Guns*, vol. 6, July 1960. (Div. 4)

"*The Professional Soldier. A Social and Political Portrait*, by Morris Janowitz," by Meredith P. Crawford, review, *Armor*, vol. LXIX, no. 4, July-August 1960. (Exec. Off.)

"RCAF Experience With the Training of NATO Aircrew,' by Squadron Leader E.P. Sloan," by Meredith P. Crawford, discussion, at NATO Defence Psychology Symposium, Paris, France, August 1960; published in *Defence Psychology*, Frank A. Geldard (ed.), Pergamon Press, New York, 1962. (Exec. Off.)

Human Factor Problems Associated With Flight at Low Altitude and High Speed, Subcontractor's report, August 1960 (Subcontractor: Lockheed Aircraft Corporation). (Div. 6) AD-815 211

> The primary objective of this annotated bibliography is to provide a compilation of studies concerned with the effects of prolonged high-speed low-altitude flight on aircrew performance. Most of the human factor problems involved result from vibration and buffeting, acceleration forces, motion sickness, and overburdened visual and psychomotor processes. Most of the studies are concerned with human performance under conditions involving some of the specific characteristics of such flight.

"The Role of Expectancy in Auditory Vigilance," by Arthur Floyd, Jr., Gary D. Griggs, and Robert A. Baker, paper for American Psychological Association convention, Chicago, September 1960; published in *Perceptual and Motor Skills*, vol. XIII, no. 2, October 1961. (Div. 2)

"Some Relationships Between Training Research and Human Engineering in the Design of Weapon Systems," by Theodore R. Vallance, paper for the 6th Annual Army Human Factors Engineering Conference, Fort Belvoir, Va., October 1960. (Exec. Off.)

1961

"Shop Talk and Technical Writing," by William T. Battrick, *STWP Review*, vol. 8, no. 1, January 1961. (Div. 2)

"COED - A Device for the Experimental Study of Man-Machine Systems," by R.H. Johnson, D.A. Gordon, B. Bergum, and W.E. Patterson, *Human Factors*, vol. 3, no. 1, March 1961. (Div. 5)

"Interrelationship of Three Measures of Motivation," by Harry A. Burdick, *Psychological Reports*, vol. 8, no. 2, April 1961. (Div. 3)

> Chi square tests of need for achievement, need for affiliation, and need for power scores on six pictures for two independent groups, 215 college students and 201 recent members of the U.S. Army, indicated that these measures of motivation were statistically independent and might be combined in research.

"An Overview: HumRRO Organization and Research" [by W.L. Williams, Jr.], paper for symposium at annual meeting of Rocky Mountain Psychological Association, Spring 1961. (Div. 5)

"Performance of Mental Deficients on a Simple Vigilance Task," by J. Roger Ware, Robert A. Baker, and Raymond R. Sipowicz, paper for annual meeting of Midwestern Psychological Association, Spring 1961; published in *American Journal of Mental Deficiency*, vol. LXVI, no. 4, January 1962. (Div. 2)

"Double Tenth—Research: Human Resources," by Meredith P. Crawford, *The George Washington University Federalist*, vol. VIII, no. 2, Spring 1961.[1] (Exec. Off.)

"Design and Evaluation of Printed Job Aids for Electronics Repairmen," by Arthur J. Hoehn, James P. Rogers, and Charles D. Fink, paper for U.S. Army-Industry Maintenance Publications Conference, Fort Knox, Ky., May 1961. (Div. 1)

"How Far Should Training Be Automated? or A Perspective for the Training Manager on the Automation of Military Courses of Instruction," by William A. McClelland, paper for Training Command Commanders' Conference, Aberdeen Proving Ground, Md., May 1961; amplified version presented to USCONARC, Fort Monroe, Va., June 1961. (Exec. Off.)

"Improved Manuals for Man-Machine Systems Through Task Analysis," by Eugene F. MacCaslin, paper for U.S. Army-Industry Maintenance Publications Conference, Fort Knox, Ky., May 1961. (Div. 1)

"Let's Take a Look at HumRRO Activities" [by LTC A.H. Eliasson], *Army Aviation*, May 1961.[2] (Div. 6)

"Science and Army Training: What HumRRO Researchers are Doing," by LTC Franklyn J. Michaelson, *Army*, vol. 11, no. 10, May 1961.[3]

"Effects of Intelligence on Signal Detection in Visual and Auditory Monitoring," by J. Roger Ware, *Perceptual and Motor Skills*, vol. XIII, no. 1, August 1961. (Div. 2)

What HumRRO Is Doing, Research Bulletin 8, August 1961. (Exec. Off.) AD-262 127

"Auditory Vigilance in Repeated Sessions," by J. Roger Ware, Raymond R. Sipowicz, and R.A. Baker, *Perceptual and Motor Skills, vol. XIII, no. 2, October 1961. (Div. 2)*

"The Heavens and the Fields," by Marvin Parrott, *Revue Militaire Générale*, no. 8, Paris, France, October 1961. (Div. 2)

"Effects of Intelligence on Vigilance: A Replication," by Raymond R. Sipowicz and Robert A. Baker, *Perceptual and Motor Skills*, vol XII, no. 3, December 1961. (Div. 2)

"Effects of Practice on Visual Monitoring," by Robert A. Baker, Raymond R. Sipowicz, and J. Roger Ware, *Perceptual and Motor Skills*, vol. XIII, no. 3, December 1961. (Div. 2)

Leadership at Higher Levels of Command as Viewed by Senior and Experienced Combat Commanders, by MG Edmund B. Sebree, USA Ret., Research Memorandum, December 1961. (Div. 3) AD-178 740

This special research project was established for exploration of (a) the respects in which higher-level leadership varies from leadership below division level; (b) the knowledge of psychology or sociology required by higher commanders; (c) the importance of traits of the leader in the exercise of high-level leadership; and (d) the impact of the group being led, and of the situation, upon the exercise of high-level leadership. This paper is a compilation of information on these topics obtained from personal letters to 100 senior and experienced combat officers and supplemented by other source material such as official records and military

[1] "Double Tenth" is a two-part article celebrating the tenth anniversary of HumRRO, and the tenth anniversary of the University's Navy Graduate Comptrollership Program.

[2] Colonel Eliasson was the Unit Chief of the U.S. Army Aviation Human Research Unit

[3] Colonel Michaelson was Chief, Research Division, Individual Training Directorate, DCS Individual Training, USCONARC, Fort Monroe, Va.

biographies. The text also includes profiles of six leaders successful at high levels of command. The diversity in personality and techniques characterizing successful leaders facing various command problems is illustrated.

"Let's Take a Look at Aviation Training Research," by LTC Arne H. Eliasson, *Army Aviation*, vol. 10, no. 12, December 1961.[1] (Div. 6)

"Responses to Transformations: Remembering and Understanding" [by Edmund B. Coleman], paper for meeting of the Linguistic Society of America, Chicago, December 1961. (Div. 5)

"Selected Current Research in Military Psychology," by Carl J. Lange, paper for U.S. Military Academy, West Point, N.Y., December 1961. (Div. 4)

1962

"Concepts of Training," by Meredith P. Crawford, in *Psychological Principles in System Development*,, Robert M. Gagné (ed.), Holt, Rinehart, and Winston, New York, 1962. (Exec. Off.)

"The Systems Concept as a Principle of Methodological Decision," by John L. Finan, in *Psychological Principles in System Development*, Robert M. Gagné (ed.), Holt, Rinehart, and Winston, New York, 1962. (Exec. Off.)

"A Procedure for Controlling Army School Curricula," by William A. McClelland, paper for meeting of Working Group for the Army School System Study, USCONARC, Fort Monroe, Va., January 1962 (Exec. Off.)

"Identifying Training Needs and Translating Them Into Research Requirements," by Theodore R. Vallance and Meredith P. Crawford, Chapter 16 in *Training Research and Education*, Robert Glaser (ed.), University of Pittsburgh Press, Pittsburgh, January 1962. (Exec. Off.)

"When It's Dark in the Daytime," by COL Henry E. Kelly [USA Ret.], *Army*, vol. 12, no. 6, January 1962. (Div. 4)

"Why Prone?" by COL Henry E. Kelly [USA Ret.], *Army*, vol. 12, no. 8, March 1962. (Div. 4)

"The Effects of Knowledge of Results (True and False) on Vigilance Performance," by Edward W. Weidenfeller, Robert A. Baker, and J. Roger Ware, *Perceptual and Motor Skills*, vol. XIV, no. 2, April 1962. (Div. 2)

"Signal Detection by Multiple Monitors," by Robert A. Baker, J. Roger Ware, and Raymond R. Sipowicz, *Psychological Record*, vol. 12, no. 2, April 1962. (Div. 2)

"Teaching Machines and Programmed Learning in Use: In the Army - The Past and Plans," by J. Daniel Lyons, paper for symposium at meeting of Southern Society for Philosophy and Psychology, Memphis, April 1962. (Div. 6)

"Some Contributions of Training Research to the Personnel Systems Concept," by William A. McClelland, in *Tri-Service Conference on New Approaches to Personnel-Systems Research*, ONR Symposium Report ACR-76, Washington, May 1962. (Exec. Off.)

"Training for Performance Under Stress," by S. James Goffard, paper for meeting of District of Columbia Psychological Association, May 1962. (Exec. Off.)

"The Effects of Reward and Knowledge of Results on the Performance of a Simple Vigilance Task," by Raymond R. Sipowicz, J. Roger Ware, and Robert A. Baker, *Journal of Experimental Psychology*, vol. 64, no. 1, July 1962. (Div. 2)

[1] Colonel Eliasson was the Unit Chief of the U.S. Army Aviation Human Research Unit

"Sustained Vigilance I - Signal Detection During a 24-Hour Continuous Watch," by Robert A. Baker, J. Roger Ware, and Raymond R. Sipowicz, *Psychological Record*, vol. 12, no. 3, July 1962. (Div. 2)

"Vigilance: A Comparison in Auditory, Visual, and Combined Audio-Visual Tasks," by Robert A. Baker, J. Roger Ware, and Raymond R. Sipowicz, *Canadian Journal of Psychology*, vol. 16, no. 3, September 1962. (Div. 2)

What HumRRO Is Doing, Research Bulletin 9, September 1962. (Exec. Off.) AD-248 961

"The Engineering of Training," by Meredith P. Crawford, paper for Army Human Factors Engineering Conference, U.S. Army Infantry Center, Fort Benning, Ga., October 1962. (Exec. Off.)

"Practical Aspects of the Behavioral Sciences," by Meredith P. Crawford, paper for the Washington Academy of Sciences, Washington, November 1962. (Exec. Off.)

"Current Views on Psychology and Leadership," by Carl J. Lange, paper for U.S. Military Academy, West Point, N.Y., December 1962. (Div. 4)

"Reversibility of the After-Images of Ambiguous Figures," by Robert O. Wood, Jr., paper for meeting of Texas Psychological Association, San Antonio, December 1962. (Div. 5)

1963

"Draft Policy Statement on Effects of Fatigue and Confinement," by Norman Willard, Jr., paper for U.S. Army Armor Policy Conference, Fort Knox, Ky., January 1963 (incorporated in Conference Recommendations, Sixth Quadripartite Conference on Armour, Bovington, England, 8-16 May 1963). (Div. 2)

"Helicopter Formation Flying," by Wallace W. Prophet, *U.S Army Aviation Digest*, vol. 9, no. 2, February 1963. (Div. 6)

"Training Research in the United States Army," by William A. McClelland, paper for Training Conference for the National Security Industrial Association, Fort Bliss, Tex., February 1963. (Exec. Off.)

"Human Processing of Olfactory Information," by Robert H. Wright and Kenneth M. Nichols, paper for Bionics Symposium, Wright-Patterson AFB, Ohio, March 1963; in *1963 Bionics Symposium Contributed Paper Preprints*. Aeronautical Systems Division and the Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio, March 1963. (Div. 6)

"Programmed Instruction and the Technology of Training," by Robert G. Smith, Jr., paper for meeting of National Society for Programmed Instruction, March 1963. (Exec. Off.)

"The Guiding Assumptions of Liberal Arts Programming: A Psychologist's View," by Theodore R. Vallance, *Journal of Higher Education, vol. XXXIII, no. 4, April 1963. (Exec. Off.)*

"Vigilance Performance Under Conditions of Redundant and Nonredundant Signal Presentation," by William C. Osborn, Richard W. Sheldon, and Robert A. Baker, *Journal of Applied Psychology*, vol. 47, no. 2, April 1963, (Div. 2)

"Criteria for Career Force Structure," by Norman Willard, Jr., paper for Inter-Service Conference on Techniques for Determining the Military Career Force Structure, Washington, May 1963. (Div. 2)

"The Effects of Verbal and Non-Verbal Knowledge of Results on Detection Performance," by J. Roger Ware, Boyd Kowal, and Robert A. Baker, paper for annual meeting of Midwestern Psychological Association, Chicago, May 1963. (Div. 2)

"Vigilance Performance Under Conditions of Single Versus Multiple-Type Signal Presentation," by William C. Osborn, Robert A. Baker, and Richard W. Sheldon, paper for annual meeting of Midwestern Psychological Association, Chicago, May 1963. (Div. 2)

"Training Research Utilizing Man-Computer Interactions: Promise and Reality," by William A. McClelland, paper for Avionics Panel program, Advisory Group for Aeronautical Research and Development, Athens, Greece, July 1963; issued as Professional Paper 23-67, June 1967. (Exec. Off.) AD-654 818 ED-015 359

Several conceptual propositions in regard to man and the computer are offered. The nature of training research is examined. There is also a brief categorization of human behavior to suggest some of the uses and some of the difficulties in the utilization of computers in training research. The role of the training research psychologist dealing with large groups of people in mass instruction in a military setting is discussed, as is the importance of the computer for data processing and as a tool for simulating complex behavior.

"A Tentative Taxonomy of Task Demands," by Eugene F. MacCaslin, paper for American Psychological Association convention, Philadelphia, September 1963. (Div. 1)

"The Evaluation of Systems-Analytic Training Programs," by Eugene A. Cogan, paper for 9th Annual Army Human Factors Research and Development Conference, Washington, October 1963; issued as Professional Paper 29-67, June 1967. (Exec. Off.) AD-637 246

Methods of evaluating, or validating, an experimental training program are discussed, and needs for improvement in methodology are noted. An adaptation of HumRRO's seven-step paradigm of the development of the training program is used as a frame of reference. The paper includes description of various aspects of evaluating a program, including assessing proficiency, assessing costs and feasibility, and developing and evaluating the system job model.

"What Programmed Instruction Is—And Isn't," by Robert G. Smith, Jr., paper for Bureau of Naval Weapons Training Conference, Washington, October 1963. (Exec. Off.)

"Evaluation of Prospective Social Relationships: A Function of Comparison Level and Predicted Outcome Level," by Arthur L. Miller, *Journal of Abnormal and Social Psychology*, vol. 67, no. 5, November 1963. (Div. 2)

"Lao Buddhism: A Vehicle for Technical Change," by Arthur Niehoff, paper for meeting of American Anthropological Association, San Francisco, November 1963; published under the title, "Theravada Buddhism: A Vehicle for Technical Change," *Human Organization*, vol. 23, no. 2, Summer 1964. (Div. 7)

1964

"Human Factors in Cold Weather Operation," by Wallace W. Prophet and Russel E. Schulz, *U.S. Army Aviation Digest*, vol. 10, no. 1, January 1964. (Div. 6)

"Effect of Increasing Signal Load on Detection Performance of a Vigilance Task," by J. Roger Ware, Robert A. Baker, and Richard W. Sheldon, *Perceptual and Motor Skills*, vol. 18, no. 1, February 1964. (Div. 2)

"The Future of Military Psychology: Paramilitary Psychology," by Charles Windle and T.R. Vallance, *American Psychologist*, vol. 19, no. 2, February 1964.[1] (Exec. Off.)

"The Role of Experimenter Attitude and Contingent Reinforcement in a Vigilance Task," by J. Roger Ware, Boyd Kowal, and Robert A. Baker, *Human Factors*, vol. 6, no. 1, February 1964. (Div. 2)

[1] Written while authors were with HumRRO; revised while with Special Operations Research Office.

"Assembly (?) or Defensive(?) Areas," by COL Henry E. Kelly (USA Ret.), *Infantry*, vol. 54, no. 2, March-April 1964. (Div. 4)

"Beyond Programed Instruction," by Robert G. Smith, Jr., Presidential Address for meeting of National Society for Programmed Instruction, San Antonio, April 1964. (Exec. Off.)

"The Improvement of Human Performance Through Research," by Meredith P. Crawford, paper for the Institute of Research Administration, American University, Washington, April 1964. (Exec. Off.)

"Programmed Instruction Under a Demand Feedback Schedule," by William H. Melching, paper for National Society for Programmed Instruction convention, San Antonio, Tex., April 1964; published in *NSPI Journal*, vol. V, no. 2, February 1966. (Div. 5)

"Discipline," by MG E.B. Sebree [USA Ret.], *Army*, vol. 14, no. 10, May 1964. (Div. 3)

This article discusses the positive and negative aspects of discipline as interpreted by commanders in the U.S. Army in a variety of situations. It is proposed that the proof of real discipline is in achievement, that discipline is gained by motivation, and that discipline is manifested not by "spit and polish" but by a cheerful and intense desire to obey. It is further postulated that discipline is motivated by personal recognition and a sense of being fairly treated both by superiors and by the Army as an institution, and that the end product held together by discipline is that important characteristic of the commander–leadership.

"Interfaces Between Operations Research and Human Factors Research," by Eugene A. Cogan, paper for U.S. Army Operations Research Symposium, Moline, Ill., May 1964; issued as Professional Paper 12-67, March 1967. (Exec. Off.) AD-649 863

This paper is a discussion of the interrelation between Human Factors Research and Operations Research. The two disciplines share objectives, and they have many similarities in how they approach a problem and how they judge the critical elements in the work and in the results. The special viewpoints and skills of each discipline seem to complement those of the other. The author suggests some of the problem areas in which closer contact between the two disciplines would be of advantage to them and to the Army.

An Annotated Bibliography on Proficiency Measurement for Training Quality Control, by Robert G. Smith, Jr., Research Memorandum, June 1964. (Exec. Off.) AD-613 552 ED-013 195

This annotated bibliography is a comprehensive list of literature available in the field of proficiency measurement for training quality control. It supplements *Controlling the Quality of Training*, Technical Report 65-6, June 1965.

An Annotated Bibliography on the Determination of Training Objectives, by Robert G. Smith, Jr., Research Memorandum, June 1964. (Exec. Off.) AD-448 363

This annotated bibliography lists literature available on developing training objectives. It supplements *The Development of Training Objectives*, Research Bulletin 11, June 1964.

The Development of Training Objectives, by Robert G. Smith, Jr., Research Bulletin 11, June 1964 (Exec. Off.) AD-448 364 ED-014 139

This Research Bulletin is the first of several publications designed to present general accounts of the technology for developing training. It describes modern concepts and techniques used in determining training objectives, selected as being practical for Army training personnel. An annotated bibliography of literature available in the field, *An Annotated Bibliography on the Determination of Training Objectives*, Research Memorandum, June 1964, supplements this report.

"*Vigilance. A Symposium*, by Donald N. Buckner and James J. McGrath (eds.)," by Robert A. Baker, review, *Psychological Record*, vol 11, no. 3, July 1961. (Div. 2)

"Command Leadership," by Joseph A. Olmstead, paper for Air Command and Staff College, Air University, Maxwell AFB, Ala., September 1964. (Div. 1)

"Learning Theory and Research Paradigms Applied to Training Research: Some Dissonances," by Eugene F. MacCaslin and Eugene A. Cogan, paper for American Psychological Association convention, Los Angeles, September 1964; issued as Professional Paper 13-68, 6 pp., May 1968. (Div. 1) AD-671 060

While the problems and methods of learning theory and training technology seem similar they are in fact subtly different. Illustrations of dissonance are discussed, using the following natural but inefficient extrapolations from academic traditions: to test a training program, compare two candidate programs, to compare two training devices, hold *S*s, training time, and method constant; the problem of a training program is a special case of transfer of training; a single objective task analysis may be used for any of several research purposes; and training methods for psychomotor performance and sensory discrimination are the best investment of training research.

"A Review of Recent Research and Development on Military Leadership, Command, and Team Function," by Meredith P. Crawford, paper for American Psychological Association convention, Los Angeles, September 1964; issued as a Research Memorandum, 27 pp., September 1964 (AD-478 288); published under the title, "Training for Leadership, Command, and Team Function," in *Psychological Research in National Defense Today*, J.E. Uhlaner (ed.), Technical Report S-1, U.S. Army Behavioral Science Research Laboratory, June 1967. (Exec. Off.) ED-023 028

"Statistical Judgment: A Study of Mean Length and Mean Inclination," by Arthur Miller, Robert Baker, and Richard Jones, paper for American Psychological Association convention, Los Angeles, September 1964. (Div. 2)

"A Military Career," by MG Edmund B. Sebree [USA Ret.], *Infantry*, vol. 54, no. 5, September-October 1964. (Div. 3)

This article examines the problem of junior Army officer attrition as related to motivation and morale.

"Army Human Factors Information Developments," by A. James Mcknight, paper for symposium at meeting of Human Factors Society, Washington, October 1964. (Div. 1)

"Effects of Method of Presentation, Modes and Response Category Knowledge of Results on Detection Performance in a Vigilance Task," by J. Roger Ware and Robert A. Baker, *Journal of Engineering Psychology*, vol. 3, no. 4, October 1964. (Div. 2)

"Sustained Vigilance II: Signal Detection for Two-Man Teams During a 24-Hour Watch," by J. Roger Ware, Robert A. Baker, and Eugene Drucker, *Journal of Engineering Psychology*, vol. 3, no. 4, October 1964. (Div. 2)

"Training Oriented Human Factors Engineering of Army Aircraft," by Robert H. Wright, paper for symposium at Army Human Factors Research and Development Conference, Fort Rucker, Ala., October 1964. (Div. 6)

1965

"Military Applications of Programed Instruction" and "Management Considerations in Programed Instruction," by Robert G. Smith, Jr., papers for NATO Conference on Military Applications of Programmed Instruction, Naples, Italy, April 1965; issued as Professional Paper 7-67, February 1967 (Exec. Off.) AD-647 840

The first paper indicates the influence of military applications of programed instruction on the development of modern concepts of programing, and describes a number of specific applications of its use by the Air Force, Army, and Navy. The discussion in the second paper is directed toward the training officer considering the use of programed instruction and covers such areas as: advantages; costs; factors to be considered in selecting courses to be programed; how to obtain programs; how to decide whether or not an available program is suited to a particular need; what to consider in planning to contract with a programing firm, and writing a program. Necessary attitudes of a programer and the demands of his job are outlined, as are the problems of management that must be faced and solved.

"The Application of Programed Instruction to Foreign Language and Literacy Training," by Eugene H. Rocklyn, paper for NATO Conference on Military Applications of Programmed Instruction, Naples, Italy, April 1965; issued as Professional Paper 8-67, February 1967. (Div. 7) AD-647 841

This paper provides a view of some existing self-instructional programs for foreign language training, especially for use by the military in training large numbers of men with varied abilities. The advantages of good self-instructional language training programs over conventional courses are discussed, and the development of one program is traced from its inception to its successful conclusion. By comparison, self-instructional materials for literacy training in the United States have not been developed to the same extent, and problems in this area are discussed.

Controlling the Quality of Training, by Robert G. Smith, Jr., Technical Report 65-6, June 1965 (Exec. Off.) AD-618 737 ED-015 521

The need for a quality control system in a military training program and methods of establishing such a unit are described and evaluated in this report, which is part of a research project in the technology for developing training. It is stated that the purpose of quality control is to ensure a satisfactory standard of competence among the students who graduate, to maintain this quality by a continuous monitoring process, and to improve training where it is found to be deficient. In order to function successfully, a quality control system should constitute a separate unit, independent of but cooperating with the instructional departments. Attention is given to proficiency testing as the chief means of measuring the success of the training program, with emphasis upon the importance of a uniform standard and consistent method in the preparation, administration, and scoring of tests. The report is supplemented by *An Annotated Bibliography on Proficiency Measurement for Training Quality Control*, Research Memorandum, June 1965.

"Disaster at Little Big Horn," by MG E.B. Sebree [USA Ret.], *Infantry*, vol. 55, no. 1, July August 1965. (Div. 3)

This paper presents an example of the lack of communications, tactics, unity, and leadership that became the disaster at Little Big Horn.

"Dimensions of Simulation," by Meredith P. Crawford, Presidential Address for Division of Military Psychology at American Psychological Association convention, Chicago, September 1965, published in *American Psychologist*, vol. 21, no. 8, August 1966; also issued as Professional Paper 5-66, October 1966. (Exec. Off.) AD-642 806

The uses of simulation in research and development training as well as in the broader field of education are explored. The major uses of simulation are discussed, with special emphasis on the perceptual structuring of environments in relation to occupations prefacing a discussion of the uses of simulation for training and the measurement of its outcomes. Some suggested psychological dimensions of simulations emerge from the discussion.

"A Study of Backward Chaining," by John A. Cox and Lynn M. Boren, *Journal of Educational Psychology*, vol. 56, no. 5, October 1965. (Div. 5)

Thirty men were trained to perform a 72-action procedure on Nike Hercules equipment. Three different training techniques were used, 10 men being trained with each technique. First, the actions were organized into seven operant spans and taught in reverse chronological order. Second, the same operant spans were taught in chronological order. Third, the complete procedure was taught without grouping actions into operant spans. Each subject was required to learn the procedure to one perfect performance. The amount of training time was collected as the score for each subject. Comparisons were made between the mean training times for the three techniques. No differences larger than chance were found.

"Psychological Research in Electronics Maintenance Training," by W.A. McClelland, paper for Director of Electrical and Mechanical Engineer's Study Period, Arborfield, England, November 1965, issued as Professional Paper 22-67, May 1967. (Exec. Off.) AD-653 620

In order to establish a frame of reference for the British audience, HumRRO's role and mission in Army research and development, the U.S. Army personnel and maintenance systems, and a procedure for curricular control are briefly described. The bulk of the paper is devoted to selected examples of HumRRO R&D in electronics maintenance training. FORECAST, JOBTRAIN, MAINTRAIN, LIMIT, and REPAIR are cited.

Short-Term Memory: An Annotated Bibliography, by Donald Reynolds and Richard D. Rosenblatt, Technical Report 65-13, December 1965. (Div. 1) AD-627 394

The bibliography is divided into 12 areas: Information Theory; Proactive and Retroactive Interference and Interpolated Activities; Set, Subject-Strategies, and Coding Techniques; Paired-Associate Studies; Simultaneous Listening and Memory Span Studies; Rate and Mode of Stimulus Presentation; Rate and Order of Recall, and Serial and Sequential Tasks; Methods, Theory, and Review Articles; Meaningfulness, Degree of Learning, and Stimulus Organization; Age Differences; Comparisons of Short-Term Memory and Long-Term Memory; Perceptual Studies. There are 170 articles annotated, and extensive cross-indexing to facilitate location of articles. Although the earliest study included is dated 1910, the majority of articles were published from 1959 through 1964. Use of multiple presentation of stimuli, even if the material was "immediately recalled," was labeled "learning" rather than "memory" and was excluded.

1966

"The Relationship between Vigilance and Monotonous Work," by Robert A. Baker and J. Roger Ware, *Ergonomics*, vol. 9, no. 2, March 1966. (Div. 5)

"Factors Influencing Utilization of Research Findings in Institutional Change," by J. Daniel Lyons, paper for annual meeting of Southeastern Psychological Association, New Orleans, April 1966; issued as Professional Paper 2-66, April 1966. (Div. 1) AD-634 839

Some of the factors and conditions which appear to have influenced the utilization by the U.S. Army of HumRRO research findings are presented and discussed.

"Men, Machines, and the Software Middle Man," by Edgar L. Shriver, paper for meeting of Society of Technical Writers and Publishers, Huntsville, Ala., March 1966; issued as Professional Paper 3-66, April 1966. (Div. 1) AD-634 213

The common elements of recently developed new concepts of electronics maintenance are described. Some possible applications of these concepts for changes in the jobs of technical writers are discussed.

"Learning to Lead," by MG Edmund B. Sebree, USA Ret., *Military Review*, vol. XLVI, no. 5, May 1966. (Div. 3)

This article presents an historical examination of leadership and characteristics of the leader. Statements on the issue by prominent military leaders of the world and a "career pattern" derived from personnel records of more than 200 officers are presented. Leadership is defined broadly as a social interaction between the leader as an individual, the men being led, and a vast number of varying situational factors. Essential leadership traits are condensed under the headings: professional knowledge, setting and demanding high standards, and showing consideration for others. Leadership is characterized as a dynamic interaction process which is learned, not taught.

"Models *of* and *for* Training," by Eugene A. Cogan, presentation at Human Factors Working Group at 17th Military Operations Research Symposium, Monterey, Calif., May 1966; included in *Training Models*, Professional Paper 13-66, December 1966. (Exec. Off.)

"Individualization of Instruction," by Howard H. McFann, paper for symposium at 12th Annual Army Human Factors Research and Development Conference, Fort Benning, Ga., October 1966; included in *Individual and Small-Unit Training for Combat Operations*, Professional Paper 21-67, May 1967. (Div. 3)

"Training for Modern Combat Operations," by T.O. Jacobs, paper for symposium at 12th Annual Army Human Factors Research and Development Conference, Fort Benning, Ga., October 1966; included in *Individual and Small-Unit Training for Combat Operations*, Professional Paper 21-67, May 1967. (Div. 4)

"The Utility of Data From Field Performance Measurement," by A. James McKnight, presentation at annual meeting of the Human Factors Society, Anaheim, Calif., November 1966; issued as Professional Paper 10-67, March 1967. (Div. 1) AD-649 866

The thesis of this presentation is that in conducting field performance measurement, the researcher wishes to obtain an estimate of individual or group performance with respect to some larger system. Three general points where he frequently fails to apply this objective to the field measurement processes are discussed. First, in defining the tasks, the performance is often unwittingly changed so that it no longer conforms to the goals of the system. Secondly, the ability to obtain an estimate of field performance is frequently degraded by failure to maintain representative sampling in the selection or weighting of performance tasks. Finally, departure from observable system behavior in favor of some judgmental estimate of behavioral effectiveness in selecting performance measures leaves the relation of behavior to system goals unknown, and limits the utility of the data with regard to other aspects of the same system or to other systems.

The Design of Instructional Systems, by Robert G. Smith, Jr., Technical Report 66-18, November 1966. (Exec. Off.) AD-644 054 ED-014 135

This report, based on an extensive survey of current literature, describes and discusses a system approach to designing training and considers factors bearing on training effectiveness. An efficient instructional system is conceived as one in which the components form an integrated whole, achieving maximum effectiveness at the least possible cost. Components considered in this report include presentation media, student management, techniques for practicing knowledge and performance, knowledge of results, directing student activities toward the goals of the training program, and testing and evaluating the system in terms of efficiency and cost. The report is supplemented by *An Annotated Bibliography on the Design of Instructional Systems*, Technical Report 67-5, May 1967.

HumRRO Techniques in Course Development, by Meredith P. Crawford, Professional Paper 15-66, December 1966; based on a paper for Administrator's Training Seminar, Bureau of Personnel, U.S. Navy, Washington, May 1966. (Exec. Off.) AD-646 979

After a short description of HumRRO and its research program, techniques that have evolved for developing an effective training program are described. The steps are: (a) Analyze the military system in which the job is located; (b) analyze the particular job and its place in the system; (c) develop proficiency measures; (d) specify the knowledges and skills needed by the individual in the job; (e) determine training objectives; (f) construct the training program; and (g) test the program.

Training Models, Professional Paper 13-66, December 1966; papers for Human Factors Working Group at 17th Military Operations Research Symposium, Monterey, Calif., May 1966. (Div. 1, Exec. Off.) AD-646 978

I. "The Formulation of Training Problems," by Harold G. Hunter (Exploratory Research 13); II. "Models *of* and *for* Training," by Eugene A. Cogan (General).

The first paper covers training from the systems perspective including such aspects as specificity of training objectives, resources available, job context, technologies used and describes a system for training development. Communication at interfaces of user/training developer, trainer user, and trainer/and monitoring HQ is critical. The need for research on the information flow between the agencies and toward generalized training models is emphasized. The second paper discusses models *for* and *of* training. Models *for* training include job performance, feedback, allocation, Management-Production, and Psychometrics. The state-of-the-art provides no single model *of* the training process. Additional work on modeling is needed for the process *of* training, realism in training, standards of performance, and mission effectiveness.

"Army Utilization of HumRRO R&D Products," by Saul Lavisky, paper for annual Industry Conference of the American Textbook Publishers Institute, Cherry Hill, N.J., December 1966.

1967

Goal-Directed Leadership: Superordinate to Human Relations?, Professional Paper 11-67, March 1967; papers for symposium at American Psychological Association convention, New York, September 1966. (Divs. 3,4) AD-649 864 ED-012 862

"The View From the Top—The Demands of Organizational Leadership," by Joseph A. Olmstead (HIGHLEAD); "The Apprentice Leader—Preparation for a Role," by Paul D. Hood (NCO); "The View From the Underside—Task Demands and Group Structures," by Clay E. George (UNIFECT); "The Man in the Middle—A Mixed Role," by T.O. Jacobs (OFFTRAIN).

These presentations are concerned with leadership in hierarchical organizations. Leadership theory and practice have been characterized by conflicting views of trait theorists, "human relations" advocates, and "reality-centered" proponents. Research dealing with military leadership and with small group effectiveness within a military setting has led to a more coherent picture of leadership, integrating certain aspects of these views applicable to several different levels within the military organization. From this work, symposium members have made extrapolations meaningful to leadership theory in goal-directed organizations other than the military.

HumRRO Research on Human Performance, by Meredith P. Crawford, Professional Paper 14-67, April 1967; based on a paper for Department of Psychology, Purdue University, May 1966. (Exec. Off.) AD-651 045

This paper is a discussion of the operation of an organization performing basic and applied psychological research and exploratory development for a large client system. The Human Resources Research Office of The George Washington University is used as a case study in the ways in which research psychologists deal with practical problems. The organizational framework is explained, with particular emphasis on HumRRO's relationship with the Army as client. The current major research activities directed toward improving Army training and performance, and the steps between a research idea and the use of the final product of that idea, are discussed.

An Annotated Bibliography on the Design of Instructional Systems, by Robert G. Smith, Jr., Technical Report 67-5, May 1967. (Exec. Off.) AD-653 128 ED-014 136

The bibliography is divided into seven major areas: I, Systems General; II, Training Systems; III, Presentation of Knowledge; IV, Practice of Knowledge; V, Practice of Performance; VI, Management of Students; and VII, Additional Material. The major areas are further divided into sub-topics where appropriate. There are 119 annotated entries in the bibliography, dating from 1950 to 1965. Key-word-in-context (KWIC) and author indexes are included. This bibliography supplements *The Design of Instructional Systems*, Technical Report 66-18, November 1966.

Individual and Small-Unit Training for Combat Operations, Professional Paper 21-67, May 1967; papers for symposium at 12th Annual Army Human Factors Research and Development Conference, Fort Benning, Ga., October 1966. (Divs. 3,4) AD-653 845 ED-013 113

"Training for Modern Combat Operations," by T.O. Jacobs (General); "A Case Study of the Development of an Individual Combat Training Program," by Joseph S. Ward (RIFLEMAN); "The Foundations for Leader Training," by Theodore R. Powers (ROCCOM); "Training for Coordination Within Rifle Squads," by Clay E. George (UNIFECT); "Individualization of Instruction," by Howard H. McFann (General).

Particular training programs are described in these five papers based on numerous research projects concerned with military training and training methods. A review and assessment of training research, primarily that for the Army combat arms, are in the first paper. The second paper deals with the coordination requirements imposed on rifle squads, and with methods of training for coordination. In the third paper a method of job assessment of ROTC graduates' initial-duty assignments is described with a view toward the design of training objectives. The ten steps in a complete job of curriculum engineering of an individual training program are described in the fourth paper. In the final paper there is a discussion of orienting instruction to take into account the important dimensions of the way people differ from one another.

Human Factors Research in Support of Army Aviation, Professional Paper 27-67, June 1967; papers for symposium at annual meeting of Southeastern Psychological Association, Atlanta, Ga., April 1967. (Div. 6) AD-665 126

"Human Factors in Complex Systems," by Francis H. Thomas (OBSERVE); "Helicopter Training Devices in Support of Army Aviation," by Paul W. Caro, Jr. (ECHO); "Aviator Performance Under Stress," by Wiley R. Boyles (Exploratory Study 50).

These three papers were presented as part of a symposium concerned with human factors inplications in Army aviation performance and training. The first paper deals with human factor problems in complex systems, particularly problems encountered in the aerial reconnaissance and surveillance subsystem of the Combat Intelligence System. The initial concern has been to improve human effectiveness in collecting battle area information through new training methods and techniques. The second paper deals with the effectiveness of the synthetic helicopter flight training devices and their usefulness for transfer of training from a rotary-wing instrument flight qualificiation course to performance on the actual helicopter. The third paper concerns research on aviator stresses during combat missions. The research objectives were to provide the Army with readily usable information on variables that affect aviator performance, and to integrate this information into a system of performance prediction.

"Training the Editor: Skills Are Not Enough," by Lola M. Zook, paper for symposium at International Technical Communications Conference, Society of Technical Writers and Publishers, Chicago, May 1967; issued as Professional Paper 28-67, 11 pp., June 1967. (Exec. Off.) AD-654 772

While it is obvious that a trainee technical editor needs to learn editorial skills and techniques, it is less obvious but not less important for the trainee to acquire certain attitudes in and toward his work as an editor. Viewpoints and work patterns that characterize experienced editors are used as a basis for formulating a series of concepts about the key elements in the training of an editorial apprentice. These concepts are discussed in terms of the development, in a tutorial-type on-the-job training environment, of attitudes and viewpoints that will increase the professional capabilities of the trainee.

"Training Research for the Army," by Saul Lavisky, *Phi Delta Kappan*, vol. XLVIII, no. 9, May 1967. (Exec. Off.)

"Simulation in Training and Education," by Meredith P. Crawford, paper for NATO Symposium, Paris, France, July 1967; issued as Professional Paper 40-67, 19 pp., September 1967; included in *The Simulation of Human Behavior (La Simulation du Comportement, Actes d'un Symposium O.T.A.N.)*, Dunod, Paris, July 1969. (Exec. Off.) AD-660 013) ED-016 172

The key concepts of system and simulation as they are applied to training and education are discussed in this paper. Five general characteristics of machine-ascendant systems that facilitate the orderly design process of training simulators are presented. The conceptualization of the behavior of organizations and their members in systems terms is cited as an important resource for determining objectives of education.

"The Human Factor in Army Aviation," by Wallace W. Prophet, *Aviation Digest*, vol. 13, no. 8, Auguut 1967; issued as Professional Paper 43-67, 5 pp., September 1967. (Div. 6) AD-660 076

In an article in observance of the 25th anniversary of U.S. Army aviation, some research activities are described to illustrate the attention being given to the most important factor in Army aviation—the human factor. Research in sub-areas that are part of the human factors field, such as personnel selection, training methods, prediction of performance, performance assessment, training devices, simulation, and human engineering, is also described.

Technical Manuals for Maintenance Support: A Maintenance Rationale, Some Research Findings, and Some Projections, by C.D. Fink, Professional Paper 37-67, August 1967; based on a paper for AMC Maintenance Manual Council, Fort Knox, Ky., June 1967. (Div. 1) AD-659 079

This paper considers electronics maintenance concepts and research findings in relation to development and use of technical manuals for use in maintenance. The experimental development of maintenance manuals that give attention to easy-to-follow troubleshooting procedures is described, with special reference to effective utilization of military personnel on their first tour of duty. Some projections regarding the use of technical manuals are included.

1968

"Guidelines for Manpower Training as Developed by the Human Resources Research Office," by William A. McClelland and J. Daniel Lyons, paper for annual meeting of Highway Research Board, Washington, January 1968; issued as Professional Paper 43-68, 10 pp., December 1968. (Exec. Off.) AD-683 020

This paper describes the Human Resources Research Office organization and its role and mission in Army R&D. There are examples of HumRRO products being used by the military. A seven-point generalized procedure for building and testing maintenance training courses as developed by HumRRO, is discussed. Functional context training, the HumRRO approach to the selection and sequencing of course materials, is described.

Utilization of Behavioral Science Research in a Large, Operational System, by William A. McClelland with the technical assistance of Angela D. Bentz, Professional Paper 7-68, 7 pp., March 1968; based on a paper for Conference on Social Research and Military Management of the Inter-University Seminar on Armed Forces and Society, University of Chicago, June 1967. (Exec. Off.) AD-667 631

The operation and organizational framework of the Human Resources Research Office are described with particular emphasis on the research and development relationship with the U.S. Army as a client. Some of the factors and conditions which appear to have influenced the utilization by the U.S. Army of HumRRO findings are presented and discussed.

"Individualization of Instruction - Issues and Problems," by Robert G. Smith, Jr., paper for National Society for Programmed Instruction convention, San Antonio, Tex., April 1968. (Exec. Off.)

"The Closed Mind," by Robert A. Baker, Presidential Address for joint meeting of the Kentucky Psychological Association and the Southern Society for Philosophy and Psychology, Louisville, Ky., April 1968. (Div. 2)

"The Role of the Technical Editor in His Professional Development," by Lola M. Zook, paper for symposium at International Technical Communications Conference, Society of Technical Writers and Publishers, Los Angeles, May 1968; issued as Professional Paper 19-68, 12 pp., June 1968 (Exec. Off.) AD-673 435

In the term "technical editor," "technical" means something different for virtually every individual and every job, but "editor" provides common ground across jobs and disciplines. As a basis for considering how a technical editor can contribute to his own professional development, the paper discusses skills, attitudes, and activities that characterize the professional editor, taking into account the special problems faced by the editor who works with technical subject matter.

From Research to Practice in Electronics Maintenance Training, by William A. McClelland, Professional Paper 21-68, 10 pp., June 1968, based on a paper for USCONARC School Curriculum Conference, Fort Knox, Ky., February 1967. (Exec. Off.) AD-674 738

The problem of converting research results into training practice in the area of U.S. Army electronics maintenance is discussed. The need for a systematic, generalized procedure for designing, testing, and revalidating training courses is emphasized. Functional context training and a course using new instructional techniques are described.

"Some Comments on Client-Research Agency Relationships in Conduct and Use of Training Research," by William A. McClelland, paper for U.S. Air Force Air Training Command Advisory Board, Randolph AFB, Tex., July 1968; issued as Professional Paper 30-68, 12 pp., October 1968. (Exec. Off.) AD-677 511

The planning of training research and development, its performance, and the utilization of research findings, are discussed in this paper. A description and history of the organization, procedures, and personnel in a U.S. Army-university contractual relationship are given. Also discussed are the categories of human factors research programs as developed by the Human Resources Research Office and the methods of documentation of findings.

"Prediction of Aviator Performance," by Wallace W. Prophet, paper for Army Aviation Instructors' Conference, Fort Rucker, Ala., August 1968; issued as Professional Paper 5-69, 14 pp., February 1969. (Div. 6) AD-686 619

Approaches to the prediction of three specific kinds of aviator performance are discussed: (1) in flight training or school, (2) in combat, (3) with respect to career decision. Within the school setting the psychometric reliability of flight performance evaluation is treated, as in the prediction of flight performance on the basis of trainee performance on a captive helicopter training device. The interaction of self-confidence in dangerous situations with the acquisition of flight skills and with effective performance under combat stress is discussed; flight trainee volunteers are more self-confident than similar, but non-aviation, trainees, and degree of confidence is related to pass-fail in flight training. Integration of many diverse quantitative descriptors of aviator performance into a multiple predictor system is described. The aim of the system would be to provide time and usable information to Army personnel management and training decision-makers.

Innovations for Training, HumRRO presentations at the USCONARC Training Innovations Conference, Fort Benning, Ga., September 1968; issued as Professional Paper 6-69, 44 pp., February 1969. AD-685 498

Research in the areas of Army training programs and in the Army training system is reported in this collection of four papers: "Individualization of Army Training," by Howard H. McFann; "Dicussion of a Unique Approach to CAI: Project IMPACT," by Robert J. Seidel; "Student Motivation," by Norman Willard, Jr.; and "Training in the 70s and 80s," by Meredith P. Crawford.

"The Process of Effecting Change," by William A. McClelland, Presidential Address for Division of Military Psychology at American Psychological Association convention, San Francisco, September 1968; issued as Professional Paper 32-68, 27 pp., October 1968; also presented, in condensed version, to meeting of American Association of Junior Colleges, Vincennes, Ind., June 1969; also in conference proceedings, *Strategy for Change in the Junior College*, Publication no. 8, September 1969. (Exec. Off.) AD-677 980

In this paper the author indicates the importance of improving our understanding of the process of change and summarizes some of the relevant literature on the diffusion of innovations drawing from studies in rural sociology, cultural anthropology, industry, education, and psychology. There also is a brief outline of two paradigms or pre-models of change which may have utility to practitioners as well as suggesting to scholars the large gaps in the knowledge that must be filled before a theory of change can be formulated.

"Training in the 70s and 80s," by Meredith P. Crawford, paper for USCONARC Training Innovations Conference, Fort Benning, Ga., September 1968; included in *Innovations for Training*, Professional Paper 6-69, 44 pp., February 1969. (Exec. Off.) AD-685 498

This paper discusses some of the major characteristics that can be expected in the Army and the Army training system in the next 20 years. Some organizational foundations for the future now being laid by the Army are described, and promising areas in research and development that may alter the future of the Army training system are mentioned. Reference is made to the process of change as it affects the Army training system.

"Individualization of Army Training," by Howard H. McFann, paper for USCONARC Training Innovations Conference, Fort Benning, Ga., September 1968; included in *Innovations for Training*, Professional Paper 6-69, 44 pp., February 1969. (Div. 30) AD-685 498

Individualization of training is discussed from the aspects of (a) systems engineering, (b) training strategies, and (c) individual training factors. Emphasis is on the latter two, recognizing that the systems engineering approach is a prerequisite for any training system. Four possible training strategies are discussed, including the implications of each for handling individual differences. Training factors to be simultaneously considered in developing a training program that will handle individual differences are described. An attempt is made to interrelate ability level to factors of type or complexity of content, organization and sequencing, material, method and media of instruction, motivation, and management.

Research Implementation as Affected by Army Staffing Functions and Operations, by John F. Hayes, Professional Paper 34-68, 14 pp., October 1968. (Exec. Off.) AD-677 981

Army staffing factors are described with reference to activities concerning plans and products of research and development. The operational characteristics and procedures are pertinent in terms of information and guidance for research personnel concerned with research planning, execution, and implementation.

"Discussant on Papers by Mr. C. Hersh and Mr. H. Schulz," by Howard H. McFann, paper for symposium at 14th Annual Army Human Factors Research and Development Conference, Warren, Mich., October 1968. (Div. 3)

"Analysis of Job Qualifications," by A. James McKnight, paper for symposium at 14th Annual Human Factors Research and Development Conference, Warren, Mich., October 1968. (Div. 1)

"Use of Job and Task Analysis in Training," presentations to U.S. Continental Army Command, Fort Monroe, Va., October 1968; issued as Professional Paper 1-69, 43 pp., January 1969. (Exec. Off.) AD-688 810

This paper records the four presentations on the "Use of Job and Task Analysis in Training" made by members of the HumRRO staff at a briefing sponsored by the Office of the Deputy Chief of Staff for Individual Training at Headquarters, U.S. Continental Army Command in October 1968. The presentations specifically describe job and task analysis and its role in curriculum engineering. The briefing was designated the first of a series of briefings on training research and development programs of the U.S. Army Behavioral Science Research Laboratory, the Center for Research in Social Systems, and HumRRO.

"A New Approach to Training Programs," by Meredith P. Crawford, *Science Education News*, American Association for the Advancement of Science, December 1968. (Exec. Off.)

1969

"R&D: What Industry Can Learn From Research in Army Electronics and Electrical Maintenance Training," by W.A. McClelland, *Training in Business and Industry*, vol. 6, no. 1, January 1969; issued as Professional Paper 2-69, 11 pp., January 1969. (Research for the Ford Motor Company) (Exec. Off.) AD-684 277

The utilization of research results in training men to become electronics maintenance specialists is discussed. Functional context training and new instructional techniques used in the U.S. Army are described, with suggestions as to possible relevance for industrial training needs. The material is based on experience in a number of HumRRO research projects.

"Small Unit Defense," by COL Henry E. Kelly, (USA Ret.), *Infantry*, vol. 59, no. 1, January-February 1969. (Div. 4)

"Developing Programs for Teachers," by Carl J. Lange, in *Preparing Educators to Meet Emerging Needs*, Designing Education for the Future: An Eight-State Project, Denver, Colo., March 1969; abbreviated version, "Teacher Education and Educational Technology, published in *Educational Technology*, vol. 8, no. 24, December 1968; issued as Professional Paper 20-69, 19 pp., June 1969. (Exec. Off.) AD-689 990

General steps in the systems approach for the development of an instructional system are suggested in this paper, including systems analysis performed from a psychologist's viewpoint; job analysis; specification of knowledge and skill components; precise statement of objectives of the training; subject matter, media, techniques, and so forth of the training program; proficiency tests; and program evaluation. It is suggested that the significant contribution of this approach is that it provides instructional systems relevant to the purposes for which they exist, and for the possibility of systematic feedback of information to assure relevancy.

"Behavioral Objectives and Individualization of Instruction," by William H. Melching, paper for symposium at annual meeting of Southwestern Psychological Association, Austin, Tex., April 1969; issued as Professional Paper 18-69, 11 pp., May 1969. (Div. 5) AD-688 819

Implementation of a strong movement education today toward individualization of instruction can be facilitated by a systems approach, sometimes referred to as "The New Technology." The careful delineation of a set of behavioral objectives as an early step is required. The ability to specify objectives is deemed especially critical for the college instructor. In fact, it is contended that a partial solution to the frustrations voiced by today's student is one in which responsibility for determining instructional goals is *shared* by student and instructor.

"Human Factors in Airmobility," by Wallace W. Prophet, paper for Army Scientific Advisory Panel Spring meeting, Fort Rucker, Ala., May 1969; issued as Professional Paper 31-69, 16 pp., October 1969. Reprinted in part, as "Human Factors in Airmobility 1970-1980," *Army Aviation Digest*, vol. 17, no. 1, January 1971, pp. 8-11. (Div. 6) AD-697 081

In this paper the general organization of the Army Human Factors and Social Science Research Program and its principal research agencies, and current research activities of HumRRO Division No. 6 (Aviation) are described. These include studies of prediction of aviator performance, systems engineering of aviation maintenance training, human information processing functions in aerial reconnaissance and surveillance systems, and aviation simulation and training device requirements. Selected human factors research areas of significance to Army airmobility during the 1970-1980 period are also discussed. These are grouped under problems related to airmobile operational considerations, hardware considerations, and human learning considerations.

"Decisions About Data Collection Strategies," by Eugene A. Cogan, paper for U.S. Army Operations Research Symposium, Durham, N.C., May 1969; issued as Professional Paper 23-69, 14 pp., June 1969; also included as Chapter 7 in *Readings in Command Management Operations Research/Systems Analysis*, RB 20-5, vol. IIA, U.S. Army Command and General Staff College, Fort Leavenworth, Kans., December 1969, pp. 7-1—7-7. (Exec. Off.) AD-689 948

"Pure" academic research rules on data collection do not apply directly to operations research. OR data collection should be viewed in terms of objective, cost, and effectiveness. For the model formulation objective, proper data strategies emphasize multiple views of the operating system to identify the "relatednesses" to be depicted. For the objective of estimating parameters or testing predictions, bias, precision, and level of confidence of results are effectiveness concepts to be balanced against cost. Decision and utility theory, sensitivity analysis, and sequential analysis apply to OR data collection strategies and employ operational parameters to define data needed and, hence, minimize costs.

"Remarks on Systems Analysis for Social Problems," by Eugene A. Cogan, paper for Washington Operations Research Council symposium, Gaithersburg, Md., May 1969; issued as Professional Paper 15-70, 9 pp., May 1970. (Exec. Off.) AD-709 500

In this paper the need for more experience in *how* to adapt and apply the techniques of systems analysis to social and educational problems is stressed. Education and other social institutions, although very large activities, are managed as small independent units; therefore, adapting techniques from other applications and to form *general* decisions paradigms is mandatory. As for any systems analysis, it is necessary to begin with specific, carefully defined output objectives. For example, rather than subject matter approaches to educational curricula, output (desired resulting performance competence) should be used to identify input (instructional content). Use of system analysis techniques is essential to develop ways to solve social problems. For education, individualizing instruction to vastly improve the education process requires a systems analysis approach.

"Operation Order," by COL Henry E. Kelly, USA Ret., *Infantry*, vol. 59, no. 3, May-June 1969. (Div. 4)

Progress Report on HumRRO Research on Project 100,000, by Howard H. McFann, Professional Paper 25-69, 20 pp., July 1969; based on presentation at USCONARC 2nd Education and Training Conference, Fort Monroe, Va., February 1969. (Div. 3) AD-691 633 ED-033 223

A progress report dealing with the technical advisory service activities of HumRRO, primarily covering content, training, learning ability, literacy requirements, and on-the-job performance.

"Faculty In-Service Training Programs and the Process of Educational Change," by Saul Lavisky, presentation at Workshop for In-Service Training Personnel, American Association of Junior Colleges, Warrenton, Va., July 1969; issued as Professional Paper 38-69, 16 pp., December 1969. (Exec. Off.) AD-703 517 ED-042 248

In this paper the author indicated the importance of improving the understanding of the process of change and summarizes some of the relevant literature on the innovation process in education. The role of a "change agent" and techniques for innovation in education and training are described.

"HumRRO Research on Project 100,000," by Howard H. McFann, paper for symposium at American Psychological Association convention, Washington, September 1969; issued as Professional Paper 37-69, 14 pp., December 1969. (Div. 3) AD-703 516 ED-045 869

This paper presents the general research plans and some findings of HumRRO research associated with Project 100,000. The research objectives are to obtain information on what impact, if any, men taken into the Army under this program will have on training and operations, and to understand the relationship between measured aptitude and performance both in training and on the job. Summary data show the general relationship between Armed Forces Qualification Test scores and performance to include laboratory tasks and operational training. One of the conclusions is that efficient and effective training must take into account individual differences. Plans are presented which have the goal of providing necessary information on factors involved and techniques to account for them.

"A Framework for Viewing Quality Control in Training," by Eugene A. Cogan, Arthur J. Hoehn, and Robert G. Smith, Jr., paper based on a presentation by Dr. Hoehn at Defense Language Institute conference, Allenberry, Pa., September 1969; *Educational Technology*, vol. 10, no. 11, November 1970; issued as Professional Paper 28-70, 3 pp., November 1970. (Exec. Off.) AD-720 003

This paper contains a description of a framework for conceiving quality control and training. Quality control is viewed as an information system in support of (a) quality assurance, (b) control of student progress, (c) training program improvement, and (d) training system diagnosis and change. The essential components of a quality control system are (a) training objectives (preferably in terms of performance), (b) proficiency and diagnostic measures, (c) data reduction and analysis, (d) communication procedures, (e) procedures for decision and corrective action, and (f) managerial support.

"Military Psychology and General Psychology," by Meredith P. Crawford, invited address to Division of Military Psychology, American Psychological Association meeting, Washington, September 1969; *American Psychologist*, vol. 25, no. 4, April 1970; issued as Professional Paper 16-70, 12 pp., May 1970. (Exec. Off.) AD-712 898

In this paper the relevance of military psychology to current social problems is discussed and illustrated. Relevance was considered from the point of view of the substance, the research and development methods, and the especial orientation to implementation of research findings that is associated with military psychology. Among the topics dealt with are the techniques of task and skill analysis and job definition and their relationship to research and development in education; precise derivation of objectives in educational technology; and cross-cultural interaction.

HumRRO Research and the Army's Training Programs, by Saul Lavisky, Professional Paper 36-69, 21 pp., December 1969. (Exec. Off.) AD-701 607 ED-037 665

This paper reviews, in a narrative form, conspicuous examples of Army utilization of HumRRO research-and-development products between 1951 and 1969. It describes some of the ways in which behavioral- and social-science research has helped to improve Army training.

1970

"HumRRO, A Systems Approach," by Saul Lavisky, *Educational Screen and Audiovisual Guide*, vol. 49, no. 1, January 1970. (Exec. Off.) EJ-016 534

HumRRO Research in Training Technology, presentations at Headquarters, U.S. Continental Army Command, Fort Monroe, Va., February 1970; issued as Professional Paper 21-70, 39 pp., June 1970. (Exec. Off.) AD-712 285

This paper records four presentations on research and development in educational technology made by members of the HumRRO staff at a briefing sponsored by the Office of the Deputy Chief of Staff for Individual Training at Headquarters, U.S. Continental Army Command in February 1970. The presentations describe research under Work Unit IMPACT, Prototypes of Computerized Training for Army Personnel; research activities on individual training, with low aptitude personnel under Project 100,000; and research in aviation training and aviation training devices. This was the sixth in a series of briefings on training research and development programs of the U.S. Army Behavior and Systems Research Laboratory, the Center for Research in Social Systems, and HumRRO.

"HumRRO and Training Technology: An Introduction," by Meredith P. Crawford, paper for CONARC briefing, Fort Monroe, Va., February 1970; included in *HumRRO Research in Training Technology*, Professional Paper 21-70, 39 pp., June 1970. (Exec. Off.) AD-712 285

This introduction to the CONARC briefing provides a background for the four papers presented, and outlines an approach to the development of training programs which form an important basis of a technology of training. The organization of HumRRO, particularly as it relates to the Army, is presented.

"Individual Training of Personnel of Different Aptitudes," by H.H. McFann and Arnold A. Heyl, paper for CONARC briefing, Fort Monroe, Va., February 1970; included in *HumRRO Research in Training Technology*, Professional Paper 21-70, 39 pp., June 1970. (Div. 3) AD-712 285

This paper is concerned with individual training in the combat and combat-support MOSs, in a population representing the complete spectrum from the functional illiterate to the college graduate. Research performed with low-aptitude personnel under Project 100,000 in HumRRO Work Units UTILITY, REALISTIC, APSTART, and SPECTRUM is discussed.

"Synthetic Flight Training Devices," by Wallace W. Prophet, paper for CONARC briefing, Fort Monroe, Va., February 1970; included in *HumRRO Research in Training Technology*, Professional Paper 21-70, 39 pp., June 1970. (Div. 6) AD-712 285

This paper is a progress report on HumRRO research in aviation training and aviation training devices.

"Solving People Problems," by Saul Lavisky, *Army Digest*, vol. 25, no. 3, March 1970, pp. 13-15. (Exec. Off.)

This article appeared in the *Army Digest* as a review of HumRRO's two decades of research for the Army. The six major areas of research were individual training and performance; unit training and performance; training for leadership, command, and control; language and area training; training technology; and training management.

"A Manpower Delivery System: Implications for Curriculum Development," by Robert G. Smith, Jr., paper for Invitational Conference for Curriculum Development and Vocational Training, University of Minnesota, March 1970; issued as Professional Paper 19-70, 9 pp., June 1970. (Exec. Off.) AD-713 499

A simplified and abstract model of a manpower delivery system is presented in this paper. The relationships among the functions of occupational demands, guidance activities, placement work, occupational barriers, and interests of the job-seeker are discussed. The model points out to educational and training planners the principal aspects to consider when conducting a system analysis for vocational or professional education.

"Systematic Approaches for Identifying and Organizing Content for Training Programs," by Harry L. Ammerman, paper for Invitational Conference for Curriculum Development and Vocational Education, University of Minnesota, March 1970; issued as Professional Paper 20-70, 15 pp., June 1970. (Div. 5) AD-713 719 ED-047 287

This paper concentrates on two aspects in the development of curriculums for technical training: (1) the identification of curriculum content for specific courses of study, and (2) the organization of such content in training programs. Use of a word-association technique in a military radar

maintenance course revealed that many procedural questions need exploring before this approach can become an operational tool of curriculum designers, but its potential usefulness warrants further research. Effort being expended in making instructional decisions should be directed toward more rigorous and complete determination of the performance requirements.

"Motivation and Incentives in Manpower Analysis," by Eugene A. Cogan, Working Group presentation for 25th Annual meeting of Military Operations Research Society, U.S. Coast Guard Academy, New London, Conn., June 1970. (Exec. Off.)

This paper provides main findings from three selected studies on motivation and incentives in the Army, from which the author has drawn a number of simple generalizations. The results made clear that studies can play a significant role in national policy on military service and on policies about civilian occupations.

"Do Personality and Social Psychologists Study Men More Than Women?" by Douglas S. Holmes and Bruce W. Jorgensen, *Representative Research in Social Psychology*, Spring 1970; issued as Professional Paper 8-71, 7 pp., June 1971.

This research reports the existence of a sex bias in subject samples research in personality and social psychology, and compares it to the bias favoring college students. Issues of three relevant journals published in 1966, as well as all issues of a single journal in 1946 and 1956, were examined for sex and source of subjects. Males appear as subjects twice as often as females, a ratio even greater than that favoring college student subjects over noncollege student subjects. The bias in favor of studying males is as great or greater with noncollege student subjects as with college student subjects. Some implications of the bias in favor of using male subjects are discussed.

"HumRRO Research on Officer Training," briefings at Headquarters, U.S. Continental Army Command, Fort Monroe, Virginia, July 1970; issued as Professional Paper 24-70, 44 pp., September 1970. (Exec. Off) AD-714 211

This paper records the four presentations on officer training and education research programs made by members of the HumRRO staff at a briefing sponsored by the Office of the Deputy Chief of Staff for Individual Training at Headquarters, U.S. Continental Army Command in July 1970. The presentations provide information about selected HumRRO research projects, summarizing the work, describing progress to date, and giving a forecast of future demands to be placed on military leaders and advisors. The briefing was the fourth in a series on HumRRO training research and development programs.

"HumRRO Research on Officer Training and Education: The Leader, the Manager, the Technical Specialist," by William A. McClelland, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970. (Exec. Off.)

"Overview and Summary of Work Units OC LEADER, CAMBCOM, FORGE, and INGROUP," by T.O. Jacobs, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970. (Div. 4)

"The Military Mind Probes Tomorrow's Corporate Leaders," by Joseph A. Olmstead, *Business Management*, vol. 39, no. 5, February 1971.

"HumRRO Research and Project 100,000," by Howard H. McFann, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 33-70, 7 pp., December 1970. (Div. 3) AD-722 274

This paper was part of a symposium in which research on Project 100,000 was summarized. The report presents information on three major HumRRO projects concerned with training and performance of men of varying ability levels. The first project compared on-the-job performance of military personnel of varying ability levels. The second project concentrated on literacy requirements for military jobs. The third project concerned developing and testing, in an operational context, instructional programs appropriate for simultaneously training men of various ability levels.

"A Military-Industrial Perspective on Psychotechnology Today and Ten Years Hence," by W.A. McClelland, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970. (Exec. Off.)

"Command and Control in the Army's Human Factor System," by Donald F. Haggard, paper for 16th Annual Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970. (Div. 5)

"The Human Resources Research Organization's Aviation Psychology Research Program: Past, Present, and Future," by Wallace W. Prophet and Paul W. Caro, paper for Psychology in the Air Force Symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971. (Div. 6)

Since 1956, the Human Resources Research Organization (HumRRO) has carried on an active program of research in aviation psychology. The bulk of this effort has been focused on problems of Army aviation, but recently work has been initiated for other services including the U.S. Air Force. Dominant areas in the research program include studies of flight proficiency measurement, simulation, aerial reconnaissance and surveillance, training requirements analysis, systems engineering of training, and perceptual-motor skills learning. These areas of research are discussed, and a review of aviation psychology research requirements for the 1970s is given.

"The Media Manufacturer and the Educator," by Robert G. Smith, Jr., in *To Improve Learning, An Evaluation of Instructional Technology*, Academy for Educational Development, Inc., 1971; issued as Professional Paper 13-71, June 1971.

The background is developed in this paper for posing some suggested answers to the problem of how to create better cooperation between the educator and industry. It is pointed out that educators are homogeneous members of a labor-intensive enterprise, so that nearly any introduction of hardware means a significant innovation. The systems approach is reviewed, and the process of change is discussed. Both short- and long-range suggestions for establishing a closer working relationship and better mutual understanding for educators and industry are offered.

"Systems Analysis and The Introduction of Educational Technology in Schools," by Eugene A. Cogan, in *To Improve Learning, An Evaluation of Educational Technology*, Academy for Educational Development, Inc., 1971; issued as Professional Paper 14-71, June 1971.

In this paper the question of how systems analysis can be used to aid the introduction of educational technology into the field of education has been addressed. The question is approached by discussing systems analysis, education, and the general relevance of systems analysis tools to education, by discussing a variety of kinds of application that have been made and are being made, and by discussing steps needed and directions for effort to hurry and improve the use of systems analysis tools for education.

Part III: Research and Development Products and Experimental Materials

Research and Development Products and Experimental Materials

Human factors research and development directed toward the improvement of a specific operational activity often produces documents, materiel, manuals, or textual materials used in the study, which may be suitable for operational use. Although direct utilization may be possible, such materials typically require adaptation for a particular operational application. These products, which are devised as part of the research process, range from specific items such as training programs or job aids to more general materials having human factors relevance in training and other activities. If the information is available, reference is made to publication of material by sponsors.

ACHILLES

Job performance test for Nike IFC maintenance technicians:

Part II of Research Memorandum, *A General Note on the Development and Use of Job Performance Tests and a Detailed Description of Performance Tests for NIKE IFC Technicians*, by W.L. Williams, Jr., and Paul G. Whitmore, Jr., March 1959.

AREA

Illustrations of problems for instructor use in area training:

Examples of Cross-Cultural Problems Encountered by Americans Working Overseas: An Instructor's Handbook, by Robert J. Foster, May 1965.

Listing of films, books, and readings useful for instructors of area training programs:

Technical Report 67-11, *Some Resources for Area Training*, by Robert J. Foster and David T. O'Nan, September 1967 (AREA I). AD-660 057

Instructions for role-playing situations between Army advisors and their foreign counterparts overseas, and excerpt from test (from Triandus and Hall) to measure reactions to opinions and personal traits of others:

Appendices A and B of Technical Report 69-7, *Simulating Intercultural Communication Through Role-Playing*, by Edward C. Stewart, Jack Danielian, and Robert J. Foster, May 1969 (AREA II).

ARMORCOM

Communications training program (ASubSch 17-600) and performance test for tank radio operators:

Appendices B and C of Special Report 9, *Simplification of the Panel Layout on Standard Series Tank Radios*, by Boyd L. Mathers, July 1957 (ARMORCOM I).

ARMORNITE

Ground surveillance radar signals taped for target discrimination training:

Supplementary materials to Technical Report 90, *Operator Proficiency in Interpreting Ground Surveillance Radar Signals (AN/TPS-33)*, by Alfred J. Kraemer, David L. Easley, Arthur L. Miller, and Paul H. Stevenson, June 1964 (For Official Use Only) (ARMORNITE XIII).

ASAP

Guidebook for preparing proposals for alcohol safety action projects:

"Guidebook: Preparation of Proposals for Alcohol Safety Action Projects," October 1970.

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AUTOSPAN

Course materials, in seven volumes, for a self-instructional Spanish course:

AUTOSPAN, A Self-Instructional Course in Latin American Spanish, January 1969.

Course guidelines, examples of different types of lessons, and test materials:

Appendices A-J of Technical Report 70-14, *Development and Evaluation of a Self-Instructional Spanish Course*, by George H. Brown, Richard Beym, Thelma R. Smackey, and Angelo A. Cozzetto, September 1970.

AVTRAIN

QMR for a variable cockpit training system and derivation of operating costs for CG aircraft:

Appendices A and B of Technical Report 69-103, *Design and Procurement Bases for Coast Guard Aircraft Simulators*, by Paul W. Caro, Eugene R. Hall, and Cmdr. Gilbert E. Brown, Jr., December 1969.

BASICTRAIN

Performance test of basic infantry skills for BCT graduates:

Staff Memorandum, *Basic Infantry Skills Performance Test, ATP 21-114*, by George D. Greer, Jr., Finis W. Wilson, and Morton G. Wolpert, March 1956.

Minimal training goals and analysis by subject of the Army Training Program for Basic Combat Training:

Technical Report 67, *The Development of a List of Minimal Training Goals for Basic Combat Training*, by Albert Elkin, December 1960 (BASICTRAIN I).

CAMBCOM

Inventories of knowledges and skills of battalion commander and primary staff:

Knowledge and Skills Inventory:

"The Adjutant S-1, Combat Arms Maneuver Battalion," 1970.
"The Intelligence Officer S-2, Combat Arms Maneuver Battalion," 1970.
"The Operations/Training Officer S-3, Combat Arms Maneuver Battalion," 1970.
"The Logistics Officer S-4, Combat Arms Maneuver Battalion," 1970.

Battalion Commander Combat Arms Maneuver Battalion, Identification of Knowledge and Skills and Investigation of Thought Processing, by Arthur J. DeLuca and Theordore R. Powers, 1971.

CIVIC

Case histories of cross-cultural technical aid projects:

Research Memorandum, *A Selected Bibliography of Cross-Cultural Change Projects*, by Arthur H. Niehoff and J. Charnel Anderson, October 1964 (CIVIC II).

CLASSIC

Operating procedures for guided missile personnel:

Part II of Technical Report 51, *A Study of Human Factors in the Operation of the Nike Ajax System, Part I: The Training Problems and Requirements. Part II: "The Shooting Team"—Recommended Operating Procedures* (For Official Use Only), with supplementary data and questionnaire in Research Memorandum, *A Study of Human Factors in the Operation of the Nike Ajax System. Part III: Technical Appendices*, by Randall M. Hanes and Robert A. Goldbeck, November 1958 (For Official Use Only) (CLASSIC I).

COMTAC

Compilations of message content in patrol operations, and tentative system for development of a code:

Appendices A, B, and C and Figures 3, 4, and 5 of Technical Report 67-7, *A Content Analysis of Communications Within Army Small-Unit Patrolling Operations*, by Ronald L. Brown, June 1967 (COMTAC I).

CONTACT

Self-instructional taped courses with related printed materials for Russian and Mandarin Chinese languages:

Supplementary materials to Technical Report 65-14, *A Self-Instructional Course in Russian*, by Eugene H. Rocklyn, December 1965, (CONTACT II) and Technical Report 65-15, *Development and Evaluation of a Tactical Mandarin Chinese Language Course*, by Catherine Garvey and Eugene H. Rocklyn, December 1965 (CONTACT III).

CONTROL

Controller briefing papers:

Appendix A of Technical Report 69-24, *Squad Performance as a Function of the Distribution of a Squad Radio*, by James W. Dees, December 1969.

Driver Education

Descriptions of automobile driver tasks:

(HumRRO Technical Report 70-103), *Driver Education Task Analysis Volume I: Task Descriptions*, by A. James McKnight and Bert B. Adams, U.S. Department of Transportation Technical Report HS 800 367, DOT Contract No. FH 11-7336, November 1970.

Instructional objectives for automobile drivers:

(HumRRO Technical Report 71-9), *Driver Education Task Analysis Volume III: Instructional Objectives*, by A. James McKnight and Alan G. Hundt, U.S. Department of Transportation Technical Report (in press), DOT Contract No. FH 11-7336, March 1971.

ECHO

A device training program for the captive helicopter training device:

Appendix A to Technical Report 68-9, *The Captive Helicopter as a Training Device: Experimental Evaluation of a Concept*, by Paul W. Caro, Jr., Robert N. Isley, and Oran B. Jolley, June 1968 (ECHO II). AD-673 436,

Experimental syllabus, synthetic R/W flight training for the WORWAC, photographic recording of flight performance, and checklist record for flight performance:

Appendices A-C of Technical Report 68-14, *Evaluation of Synthetic Instrument Flight Training in the Officer/Warrant Officer Rotary Wing Aviator Course*, by Robert N. Isley, Paul W. Caro, Jr., and Oran B. Jolley, November 1968 (ECHO III).

Computation notes:

Appendix A of Technical Report 70-6, *A Determination of Selected Costs of Flight and Synthetic Flight Training*, by Oran B. Jolley and Paul W. Caro, Jr., April 1970 (ECHO III).

Analysis of a flight maneuver during a tactical instrument mission in the TH-13T aircraft:

Appendix D of Technical Report 70-7, *Equipment-Device Task Commonality Analysis and Transfer of Training*, by Paul W. Caro, June 1970 (ECHO IV).

Educational Workshops

Educational workshop activities and pupil performance objectives:

Appendices A through E of Technical Report 70-104, *Introducing Innovation in Instruction: In-Service Teacher Workshops in Classroom Management*, by William H. Melching, Edward W. Frederickson, and Paul G. Whitmore, November 1970.

FIREPOWER

Target detection training program including slides:

Supplementary materials and Appendices to Research Memorandum, *Target Detection Study 1, A Preliminary Investigation of the Trainability of Target Detection and Distance Estimation Skills*, by Edward A Stark, Peter C. Wolff, and Donald F. Haggard, July 1961 (FIREPOWER IV).

FORECAST

Guide to task analysis and use of training techniques for electronic systems maintenance:

A Procedural Guide for Technical Implementation of the FORECAST Methods of Task and Skill Analysis, by Edgar L. Shriver, C. Dennis Fink, and Robert C. Trexler, July 1961 (FORECAST II-III). AD-262 771,

Description of mockups used to teach electronics repairmen the fundamental principles of troubleshooting and repairing equipment.

FORECAST Mockup System Technical Description, by C. Dennis Fink, Robert C. Trexler, James E. Birdsall, and Edgar L. Shriver, September 1961 (FORECAST III). AD-637 726

Practical exercise equipment for Sergeant missile system maintenance training:

Published as training manual by U.S. Army Ordnance Guided Missile School, Redstone Arsenal, Ala., January 1964; developed from Research Memorandum, *A Description of SNAP Programming*, by Edgar L. Shriver and Robert C. Trexler, May 1963 (FORECAST IV).

Scrambled books for teaching troubleshooting of the HIPAR transmitter:

SNAP Programming: Troubleshooting the Improved NIKE Hercules HIPAR Transmitter, by Edgar L. Shriver and Robert C. Trexler, February 1964, Supplement to Research Memorandum, *A Description of SNAP Programming*, by Edgar L. Shriver and Robert C. Trexler, May 1963 (FORECAST IV).

FORGE

Functional area scales and leader action questionnaire:

Appendices A and B of Technical Report 71-11, *Leadership Actions As Evaluated by Experienced Company-Grade Officers*, by Joseph A. Olmstead, Larry L. Lackey, and Harold E. Christensen, June 1971.

HAWKEYE

Technical materials for training of Hawk CW radar maintenance technician:

Instructor's manuals and guides:

Operation and Symptom Collection, CWAR, AN/MPQ-34, instructor's manual, November 1966.

Operation and Symptom Collection, HPIR, AN/MPQ-34, instructor's manual, February 1967.

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Instructor's guides for signal tracing:

CWAR – Displays – 18 Practical Exercises
CWAR – Antenna – 16 Exercises
CWAR – Receiver – 18 Exercises
CWAR – Transmitter – 24 Exercises
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Instructor's Guide, Lab: Test Equipment Meters, TS 505A/U, TS 352A/U, and AN/PSM6, November 1966.

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Training aids:

A special Oscilloscope Signal Generator.

A test panel for Multimeter training.

Ninety circuit boards (and power supplies) which duplicate Hawk CW circuits for practical exercises in troubleshooting within a stage.

HAWKEYE *(Continued)*

Draft POI, troubleshooting instructions, proficiency tests, training schedule, questionnaire:
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HIGHLEAD

Department of the Army Pamphlet on leadership:
Leadership at Senior Levels of Command, Department of the Army Pamphlet 600-15, Headquarters, Department of the Army, October 1968.

IMPACT

Flow diagram and criterion tests for COBOL course, and description of the IMPACT List Processor:
Appendices C, D, and E of Technical Report 69-3, *Project IMPACT: CAI Concepts and Initial Development*, by Robert J. Seidel and the IMPACT Staff, March 1969.

Glossary of terms and key to flowchart symbols:
Appendices A and B, *Project IMPACT—Computer-Administered Instruction: Description of the Hardware/Software Subsystem*, by the IMPACT Staff, December 1970.

Functions for the Coursewriter III language:
Software Documentation Series, Project IMPACT—Computer-Administered Instruction: Functions for the Coursewriter III Language, by the IMPACT Staff, RBP-D1-71-2, June 1971.

INGO

Guidelines and materials for preparation of instructional objectives:
Chapters 2, 3, and 4 and Appendix A of Technical Report 66-4, *The Derivation, Analysis, and Classification of Instructional Objectives*, by Harry L. Ammerman and William H. Melching, May 1966; material adapted and used in USCONARC Pamphlet No. 350-14, *Training: Student Performance Objectives*, December 1966.

INGROUP

Methods for instruction in small groups:
Handbook of Small-Group Methods of Instruction, RBP-D4-71-27, 1971.

INTACT

Standardized performance checklist (PPDR) and progress records on fixed wing aircraft proficiency measurement (based on material prepared for Work Unit LIFT):
Pilot Performance Description Record, O-1.
Pilot Performance Description Record, U-6.
Pilot Performance Description Record, TL-180.
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Manual for flight maneuvers required in the Primary Phase of Army Flight Training:
Primary Fixed Wing Contact and Instrument Flight Manual, Cessna 180 (prepared jointly by HumRRO and United States Army Aviation School, Fort Rucker, Ala.), November 1960.

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Appendices A through F of Technical Report 69-26, *Evaluation of the Integrated Contact-Instrument Concept for Army Fixed Wing Flight Instruction*, by Wallace W. Prophet and Oran B. Jolley, December 1969.

JOBTEST

Proficiency tests for general vehicle repairman:

Appendices A through D of Technical Report 70-11, *Development of a Work Sample Criterion for General Vehicle Mechanic*, by John D. Engel, July 1970 (JOBTEST I).

JOBTRAIN

Guidance for design and development of training programs for electronics maintenance repairmen:

Research Memorandum, *The Development of Training Programs for First Enlistment Personnel in Electronics Maintenance MOS's. II. How to Analyze Performance Objectives to Determine Training Content*, by Arthur J. Hoehn, January 1960 (JOBTRAIN II)

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Procedural guides for checking equipment, necessary troubleshooting steps

Published as Southeastern Signal Corps School manuals, *TA-182/U Checkout Manual, AN/TCC-3 Checkout Manual, AN/TCC-7 Checkout Manual, AN/TCC-11 Checkout Manual, PP-826/U Checkout Manual, TH-5/TG Checkout Manual*, and *Radio Set AN/GRC-50*, 1962-1964 (JOBTRAIN III).

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LEAD

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Land Navigation, March 1966.
Counterintelligence, July 1966
Human Maintenance Under Campaign Conditions, July 1966
Messenger Communication, July 1966.
Observation, Combat Intelligence, and Reporting, July 1966
Radio Communication, July 1966.
Visual Sound and Tactual Communication, July 1966
Wire Communication, July 1966
Use of Indirect Supporting Fires, April 1967
Cover, Concealment, and Camouflage, September 1967
Antipersonnel Mine M 18A1 (Claymore), September 1967
Physical Conditioning, November 1967.
Protection Against Mines, Boobytraps, and Warning and Illuminating Devices, by Frank L. Brown and John D. Loomis, January 1968
Self-Aid, First Aid and Evacuation, by Elizabeth Y. Felton, T.O. Jacobs, and Kenneth Perkinson, January 1968.
Patrolling, by Fred K. Cleary, March 1968.
Rifle, 5.56mm M16, by Staff, LEAD I, March 1968
Hand Grenades, by Frank L. Brown, April 1968.

Mounted and Dismounted Platoon Combat Formations, by Staff, LEAD I, April 1968.
Tactical Movement, by Henry E. Kelly, April 1968.
Squad Formations, Battle Drill, and Elementary Fire and Maneuver, by Arthur J. DeLuca and George J. Magner, June 1968.
Retrograde Operations, by Fred K. Cleary, July 1968.
Bayonet Knife and Hand-to-Hand Combat, by Henry E. Kelly, July 1968.
Offensive Operations, by Fred K. Cleary and Henry E. Kelly, July 1968.
Defensive Operations, by George J. Magner, July 1968.
Demolitions and Boobytraps, by George J. Magner, July 1968.
Mission, Organization, and General Operation of the Rifle Platoon, by Frank L. Brown and Henry E. Kelly, July 1968.
Maintenance of Clothing and Equipment, by Jane V. Lee, Dennis I. Jarden, and Joseph A. Moody, August 1968.
Antitank Weapon, 66-mm HEAT Rocket, M72, by George J. Magner, August 1968.
Rifle, 7.62-mm M14, Frank L. Brown, August 1968.
Technique of Fire of the Rifle Squad, by Henry E. Kelly, August 1968.
Portable Flamethrowers, by Henry E. Kelly, August 1968.
Grenade Launcher, 40-mm, M79, by George J. Magner, September 1968.
Rifle, 7.62-mm, M14A1, by Frank L. Brown, September 1968.
Code of Conduct, Evasion, and Escape, by Frank L. Brown, September 1968.
Emplacements, Shelters, Obstacles, and Fields of Fire, by Fred K. Cleary, September 1968.
Protection Against CBR Warfare and Nuclear Explosives, by Henry E. Kelly and George J. Magner, October 1968.
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Machinegun 7.62-mm, M60, by Henry E. Kelly, October 1968.
Armored Personnel Carrier, by George J. Magner and Johnnie O. Holder, December 1968.
Infrared Weaponsight and Image Intensification Devices, by Frank L. Brown and John D. Loomis, March 1969.
Airmobile Operations, by Frank L. Brown, Chester I. Christie, Hubert S. Shaw, and Cecil P. Kimberling, June 1969.

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Technique of Fire of the Rifle Squad, by Henry E. Kelly, October 1969.
Tactical Movement, by Henry E. Kelly and Fred K. Cleary, December 1969.

Programmed booklets for training of leaders of small infantry units:
Combat Formations and Battle Drill, June 1966. (LEAD II)
Fundamentals of Defensive Combat, Forward Rifle Platoon, May 1966. (LEAD II)

LIFT

Standardized performance checklist (PPDR) for flight proficiency measurement on rotary wing aircraft and manual of instructions for check pilot training in use of PPDR:
Pilot Performance Description Record, OH-13.
Pilot Performance Description Record, OH-23.
Pilot Performance Description Record, H-19.
Pilot Performance Description Record, CH-21.
Pilot Performance Description Record, CH-34.
Pilot Performance Description Record, UH-1.

Daily Progress Records, H-23.

PPDR Handbook: Use of Pilot Performance Description Record in Flight Training Quality Control, by George D. Greer, Jr., Wayne D. Smith, Jimmy L. Hatfield, Carroll M. Colgan, and John O. Duffy, December 1963.

Instructors' standardized description of helicopter maneuvers for student pilots:
Manuals, *Experimental Edition, Instructor Patter for H-23 Helicopter Training*, March 1957, and *Experimental Edition, Instructor Patter for H-13 Helicopter*, August 1957. (LIFT I)

Standardized helicopter maneuver descriptions for instructor and trainee use:
Training manual, *Standardized Maneuvers for H-23 Helicopter Training*, September 1957. (LIFT I)

LIFT *(Continued)*

SOPs for scheduling, conducting, and evaluating class results of checkrides:

Appendices A and B of Consulting Report, *A System of Flight Training Quality Control and Its Application to Helicopter Training*, by John O. Duffy and Carroll M. Colgan, June 1963. (LIFT IV)

LIMIT

Program of instruction on the operation of a gasoline engine fuel system, lesson plans and achievement tests for low-aptitude enlisted personnel:

Staff Memorandum, *Special Lesson Plans: Gasoline Engine Fuel System*, by Robert Anneser and Robert S. Beecroft, February 1958 (LIMIT I).

LOCK-ON

Scales, checks, and forms for evaluating Nike IFC operators:

Research Memorandum, *On-Site Training of Guided Missile Operators: Evaluation Materials*, by Myron Woolman, October 1960 (LOCK-ON I).

Training program for on-site Nike IFC operators:

Training manual, *USARADCOM Integrated Fire Control Training Guide*, July 1957, and supplementary materials to Technical Report 64, *On-Site Training of Guided Missile Operators*, by Myron Woolman, August 1960; also published as Army Training Circulars TC 44-4, *NIKE-AJAX Launching Area Training Guide*, September 1961, TC 44-5 *NIKE-AJAX Battery Control Area Training Guide*, October 1961, and TC 44-6, *NIKE-HERCULES Launching Area Training Guide*, January 1962. (LOCK-ON I).

LOWENTRY

Aids for navigation at low levels of altitude:

Appendices A through D, of Technical Report 71-10, *Survey of Factors Influencing Army Low Level Navigation*, by Robert H. Wright and Warren P. Pauley, June 1971.

MAINTRAIN

Procedures for maintenance on complex weapon systems for the Nike-Ajax launcher and assembly area personnel:

Research Memorandum, *A Survey of Organizational Maintenance of the Nike Ajax Missile*, by Robert A. Goldbeck, Emanuel Kay, W.L. Williams, Jr., and James P. Rogers, July 1960 (Subcontractor: American Institute for Research) (MAINTRAIN III).

Troubleshooting manual for guided missile systems:

Experimental manual, *Assembly Area Trouble Shooting Manual Missile Guidance Set AN/DPW-11, Guided Missile Test Set AN/DSM-12, Guided Missile Electrical Test Set M22 (Nike-Ajax Antiaircraft Guided Missile System)*, undated (MAINTRAIN V).

Guide to the preparation of improved manuals for use in the troubleshooting of complex electronic equipment:

Preparation of MAINTRAIN Troubleshooting Manuals, Working Paper, by James P. Rogers and Julia S. Harris, October 1964 (MAINTRAIN V).

Proposed contents for troubleshooting manuals:

Appendix B of Technical Report 65-1, *The Development and Evaluation of an Improved Electronics Troubleshooting Manual*, by James P. Rogers and H. Walter Thorne, March 1965. (MAINTRAIN V).

MALT

Short, self-instructional, job-oriented Vietnamese language program:

Self-instructional taped course with related printed materials for programed Basic Vietnamese Course,

Description, course content, and examples of speaking and comprehension tests and speaking lessons, in text and appendices of Technical Report 67-1, *Programed Learning in Vietnamese: Construction and Evaluation of a Short Practical Language Course*, by Alfred I. Fiks and Dinh Van Ban, January 1967.

MAP

Forms, trait scales, critical role behaviors interview schedule, advisor and counterpart behavioral inventories:

Appendices A, B, F, G, and H of Technical Report 70-13, *Military Advisors and Counterparts in Korea: 2. A Study of Personal Traits and Role Behaviors*, by Dean K. Froehlich, September 1970.

Measures of position power and forms for measuring advisor-counterpart transactions:

Appendices A and B of Technical Report 71-2, *Military Advisors and Counterparts in Korea: 3. An Experimental Criterion of Proficiency*, by Dean K. Froehlich, February 1971 (MAP II).

MAPREADING

Mapusing training program including proficiency test:

Appendices to Technical Report 11, *The Map-Using Proficiency of Basic Trainees*, by Robert B. Tallarico, William E. Montague, and Victor H. Denenberg, September 1954.

MAPUSING

Requirement indices of map skills for infantry, armor, and reconnaissance combat personnel in each of seven levels of responsibility:

Table 3 of Technical Report 43, *A Survey of Map Skills Requirements*, by Eugene A. Cogan, Norman E. Willmorth, and Donald C. Findlay, September 1957.

Survey test of map reading for officers:

Supplementary materials to working paper on the proficiency of officers in reading and using maps, by Donald C. Findlay, Eugene G. Roach, and Pauline T. Olson, January 1958 (MAPUSING VI).

MARKSMAN

Data on rifle-firing performance with a variety of equipment, under a variety of conditions:

Appendices A through U of Technical Report 71-4, *An Experimental Review of Basic Combat Rifle Marksmanship: MARKSMAN, Phase 1*, by James W. Dees, George J. Magner, and Michael R. McCluskey, March 1971.

MBT

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Interim Report, *Preliminary Outline of Driver Duties and Tasks for US/FRG MBT-70*, by R.E. Kraemer, G.G. Boycan, and L.C. Pierce, May 1967 (MBT I).

Interim Report, *Preliminary Outline of Gunner Duties and Tasks for US/FRG MBT-70*, by G.G. Boycan, R.E. Kraemer, and R.W. Graham, May 1967 (MBT I).

Interim Report, *Preliminary Outline of Tank Commander Duties and Tasks for US/FRG MBT-70*, by G.G. Boycan and R.E. Kraemer, May 1967 (For Official Use Only) (MBT I).

Interim Report, *Preliminary Outline of Organizational Maintenance Duties and Tasks for US/FRG MBT-70 (Section I, Automotive Maintenance)*, by R.W. Graham and W.C. Osborn, January 1968 (MBT I).

Interim Report, *Preliminary Outline of Organizational Maintenance Duties and Tasks for US/FRG MBT-70 (Section II, Turret Maintenance)*, by W.C. Osborn and R.W. Graham, January 1968 (MBT I).

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US/FRG MBT-70 Crew Functional Procedures and Performance Standards, by G.G. Boycan, January 1968 (MBT I).

Preliminary Outline of Crew Duties and Tasks for Operation of the M60A1E1/E2, by L.C. Pierce, Jr., February 1968 (MBT I).

Crew Duties and Tasks for Maintenance of the M551, by R.E. Kraemer, July 1968 (MBT I).

Training Implications of the Control and Display Data for the US/FRG MBT-70, M60A1E2, M551, and M60A1, by G. Gary Boycan and Ronald E. Kraemer, March 1969 (MBT I).

METHOD

Programed Instruction for portions of the ADPS (Fieldata) Programming Course:

Basic Computer Programming: A Self-Instructional Course, Booklet, June 1967; *Answer Booklet to Basic Computer Programming: A Self-Instructional Course*, Booklet, June 1967. (METHOD II)

Samples of course content and problems from experimental portions used for the ADPS (Fieldata) Programming Course:

Appendix A to Technical Report 68-4, *The Application of Theoretical Factors in Teaching Problem Solving by Programed Instruction*, by Robert J. Seidel and Harold G. Hunter, April 1968 (METHOD II). AD-669 281

MOBILITY

Job requirements for maintenance duties of armor mechanics and supervisors:

Part 2 of task paper, *MOBILITY. Review of Problems and Past Research, Conceptualization of the Task, and Plan of Current and Future Research*, by John P. Smith, June 1960 (MOBILITY IV-V).

Malfunction indicator lists for the M48A1 tank:

Part II of Staff Memorandum, *Malfunction Indicator Lists for the M48A1 Tank*, by Ronald C. Kelsay, Ronald G. Shock, and Donald F. Haggard, May 1958 (MOBILITY VI).

Picture guide for junior officers conducting maintenance inspections on M48A1 and M48A2 tanks:

Contained in Research Memorandum, *The Effectiveness of Visual Demonstrations of Signs of Malfunction and Wear in Equipment*, by Donald F. Haggard and Ronald G. Shock, June 1962 (MOBILITY VI).

Test exercises for turret mechanics:

Appendices B and C and supplementary materials to Research Memorandum, *The Development of Performance Criteria for Turret Mechanics*, by Jack Mumford and John P. Smith, July 1961 (MOBILITY X).

MOONLIGHT

Instructor's manuals for training and testing TOE rifle squads in defensive and offensive action:

Appendices B to G in Technical Report 17, *MOONLIGHT IV. Training the Rifle Squad in Night Technique of Fire*, by Edgar L. Shriver, John Sivy, and Henry S. Rosenquist, May 1955 (MOONLIGHT IV).

Program of instruction and instructor's guide for day-night basic training in squad technique of fire:

Research Memorandum, *Experimental Training in Night Technique of Fire and Squad Tactics*, November 1959 (MOONLIGHT XII).

MOSAIC

Training manual for Hawk missile operator:

MOSAIC Hawk Operator Manual.

NCO

Manual for noncommissioned officers for use in training and as reference:

A Guide for the Potential Noncommissioned Officer, December 1961; 4th edition published as USCONARC Pamphlet No. 350-24, June 1963 (NCO II).

Leadership preparation program for BCT graduates including program of instruction, training materials, and films:

Leadership Preparation Program Implementation Package (Overview of Leadership Program Development Under Task NCO) (NCO III):

Tab A: Description of the Leadership Preparation Course
Tab B: Orientation and Implementation Materials for Leadership Preparation Course
Tab C: Contents of Leader Preparation Package and Guides for Leader Training Program
Tab D: Lesson Plan Guides for Technical Classes in Leader Preparation Course
Tab E: Information Booklets and Guides for Students of Leader Preparation Course
Tab F: Leader Selection and Assessment Materials

Supporting information available in text and appendices of Technical Report 67-2, *Implementation and Utilization of the Leader Preparation Program*, by Paul D. Hood, March 1967, and Technical Report 67-8, *Preliminary Assessment of Three NCO Leadership Preparation Training Systems*, by Paul D. Hood, Morris Showel, John E. Taylor, Edward C. Stewart, and Jacklyn Boyd, June 1967 (NCO III).

Leadership orientation course (LOC) for basic trainees including student handbook, automated tapes and slides, and materials to supplement the basic course:

Appendices A, B, and C of Technical Report 67-2, *Implementation and Utilization of the Leader Preparation Program*, by Paul D. Hood, March 1967 (NCO III).

Leadership preparation program (automated version) for BCT graduates including manuals, workbooks, electronic programer, and training materials:

Automated Leadership Training Program, including (A) Instructor's Guide and (B) Equipment Requirements.

Supporting information available in text and Appendices A and D of Technical Report 66-21, *Automation of a Portion of NCO Leadership Preparation Training*, by Morris Showel, Elaine Taylor, and Paul D. Hood, December 1966 (NCO III).

Statistical analysis tables, research instrument descriptions, and sample forms and summaries of auxiliary studies related to NCO leadership training treatments (for detailed technical study purposes):

Appendix Supplement to Technical Report 67-12, *Evaluation of Three Experimental Systems for Noncommissioned Officer Training*, by Paul D. Hood, Morris Showel, and Edward C. Stewart, September 1967.

NIGHTSIGHTS

Self-instructional devices:

A Pictorial Program for the Starlight Scope, by Richard J.D. Frank, William N. Gipe, and William L. Warnick, May 1969 (NIGHTSIGHTS IV).

A Prototype Pictorial Program for the Iroquois Night Fighter and Night Tracker (INFANT), by Richard J.D. Frank and William L. Warnick, November 1969 (NIGHTSIGHTS IV).

A Prototype Pictorial Program for A Ground Surveillance Radar Set Operator, by Joseph D. Militello and G. Gary Boycan, December 1969 (NIGHTSIGHTS IV). AD-716 246.

A Prototype Pictorial Guide for the Night Observation Device-Long Range, AN/TSS 7 Operator, by Richard Frank and John D. Engel, February 1970 (NIGHTSIGHTS IV). AD-813 869

Preliminary Lesson Plans for Operation and Operator Maintenance of the Iroquois Night Fighter and Night Tracker (INFANT), by William L. Warnick, May 1970 (NIGHTSIGHTS IV).

NIGHTSIGHTS *(Continued)*

Preliminary Lesson Plans for Operation and Operator Maintenance of the Airborne Searchlight System, by William L. Warnick, June 1970 (NIGHTSIGHTS IV). AD-877 529

Preliminary Lesson Plans for Operators of the Far Infrared Target Indicator (FIRTI), Surveillance Set Infrared AN/VAS-1( )-(V), by William L. Warnick, December 1970 (NIGHTSIGHTS IV).

OBSERVE

Training aids and color slides for basic target recognition, and location and geographic orientation for aerial observers:

Supplementary materials and manual, *Training Materials for Aerial Observer Instruction in Basic Visual Skills*, by CPT James M. Hesson and Francis H. Thomas, October 1962, Supplement to Technical Report 80, *Low Altitude Aerial Observation: An Experimental Course of Instruction*, by Francis H. Thomas, October 1962. Incorporated in Army training program in Army FM 1-80, *Aerial Observer Training*, February 1962 (OBSERVE I).

Programed course on low altitude aerial observation—administrative manual, training manuals, achievement tests, and training aids:

Supplementary materials to Research Report 14, *Programed Instruction and Low Altitude Aerial Observation*, by Peter B. Dawkins, December 1964. Published as Army TM 1-380, *Aerial Observer Programed Texts*, April 1966; including TM 1-380-1, *Administrative Manual;* TM 1-380-2, *Visual Search*, TM 1-380-3, *Target Recognition;* TM 1-380-4, *Geographic Orientation*, with DA Form 1-380-4, *Response Sheets*, March 1966; TM 1-380-5, *Target Location*, with DA Form 1-380-5, *Response Sheets* March 1966; TM 1-380-6, *Criterion and Achievement Tests*, with DA Form 1-380-6, *Response Sheets*, March 1966 (OBSERVE II).

OC LEADER

Descriptive statistics for sample population:

Appendix A of Technical Report 70-15, *An Analysis of First-Tour Duty Positions for Infantry Officer Candidate Graduates*, by James A. Caviness, October 1970.

OFFTRAIN

Program of instruction in officer leadership, consisting of student text and instructor's guide, in basic problems in small units:

Basic Problems in Small-Unit Leadership, by T.O. Jacobs; *Instructor's Guide: Basic Problems in Small-Unit Leadership*, by T.O. Jacobs, R.C. Rahn, and C.B. Moore; and *Practical Exercises: Basic Problems in Small-Unit Leadership*, by T.O. Jacobs, R.C. Rahn, and J.J. Macisco; February 1962 (OFFTRAIN IV).

PATROL

Program of instruction, including subject schedule, training aids, and requirements for training facilities, in land navigation appropriate to the BCT level:

Supplementary materials and Research Memorandum, *Instructor's Guide, PATROL I, Land Navigation: Basic Instruction*, November 1959; and *Basic Instruction in Land Navigation, Proficiency Test Manual*, December 1958. Published as part of Army TC 7-5, *Land Navigation*, June 1965 (PATROL I).

Program of instruction, including subject schedule, training aids, and requirements for training facilities, on nighttime reconnaissance patrolling for the infantry soldier:

Training manual, *Instructor's Guide, PATROL II, Reconnaissance Patrolling: A Course Stressing Integration of Basic Skills*, November 1957 (PATROL II).

RADAR

Operating procedures for the M33 operator:

Special Report 6, *The AAFCS M-33 Operator: A Manual of Operating Procedures*, by George H. Brown, Donald F. Haggard, and J. Daniel Lyons, August 1956 (RADAR V).

RADAR *(Continued)*

Training program for the AAFCS M33 technician including lesson plans and practical exercises:

Technical supplementary material, *AAFCS M33 Technician Training Program*, June 1958, *Volume I, Operation Orientation; Volume II, Electronic Fundamentals; Volume III, Acquisition Radar; Volume IV, Track Radar; Volume V, Computer;* and *Volume VI, Maintenance and Supply Procedures* (RADAR VI).

RADOP

Systems of practice and standardizing performance measures for International Morse Code operator trainees:

Chapter 6 and Appendix A of Technical Report 68, *Experimental Studies of Skill in Copying International Morse Code*, by S. James Goffard, December 1960.

REALISTIC

Reading/listening tests:

Appendix A of Technical Report 69-23, *Learning by Listening in Relation to Aptitude, Reading, and Rate-Controlled Speech*, by Thomas G. Sticht, December 1969.

RECON

Job requirements for armored cavalry platoon personnel:

Appendix A of Technical Report 92, *Determination of Combat Job Requirements for Armored Cavalry Platoon Personnel*, by William L. Warnick and Robert A. Baker, December 1964 (RECON I).

Guide for use of the armored cavalry trainer:

Training manual, *User Manual for the Armored Cavalry Trainer (ACT)*, by Robert A. Baker, John G. Cook, and William L. Warnick, October 1964. Published as USCONARC Pamphlet 350-4, *User Manual for DVC 17-15, Armored Cavalry Trainer (ACT)*, July 1965 (RECON II).

Workbook on tactics for armored cavalry platoon leader:

The Armored Cavalry Platoon Leader's Tactical Workbook, by William L. Warnick, November 1965 (RECON III).

A detailed tactical performance checklist of the combat skills required of armored cavalry platoon personnel:

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REFILL

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Description of special devices and procedures to simulate combat realism in testing performance of light weapons infantrymen:

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Combat in Built Up Areas: A Two-Hour Course in Clearing Buildings, by Joseph S. Ward, N.I. Fooks, William T. Hazelwood, September 1965 (RIFLEMAN IV).

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Proficiency tests for Nike-Ajax platoon leaders:

Supplementary materials to Technical Report 66, *Measurement of the Job Proficiency of Nike Ajax Platoon Leaders*, by John L. Morse, William F. Brown, Robert G. Smith, Jr., and Walter J. Fightmaster, October 1960 (SAMOFF II).

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Set of training materials on air defense equipment for the Nike-Hercules officer, consisting of programed textbooks (10 Sections grouped in seven volumes) and a volume of illustrations.

SAMOFF Checks and Procedures for the Nike-Hercules Officer (SAMOFF IV):

Section B. 15-Minute Alert Procedures (General Outline), June 1964.
Section C. 15-Minute Alert Procedures (Detailed Description), June 1964.
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Illustrations, June 1964.

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Tests, questionnaires, and training objectives for the driver of a school bus:

Appendices B, I, J, and K of (HumRRO Technical Report 71-3), *The Selection and Training of School Bus Drivers*, by A. James McKnight, Carolyn M. McClelland, and Mary E. Berry, U.S. Department of Transportation Technical Report (in press), DOT Contract No. FH 71-7339, February 1971.

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Job requirements for tank crewmen:

Appendices to Technical Report 47, *The Determination of Job Requirements for Tank Crew Members*, by Robert A. Baker, May 1958 (SHOCKACTION I).

Handbook for tank commanders:

The Tank Commander's Guide (3d edition), by William L. Warnick, John G. Cook, and Robert A. Baker (eds.), published by The Stackpole Company, Harrisburg, Pa., 1963 (SHOCKACTION I).

SHOCKACTION *(Continued)*

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Training manuals, *The Tank Gunner's Guide (M48A1 Tank)*, October 1957, *The Tank Driver's Guide (M48A1 Tank)*, May 1958, *The Tank Loader's Guide (M48A1 Tank)*, March 1958; also published as Army Training Circulars 17-4 and 17-5, June 1959, and 17-6, July 1959 (SHOCKACTION VI).

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Appendices A, B, and D to Technical Report 59, *An Improved Advanced Individual Training Program for Armor*, by Eugene F. MacCaslin, Arnold B. Woodruff, and Robert A. Baker, December 1959 (SHOCKACTION VI).

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The Armor Mastery Test Battery, by Robert A. Baker and Eugene G. Roach, January 1960.

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Interview guide for determining SIAF practices, and SIAF mission profile outline:
Appendices B and C of Technical Report 70-102, *Selection and Training for Small Independent Action Forces: System Analysis and Development of Early Training*, by Joseph A. Olmstead and Theodore R. Powers, September 1970.

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"Program Description No. 1, Land Navigation."
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"Program Description No. 5, Fundamentals of Tracking."
"Program Description No. 6, Communications."
"Program Description No. 7, Use of Aerial Photos."
"Program Description No. 8, Physical Conditioning and Combatives."
"Program Description No. 9, Use of Individual Weapons."
"Program Description No. 10, Use of Machineguns."
"Program Description No. 11, Basic Demolitions."
"Program Description No. 12, Use of Hand Grenades."
"Program Description No. 13, Use and Detection of Mines, Boobytraps, and Warning Devices."
"Program Description No. 14, Combat First Aid."
"Program Description No. 15, Use of Image Intensification Devices."
"Program Description No. 16, SIAF Leadership."
"Program Description No. 17, Intelligence."
"Program Description No. 18, Mission, Organization, and Employment of a SIAF."
"Program Description No. 19, Airmobile Procedures."
"Program Description No. 20, Stream-Crossing Expedients and Small Boats."
"Program Description No. 21, Basic Military Mountaineering."
"Program Description No. 22, Use of Sensors."
"Program Description No. 23, Patrolling."
"Program Description No. 24, Survival, Evasion, and Escape."
"Program Description No. 25, Civic Action, Language Development, and Training of Indigenous Forces."

SIMULATE

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Technical Report 70-23, *Combat Job Requirements for Principal Staff Personnel Division, Brigade, and Battalion*, by Robert A. Baker, December 1970.

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Consulting Report, *Small Arms Air Defense Training on a Reduced-Scale Range*, by E.W. Frederickson and Robert J. Foskett, October 1966. Incorporated in Army TC 23-15, *Engagement of Aerial Targets With Small Arms*, May 1968.

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Appendices A and B to Technical Report 68-8, *Development of Two Automated Programs for Teaching Military Justice to Men of Various Aptitude Levels*, by Morris Showel, June 1968 (SPECTRUM I). AD-673 038

"Trainees and Military Law," by Morris Showel, September 1969.

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Appendices A, B, and D to Technical Report 68-7, *The Effects of Group Competition Upon Student Performance*, by Albert L. Kubala and Harold E. Christensen, June 1968. (SPUR I).

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A Manual for Conducting Aircraft Recognition Training in the Classroom, instructor's manual, January 1967.

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Appendices D through K of Technical Report 70-1, *Development and Evaluation of an Integrated Basic Combat/Advanced Individual Training Program for Medical Corpsmen (MOS 91A10)*, by Joseph S. Ward, Nelson I. Fooks, Richard P. Kern, and Robert D. McDonald, January 1970 (SUPPORT II)

Instructor's guide, with lesson outlines for experimental programs of instruction:

Instructor's Guide—Description of Course and Lesson Outlines for:

1. An Integrated Modified BCT/AIT Program for Conscientious Objectors (COs) in Training for Medical Corpsmen, MOS 91A10
2. An AIT Program for All Medical Corpsmen, MOS 91A10
3. A Modified BCT Program for COs (1A0), by Joseph S. Ward, Nelson I. Fooks, Richard P. Kern, and Robert D. McDonald, February 1969; supplement to Technical Report 70-1, *Development and Evaluation of an Integrated Basic Combat/Advanced Individual Training Program for Medical Corpsmen (MOS 91A10)*, January 1970 (SUPPORT II).

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Appendices A and B of Technical Report 82, *Improving Tactical Training for Tank Commanders: Test Development and Performance Assessment*, by Shepard Schwartz and Arthur Floyd, Jr., March 1963.

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Appendix A of Technical Report 68-11, *A Review of the Literature on Use of Tracer Observation as an Antiaircraft Firing Technique*, by Robert J. Foskett, E.W. Frederickson, and Robert D. Baldwin, September 1968.

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Manuals for automated remedial mathematics teaching program:

Pocketschool Series, Mathematics I, Multiplication and Division (Decimals): Part One, Part Two, and Part Three; Mathematics II, Multiplication and Division (Cancellation), Mathematics III, Powers and Roots: Part One and Part Two; Mathematics IV, Powers of Ten; Mathematics V, Simple Equations: Part One, Part Two, and Part Three; Mathematics VI, Proportions: Part One and Part Two; Mathematics VII, Stated Problems: Reference Items for Parts One and Two, Part One, Part Two, and Part Three; Mathematics VIII, Nomograms, July 1960; *Mathematics IX*, with *Supplemental Graph Book*, June 1963; published as training manuals by the U.S. Army Air Defense School.

Training booklets on the section control indicator for the Nike-Hercules, extra study materials for AIT:

Supplementary materials to Research Memorandum, *Studies of Fixed Procedures Training A Preliminary Test of a Self-Instructional Method*, by Paul G. Whitmore, July 1963.

Procedures outline for programing a course of instruction:

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Consulting Report, *The Text of an Orientation Workshop in Automated Instruction*, by William H. Melching, John A. Cox, Jesse C. Rupe, and Robert G. Smith, Jr., July 1962. (TEXTRUCT II)

Procedural task analysis for trainee use of the OS-8 C/U oscilloscope, the TS-505 A/U VTVM, and the TS-352 A/U multimeter:

Procedural Analyses for the Use of Three Pieces of Test Equipment: OS-8 C/U Oscilloscope, TS-505 A/U VTVM and TS-352 A/U Multimeter, by Julia S. Harris and Harold E. Christensen, August 1962. (TEXTRUCT II)

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A Handbook for Programmers of Automated Instruction, by William H. Melching, Robert G. Smith, Jr., Jesse C. Rupe, and John A Cox, September 1963. (TEXTRUCT II)

Training objectives of the first week of the U.S. Army Air Defense School's Basic Electronics Course:

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Procedures for Using AN/USM-24C Oscilloscope, draft prototype manual by Julia S. Harris, James P. Rogers, and David H. Francis, January 1965. (TEXTRUCT II)

TRADER

Training device for AO-1 Mohawk:

Mockup cockpit procedures trainer for AO-1 Mohawk, by Wallace W. Prophet and H. Alton Boyd, Jr. [1962].

TRAINCREW

Proficiency tests for tank crewmen: tank preparation test and tactical test with briefings and instructions for administering the tests:

Appendices A, B, and C of Technical Report 68-12, *Tank Crew Effectiveness in Relation to the Supervisory Behavior of the Tank Commander*, by Shepard Schwartz, September 1968.

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Basic course of rifle marksmanship instruction—including proficiency tests—designed to prepare a soldier to use a rifle effectively in combat:

Summarized in text and appendices of Technical Report 22, *TRAINFIRE I: A New Course in Basic Rifle Marksmanship*, by Howard H. McFann, John A. Hammes, and John E. Taylor, October 1955 Incorporated in Army FM 23-71, *Rifle Marksmanship Course: TRAINFIRE I*, September 1957.

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Glossary for training management course:

Glossary of Terms for Training Management Course, April 1967.

Course and lesson outlines, student appraisal, references and readings:

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Appendix B of Technical Report 69-5, *Relationship Between Army Recruit Characteristics and First Tour Performance*, by John S. Caylor, April 1969. (TRANSITION II)

Tumor Registry

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Appendix to Technical Report 70-101, *Establishment of a Tumor Registry System for Louisiana: Proposals on Objectives, Capabilities, and Structures*, by C. Dennis Fink, June 1970.

UNIT

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Appendix A to Research Memorandum, *The Development and Evaluation of the Tank Platoon Combat Readiness Check*, by Robert A. Baker and John G. Cook, April 1963. (UNIT I)

Combat job requirements for tank platoon sergeants and leaders:

Appendix A to Technical Report 69, *The Determination of Combat Job Requirements for Tank Platoon Leader and Tank Platoon Sergeant*, by Eugene G. Roach and Robert A. Baker, March 1961. (UNIT I)

Tests of armor platoon leader's knowledge and capability for combat decisions:

The Armor Platoon Leader's Knowledge Test and the Tank Platoon Combat Decisions Test, supplementary materials to Technical Report 88, *Development and Evaluation of Systems for the Conduct of Tactical Training at the Tank Platoon Level*, by Robert A. Baker, John G. Cook, William L. Warnick, and James P. Robinson, April 1964. (UNIT II)

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Manuals for miniature armor battlefield and combat decisions game:
User Manual for the Miniature Armor Battlefield (MAB), and *User Manual for the Armor Combat Decisions Game (CDG)*, by Robert A. Baker and John G. Cook, March 1962 and December 1962, respectively. (UNIT II)

UPSTREAM

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Appendices A and B of Technical Report 83, *The Prediction of Training Requirements for Future Weapon Systems A Personnel Support System Research and Development Process*, by J.C. Rupe, April 1963. (UPSTREAM III)

UTILITY

Instruments used in evaluating performance by men at different aptitude levels:
Technical Report 70-20, *Performance in Five Army Jobs by Men at Different Aptitude (AFQT) Levels 2. Development and Description of Instruments*, by Robert Vineberg, Elaine N. Taylor, and Thomas G. Sticht, November 1970.

VE-TRAIN

Job requirements for automotive mechanics:
Annex 11 to Consulting Report, *Job Requirements for Consolidated MOS 630, 631, 632 (Automotive Mechanic)*, by John P. Smith, March 1964. (VE-TRAIN I)

VIGIL

Drill procedures and knowledge tests for Nike-Ajax section operating control indicator operator and chief of section:
Appendices A and B of Technical Report 72, *Development and Use of Proficiency Tests for Nike System Launching Platoon Operators*, by James D. Hitt, Jr., and Robert D. Baldwin, August 1961. (VIGIL I)

Method of adjusting PPIs:
Appendix of Technical Report 85, *A Filter Method of Adjusting PPIs*, by Robert D. Baldwin and A. Dean Wright, June 1963 (For Official Use Only)

VOC TAX

Samples of objectives statements, interview form:
Appendices C and F of Technical Report 71-15, *The Design and Evaluation of Vocational Technical Education Curricula Through Functional Job Analysis*, by Kan Yagi, Hilton M. Bialek, John E. Taylor, and Marcia Garman, June 1971

WACLEAD

Instructional materials for WAC junior officer leadership training:
Instructor's Guide Leadership Instruction for WAC Junior Officers, by Janet F. Lingle and Douglas S. Holmes, July 1969.
Leadership and Women in Organizations, by Douglas S. Holmes, July 1969
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WHOLEPART

Criterion firing tables for marksmanship training for M1 rifle:
Appendices to Staff Memorandum, *A Comparison of Whole Versus Part Methods of Marksmanship Training*, by F.J. McGuigan and Eugene F. MacCaslin, May 1951

Exploratory Research 40

Training manual:
Commander's KATUSA Program Checklist, by John W. McCrary, January 1969

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Data on human performance in aircraft detection and range estimation:

Tabular material in Technical Report 66-19, *The Performance of Ground Observers in Detecting, Recognizing, and Estimating Range to Low-Altitude Aircraft*, by A. Dean Wright, December 1966, and Technical Report 67-3, *Aircraft Detection, Range Estimation, and Auditory Tracking Tests in a Desert Environment*, by Edward W. Frederickson, Joseph F. Follettie, and Robert D. Baldwin, March 1967.

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Job requirements inventory for general vehicle repairman:

A Revised Job Requirements Inventory for General Vehicle Repairman, MOS 63C, by John D. Engel, December 1968.

Basic Research 1

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The HumRRO Training Analysis Directory, Book 1: Training Requirements. Part 1: MOS 101-MOS 357, June 1958; *Part 2: MOS 401-MOS 075*, January 1959.

Basic Research 19

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Dees, O'Reilly and Senn [illegible] ed Figures Test, Instructions and Test Booklet, [undated].

Sequence Memory Test, Sentence Completion Test (MMR), Auditory Number Span Test (MSU), and Verbal Retention Test (MMV), by James W. Dees, August 1969.

Technical Advisory Service

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Training Program The Mil Relationship, by Dennis Cannon, September 1962.

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Appendix A of Consulting Report, *A Study of Mathematical Skills Requirements for Basic Electronics in the U.S. Army Air Defense School*, by John A. Cox and Richard C. Montgomery, October 1964.

Model for estimating psychological casualties as a consequence of continuing combat stresses:

Part II of Technical Report 65-2, *Human Factors in Tactical Nuclear Combat*, by Robert Vineberg, April 1965.

Troubleshooting and other materials for maintenance course on LORAN Receiving Set AN/UPN-12 and -15 (Supplementing Technical Report 65-3, *Application and Test of the FORECAST Concept of Electronics Maintenance on Navy LORAN Equipment*, by Edgar L. Shriver and Robert C. Trexler, May 1965)

FORECAST Troubleshooting Manual for LORAN Receiving Set AN/UPN-12 and AN/UPN-15, teaching aid, June [1964] AD 667 381

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FORECAST Troubleshooting Scrambled Text for Operation of LORAN Receiving Set AN/UPN-12, AN/UPN-12A, AN/UPN-15, AN/UPN-15A, scrambled book, June 1964

FORECAST Within Black Troubleshooting Procedures for LORAN Receiving Set AN/UPN-12 and AN/UPN-15, scrambled book (prepared jointly by HumRRO and Fleet Training Center, Norfolk), [June 1964]

Manual for use by training personnel:

Consulting Report, *Instructor's Guide to Performance Counseling*, by Joseph A. Olmstead, May 1967.

A Suggested General SOP for the Preparation of Equipment Serviceability Criteria, Technical Report 67-10, by Paul G. Whitmore, June 1967.

Questionnaires for rifle marksman trainees:

Appendix A to Technical Report 68-15, *The Effects of "Quick Kill" Upon Trainee Confidence and Attitudes*, by Joseph A. Olmstead, December 1968.

Summary of USCONARC schools techniques for surveying graduates of enlisted technical courses:

Appendix B of Technical Report 69-9, *The Process of Developing and Improving Course Content for Military Technical Training*, by Harold G. Hunter, J. Daniel Lyons, Eugene F. MacCaslin, Robert G. Smith, Jr., and Harold Wagner, May 1969.

A Guide for Developing Questionnaire Items, by T.O. Jacobs, January 1970.

A Study Manual for the Drill Sergeant Candidate, January 1971.

General

Guidance for the development, design, and quality control of military training programs:

Research Bulletin 11, *The Development of Training Objectives*, by Robert G. Smith, Jr., June 1964.

Technical Report 65-6, *Controlling the Quality of Training*, by Robert G. Smith, Jr., June 1965.

Technical Report 66-18, *The Design of Instructional Systems*, by Robert G. Smith, Jr., November 1966.

Appendix

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Appendix A

REPORTS AND PROFESSIONAL PAPERS BY NUMBER[1]

Technical Reports

1 *DESERT ROCK I: A Psychological Study of Troop Reactions to an Atomic Explosion*, February 1953. (DESERT ROCK I)

2 *DESERT ROCK IV: Reactions of an Armored Infantry Battalion to an Atomic Bomb Maneuver*, August 1953. (DESERT ROCK IV)

3 *The Training Effectiveness of a Tank Hull Trainer*, February 1954. (TRAINER)

5 *A Preliminary Investigation of Delinquency in the Army*, April 1954. (STIR)

6 *Evaluation of a Special Live Firing Trigger-Squeeze Exercise*, May 1954. (TRIGGER)

8 *Infantry OCS Evaluations and Combat Performance*, June 1954. (OCS)

9 *The Effect of Different Methods of Motivating Men to Apply for OCS*, July 1954. (OCS II)

10 *Committee Problem Solving Techniques at the National War College*, September 1954. (POLICY)

11 *The Map Using Proficiency of Basic Trainees*, September 1954. (MAPREADING)

12 *The Training Effectiveness of a Stereoscopic Range Finder Trainer*, October 1954. (RADEVI)

13 *Transition From Civilian to Army Life*, October 1954. (ADJUSTMENT)

14 *Television in Army Training Evaluation of Television in Army Basic Training*, November 1954. (TV I)

15 *MOONLIGHT II Training the Infantry Soldier to Fire the M1 Rifle at Night*, December 1954. (MOONLIGHT II)

16 *Training Achievement in Basic Combat Squads With Controlled Aptitude*, January 1955. (APTITUDE)

17 *MOONLIGHT IV Training the Rifle Squad in Night Techniques of Fire*, May 1955. (MOONLIGHT IV)

18 *Tactical Training of the Infantry Rifle Squad*, June 1955. (SQUADTRAIN)

19 *Development of Proficiency Tests for Basic Combat and Light Infantry Training*, July 1955. (PROFICIENCY)

20 *The AAFCS M-33 Operator: Analysis of Field Activities and Problems With Implications for Training*, August 1955. (RADAR I)

21 *Leadership in Rifle Squads on the Korean Front Line*, September 1955. (INTERSQUAD)

22 *TRAINFIRE I A New Course in Basic Rifle Marksmanship*, October 1955. (TRAINFIRE I)

23 *The Kazakhs: A Background Study for Psychological Warfare*, November 1955. (KAZPO)

24 *Changes in Student Motivation at an Army Technical Training School*, December 1955. (WIGWAG II)

25 *Consistency in Relaying as a Factor in Tank Gunnery*, December 1955. (GUNNERY II)

26 *An Assessment Program for OCS Applicants*, February 1956. (OCS III)

27 *Films and Group Discussions as a Means of Training Leaders*, March 1956. (OFFTRAIN I)

28 *An Experimental Evaluation of a Basic Education Program in the Army*, April 1956. (BREAD)

29 *The Effect of Mock Tower Height in Airborne Training*, May 1956. (DELO)

30 *Research on Methods of Interviewing Foreign Informants*, August 1956. (RIM)

31 *Ordnance IFC Electronics Maintenance Personnel Analysis of Activities With Implications for Training Part I M-33*, September 1956. (FICON)

32 *Evaluation of Four Week and Eight Week Basic Training for Men of Various Intelligence Levels*, November 1956. (BASICTRAIN II)

33 *Factors Related to the Collaboration and Resistance Behavior of U.S. Army PWs in Korea*, December 1956. (PSYBEE I)

34 *A Simplified Method for Rating the Performance of Stereoscopic Range Finder Operators*, December 1956. (RANGEFINDER II)

35 *Several Methods of Testing Contour Interpretation*, January 1957. (MAPUSING V)

[1] Research for the Department of the Army unless otherwise noted.

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37 *Ordnance IFC Electronics Maintenance Personnel: Analysis of Field Activities With Implications for Training. Part II–TR-38,* March 1957. (FICON)

38 *The AAFCS M-33 Mechanic Proficiency Test: Part I–Comparison of Mechanics With and Without Field Experience. Part II–Development and Cross-Validation,* May 1957. (RADAR IV)

39 *Consistency in Laying the Main Tank Gun in a Live-Fire Situation,* June 1957. (FIREPOWER II)

40 *Identification of the Important Skills in Daylight Land Navigation,* July 1957. (MAPUSING IV)

41 *TRAINFIRE II: A New Course in Basic Technique of Fire and Squad Tactics,* July 1957. (TRAINFIRE II)

42 *Comparison of the Stereoscopic Range Finder, M12 With the Coincidence Range Finder, T43,* August 1957. (FIREPOWER I)

43 *A Survey of Map Skills Requirements,* September 1957 (MAPUSING III)

44 *FIGHTER I: An Analysis of Combat Fighters and Non-Fighters,* December 1957 (FIGHTER I)

45 *A Survey of Organizational Maintenance of the Medium Tank,* May 1958 (MOBILITY III)

46 *Development and Evaluation of an Experimental Program of Instruction for Fire Control Technicians,* May 1958 (RADAR VI)

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48 *Activities of Field Radio Repair Personnel With Implications for Training,* May 1958 (REPAIR I)

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KEY-WORD-OUT-OF-CONTEXT (KWOC) INDEX

Description of the KWOC Index

A key-word-out-of-context (KWOC) index is included in this Bibliography for the convenience of readers. The index is based on the information in Part II of the Bibliography.

Constructing the Index

The KWOC index is designed to provide an efficient method of searching the bibliography for references on a particular subject. The index is constructed by alphabetizing bibliographic titles on the basis of "key words"—those words in the title that present the greatest amount of subject-oriented content. Titles typically contain several such key words, and each title is listed separately and completely for each key word occurring in its title, as the following examples show. Titles are listed in the order of alphabetic occurrence of its key words, which are printed out of context down the left of the page for easy scanning. A key word is followed by all of the titles containing that key word. In the title itself the key word is set off with arrows: thus, >key word<.

Examples: (Key words are underlined for these samples)

Simulation Exercises in Area Training/Cross-Cultural Communication
The Simulation of Cross-Cultural Communication/Area Training
Live Simulation of Affect-Laden Cultural Cognitions

Titles as they appear in the KWOC index:

AFFECT-LADEN	LIVE SIMULATION OF >AFFECT-LADEN< CULTURAL COGNITIONS
AREA	SIMULATION EXERCISES IN >AREA< TRAINING/ CROSS-CULTURAL COMMUNICATION
	THE SIMULATION OF CROSS-CULTURAL COMMUNICATION/ >AREA< TRAINING
COGNITIONS	LIVE SIMULATION OF AFFECT-LADEN CULTURAL >COGNITIONS<
COMMUNICATION	SIMULATION EXERCISES IN AREA TRAINING/ CROSS-CULTURAL >COMMUNICATION<
	THE SIMULATION OF CROSS-CULTURAL >COMMUNICATION< / AREA TRAINING
CROSS-CULTURAL	SIMULATION EXERCISES IN AREA TRAINING/ >CROSS-CULTURAL< COMMUNICATION
	THE SIMULATION OF >CROSS-CULTURAL< COMMUNICATION/ AREA TRAINING
CULTURAL	LIVE SIMULATION OF AFFECT-LADEN >CULTURAL< COGNITIONS
EXERCISES	SIMULATION >EXERCISES< IN AREA TRAINING/ CROSS-CULTURAL COMMUNICATION
SIMULATION	>SIMULATION< EXERCISES IN AREA TRAINING/ CROSS-CULTURAL COMMUNICATION
	THE >SIMULATION< OF CROSS-CULTURAL COMMUNICATION/ AREA TRAINING
	LIVE >SIMULATION< OF AFFECT-LADEN CULTURAL COGNITIONS
TRAINING	SIMULATION EXERCISES IN AREA >TRAINING< / CROSS-CULTURAL COMMUNICATION
	THE SIMULATION OF CROSS-CULTURAL COMMUNICATION/ AREA >TRAINING<

The titles are not always listed in the index exactly as they are in the Bibliography. Because of space limitations of the computer printout, some long titles had to be edited; however, every effort was made to retain the original context. Those titles that have been truncated are indicated by an asterisk (*) with the code. In some cases, words were abbreviated in order to retain as much as possible of the original title; when these words are key words, they appear abbreviated in the title, but in the out-of-context list they appear in their full form. Where the original title did not contain sufficient subject matter for effective reference, words were added to the title to serve as additional key words. These are indicated by a virgule (/) at the end of the title and between the added words (see titles listed above for two examples of titles with added words). In some cases the listing of titles for a key word may continue from the bottom of one page to the top of the next; where this occurs, the key word is repeated at the top of the page and underlined to indicate continuation. For the convenience of users, the first and last key words that appear on a page are shown at the bottom center of the page.

Using the Index

To use the index:

1. Frame a search question and select from it the key words.

2. Search the alphabetical key word list for key words and inspect the titles in which they occur for relevance. (If titles listed under the first-selected key words do not prove useful, then synonymous words will usually disclose useful titles. For instance, if titles listed under "training" do not provide enough information, such words as "education," "curriculum," and "course" may provide the desired items.)

3. When titles that appear relevant are found, use the reference codes following each title to locate the complete citations in the Bibliography. This reference code is keyed directly to the page numbers in Part II of this Bibliography. In all cases the page number—the first segment of the code—refers to the page on which the title appears.

From the second segment of the code, the year, the searcher knows how recent the item is, and also can locate the item more quickly on the page.

The last segment varies with the type of research effort to which the item is related. The Work Units are identified by not more than five letters of the code word, e.g., COMTA=COMTAC. Usually they are the first five letters, but in some cases an exception was made to distinguish between Work Units with similar names. The Exploratory Research and the Basic Research Studies are identified by number, e.g., ER-20, BR-9. Technical Advisory Service and General items are coded as such, and are most easily located by the page and year segments of the code.

Example of research code:

62/59 FIGHT	Page 62, year 1959, Work Unit FIGHTER.
211/71/ER-72	Page 211, year 1971, Exploratory Research 72.
220/66/BR-11	Page 220, year 1966, Basic Research Study 11.
223/64/TAS	Page 223, year 1964, Technical Advisory Service.
231/60/GENRL	Page 231, year 1960, General section.

The alphabetical ordering by subject content of the key words makes it possible to enter the KWOC index at any point and scan only those titles that contain concepts of current interest to the literature searcher.

A-4DMB	GAIN IN INFORMATION IN THE DESERT ROCK>A-BOMB<MANEUVERS	67/56/JR-V
A-SCOPE	TARGET DETECTABILITY ON AN>A-SCOPE<AS INFLUENCED BY VERTICAL AND HORIZONTAL VIDEO AMPLIFICATION	195/62/VIGIL
A-TYPE	TARGET DETECTABILITY ON>A-TYPE<RADAR AS FUNCTION OF HORIZONTAL, VERTICAL VIDEO AMPLIFICATION	*195/62/VIGIL
AAA	COLLECTED PAPERS, WORK UNIT>AAAAC< EFFICIENCY AND MORALE IN ANTIAIRCRAFT ARTILLERY BATTERIES	* 15/69/AAA
ABILITY	>ABILITY<GROUPING IN ARMY BASIC COMBAT TRAINING	23/56/APTIT
	WORK UNIT STOCK- DEVELOPMENT OF TRAINING MANAGEMENT PROCEDURES FOR HETEROGENEOUS>ABILITY<GROUPS	171/66/STOCK
	THE INTERRELATIONSHIPS OF>ABILITY<LEVEL, INSTRUCTIONAL SYSTEM, AND SKILL ACQUISITION	164/73/SPECT
	A TEST - RETEST STUDY OF TWO TESTS MEASURING MECHANICAL>ABILITY<	42/59/FISHT
	THE INFLUENCE OF PRACTICE FRAMES AND VERBAL>ABILITY<ON PROGRAMED INSTRUCTION PERFORMANCE	233/66/BR-11
	MEASURES OF>ABILITY<AND PROGRAMED INSTRUCTION PERFORMANCE/ INDIVIDUAL DIFFERENCES	223/65/BR-11
	PAIRED-ASSOCIATE TRANSFER AS A FUNCTION OF>ABILITY<LEVEL IN THE A-A, C-A AND A-B, B-C PARADIGMS	217/67/BR-R
ACAD MIS	COURSE ACHIEVEMENT OF STUDENTS WITH UNSATISFACTORY>ACADEMIC<AVERAGES IN BASIC ELECTRONICS/ APTITUDE	134/54/RADAR
ACADEMIES	OBSERVATIONS ON A NUMBER OF NONCOMMISSIONED OFFICER>ACADEMIES<	112/56/NCO
ACCIDENT	ANALYSES OF U.S. ARMY>ACCIDENT<DATA	211/71/BR-72
	ARMY>ACCIDENT<REPORTING- RESULTS OF SOME EXPLORATORY INTERVIEWS	15/56/ACCID
ACCIDENTS	AN EXPERIMENTAL EVALUATION OF A DRIVER SIMULATOR FOR SAFETY TRAINING/ DRIVER ATTITUDES>ACCIDENTS<	234/66/HUM-20
ACCURACY	>GROUP CONSENSUS AND JUDGMENTAL>ACCURACY<- EXTENSION OF THE ASCH EFFECT	215/56/HUM-A
	THE EFFECT OF TRAINING ON>ACCURACY< OF ANGLE ESTIMATION/ AERIAL NAVIGATION TRAINING/ MAP READING	96/66/LOWEN
	THE EFFECT OF TRAINING ON>ACCURACY< OF ANGLE ESTIMATION	96/66/LOWEN
	TEST OF>ACCURACY< OF FIRE WITH LOOP SLING, COMBAT RIFLE SLING, HASTY SLING, AND WITHOUT SLING	*143/56/TRANM
	TEST OF>ACCURACY<, SPEED OF FIRE WITH IMPROVED LOOP SLING, COMBAT RIFLE SLING, AND WITHOUT SLING	*143/56/TRANM
ACHIEVEMENT	TRAINING>ACHIEVEMENT< IN BASIC COMBAT SQUADS WITH CONTROLLED APTITUDE	23/55/APTIT
	THE>ACHIEVEMENT< OF FOREIGN STUDENTS IN U.S. ARMY TECHNICAL SCHOOLS	4/65/CULTR
	BASIC TRAINING EFFECTIVENESS- INSTRUCTION CENTRALIZATION, CURRICULUM AND>ACHIEVEMENT<EVALUATION	* 31/57/BASIC
	COURSE>ACHIEVEMENT< OF STUDENTS WITH UNSATISFACTORY ACADEMIC AVERAGES IN BASIC ELECTRONICS/ APTITUDE	134/54/RADAR
	THE>ACHIEVEMENT< OF ACTIVE-DUTY AND RESERVE TANK CREWMEN IN AREAS OF ESSENTIAL ARMOR KNOWLEDGE	163/54/SHOCK
	EFFECT OF KNOWLEDGE OF RESULTS ON TEST PERFORMANCE AS FUNCTION OF PRE->ACHIEVEMENT<, TEST ANXIETY	*223/63/KAP-D
	>ACHIEVEMENT< IN BASIC TRAINING	43/55/BASIC
A-POSTIC	SEPARATING THE EFFECTS OF THE>A-POSTIC< REFLEX FROM REMOTE MASKING	56/56/KENDU
ACQUISITION	>EFFECTS, TRAINING RESPONSE MODE, TEST FORM, MEASURE ON>ACQUISITION< OF SEMI-ORDERED FACTUAL MATERIALS	* 42/61/BASIC
	EVAL OF EFFECTS OF PROGRAMED INSTRUCTION RESPONSE MODES, FORM ON>ACQUISITION<, RETENTION SCORES	* 42/63/LEAD
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	APTITUDE LEVEL AND THE>ACQUISITION< OF SKILLS AND KNOWLEDGES IN A VARIETY OF MILITARY TRAINING TASKS	167/69/SPECT
	>ACQUISITION<, RETENTION, AND RETRAINING: EFFECTS OF HIGH AND LOW FIDELITY IN TRAINING DEVICES	177/69/STRAN
ACS	HANDBOOK ON VOLUNTEERS IN ARMY COMMUNITY SERVICE/>ACS<	6/65/DEPAR
ACTION	SELECTION, TRAINING SMALL INDEPENDENT>ACTION< FORCES: SYSTEM ANALYSES, DEVELOPMENT EARLY TRAINING	*161/70/SIAP
ACTIONS	FACTORS THAT HAVE CONTRIBUTED TO SUCCESSFUL OR UNSUCCESSFUL AMERICAN INFANTRY SMALL-UNIT>ACTIONS<	*117/59/PLATT
ACTIVE	BASIC MILITARY KNOWLEDGE IN THE>ACTIVE< ARMY	84/57/ENGEL
	FACTORS AFFECTING THE LEVEL OF BASIC MILITARY KNOWLEDGE OF>ACTIVE< ARMY ENLISTED PERSONNEL	* 82/55/ENGEL
ACTIVE-DUTY	THE ACHIEVEMENT OF>ACTIVE-DUTY< AND RESERVE TANK CREWMEN IN AREAS OF ESSENTIAL ARMOR KNOWLEDGE	163/54/SHOCK
ACTIVITIES	>ACTIVITIES< OF FIELD RADIO REPAIR PERSONNEL WITH IMPLICATIONS FOR TRAINING	14/55/REPAI
	WEIGHTED SCORES, RANKS, C-SCALE SCORES, EVAL>ACTIVITIES<, JOB DESCRIPTIONS, SIDE AJAX BATTERY OFF	*158/57/SAMJR
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	SURVEY OF OPERATIONAL FLYING>ACTIVITIES< OF ROTARY WING AVIATORS	42/62/LEFT
ACTIVITY	>ACTIVITY< PATTERN AND RESTLESSNESS DURING SUSTAINED SENSORY DEPRIVATION	21/62/BR-6
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ADAPTIVE	>ADAPTIVE< TRAINING- AN APPLICATION TO FLIGHT SIMULATION	125/64/LYNCH
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	AN EXPERIMENTAL STUDY OF MODIFICATIONS IN FACTORS INFLUENCING REQUESTS FOR>ADJUSTMENT< IN THE ARMY	14/56/ADJEV
ADMINISTRATION	CORRECTIVE ACTION QUESTIONNAIRE- DEVELOPMENT,>ADMINISTRATION< INSTRUCTIONS QUESTIONS, SCALES AND ATTITUDES	* 55/66/CINCH
ADULT	PROJECT REALISTIC VOCATIONAL LITERACY REQUIREMENTS AT TARGET SKILL LEVELS,>ADULT< BASIC EDUCATION	*164/71/REALI
ADULTS	LEARNING ABILITIES OF DISADVANTAGED>ADULTS<	142/64/STALL
ADVANCED	AN IMPROVED>ADVANCED< INDIVIDUAL TRAINING PROGRAM FOR ARMOR	161/57/SHOCK
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EXPERIMENTS	TRAINING RESEARCH ON LOW ALTITUDE VISUAL AERIAL OBSERVATION: DESCRIPTION OF FIVE FIELD>EXPERIMENTS<	127/62/OBSER
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EXPLOSION	DESERT ROCK I- A PSYCHOLOGICAL STUDY OF TROOP REACTIONS TO AN ATOMIC>EXPLOSION<-DATACON ATTRITION	• 46/53/OR-I
	DESERT ROCK I- A PSYCHOLOGICAL STUDY OF TROOP REACTIONS TO AN ATOMIC>EXPLOSION<	46/53/OR-I
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EXPLOSIVES	CRITICAL COMBAT SKILLS OF RIFLE PLATOON LEADER: PROTECTION AGAINST CBR WARFARE NUCLEAR>EXPLOSIVES<	• 88/68/LEAD
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EYES	>EYE<PLACEMENT OF APPARENT STRAIGHT AHEAD AS AFTEREFFECT OF DEVIATION OF>EYES<FROM NORMAL POSITION	•221/69/RR-16
FACTOR	INVARIANCE OF MOTIVATIONAL MEASURES DERIVED BY>FACTOR<ANALYSIS	54/56/FIGHT
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FACULTY	>FACULTY<IN_SERVICE TRAINING PROGRAMS AND THE PROCESS OF EDUCATIONAL CHANGE	247/69/GENRL
FAMILY	RELATION OF LIFE HISTORY,>FAMILY<BACKGROUND, INTELLIGENCE DATA TO PERFORMANCE IN STRESS SITUATIONS	• 58/56/FIGHT
FARSEE,M	D ASA>FATALISM<AND SOCIO-ECONOMIC INNOVATION/ CROSS-CULTURAL CHANGE	44/65/CIVIC
FATIGUE	DRAFT POLICY STATEMENT ON EFFECTS OF>FATIGUE<AND CONFINEMENT	234/63/GENRL
FEAR	THE EFFECT OF VARIOUS INTERVIEW TECHNIQUES IN EVOKING>FEAR<RESPONSES	228/55/GENRL
FEAR INVOKING	SELF-RATINGS OF>FEAR<AS A RESEARCH INSTRUMENT IN FEAR-INVOKING SITUATIONS	85/56/JUMPH
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	DEVICE_TASK>FIDELITY<AND TRANSFER OF TRAINING: AIRCRAFT COCKPIT PROCEDURES TRAINER	175/70/SYNTH
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	STUDIES OF>FIELD<ACTIVITIES OF ARMY ELECTRONICS MAINTENANCE PERSONNEL	136/55/RADAR
	THE AAFCS M-33 MECHANIC - ANALYSES OF>FIELD<ACTIVITIES AND PROBLEMS WITH IMPLICATIONS FOR TRAINING	136/56/RADAR
	METHODS>FIELD<RADIO REPAIRMEN, II - STANDARD FM SETS EXCEPT THE RT-66, 67, OR TRANSMITTER-RECEIVER	•148/56/REPAI
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	ADAPTIVE TRAINING-AN APPLICATION TO>FLIGHT<SIMULATION	175/68/SYNTH
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	AVIATION PERFORMANCE IN THE LIGHT WEAPONS HELICOPTER DURING NAP-OF-THE-EARTH>FLIGHT<	73/64/HELI
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FLYING	SURVEY OF OPERATIONAL>FLYING<ACTIVITIES OF ROTARY WING AVIATORS	92/62/LIFT
	SURVEY OF OPERATIONAL>FLYING<ACTIVITIES OF FIXED WING AVIATORS	92/62/LIFT
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	RECORDS FIELD RADIO REPAIRMEN, II - STANDARD>FM<SETS EXCEPT THE RT-66, 67, OR TRANSMITTER-RECEIVER	*148/56/REPAI
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FOLLOW-UP	>FOLLOW-UP<STUDY OF THE PERFORMANCE OF ARMY RECRUITS IN THEIR FIRST TOUR	185/67/TRANS
	>FOLLOW-UP<STUDY OF EXPERIMENTALLY AND CONVENTIONALLY TRAINED FIELD RADIO REPAIRMEN/ PROFICIENCY	*153/60/REPAI
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	IMPLEMENTATION OF>FORECAST<CONCEPT OF ELECTRONIC SYSTEM REPAIR AT ORDNANCE GUIDED MISSILE SCHOOL	* 89/63/DREE
	>FORECAST<SELF-INSTRUCTIONAL TROUBLESHOOTING SCRAMBLED MANUAL, LORAN RECEIVING SETS AN_UPN-12, AN_UPN-15	*223/66/TAS
	>FORECAST<TROUBLESHOOTING SCRAMBLED TEXT, LORAN RECEIVING SETS AN_UPN-12, AN_UPN-15	*223/66/TAS
	THE APPROACH AND RESULTS IN THE>FORECAST< EXPERIMENTAL STUDY	66/58/DREE
FOREIGN	PSYCHOLOGICAL APPROACH, DESIGN OF SHORT, SELF-INSTRUCTIONAL, FUNCTIONAL COURSE FOR>FOREIGN< LA	*130/66/MALT
	MODERN APPROACHES TO>FOREIGN< LANGUAGE TRAINING: A SURVEY OF CURRENT PRACTICES	146/67/REED
	SOME ATTITUDINAL FACTORS IN>FOREIGN< LANGUAGE LEARNING	146/67/REED
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	CRITICAL COMBAT SKILLS OF RIFLE PLATOON LEADER: SQUAD>FORMATIONS<, BATTLE DRILL, FIRE AND MANEUVER	* 87/68/LEAD
	CRITICAL COMBAT SKILLS OF RIFLE PLATOON LEADER: MOUNTED, DISMOUNTED PLATOON COMBAT>FORMATIONS<	* 87/68/LEAD
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FOXHOLE	EVALUATION OF>FOXHOLE<-BASED FLIGHT-TIME TRAINING FOR MEN OF VARIOUS INTELLIGENCE LEVELS	51/56/HUMRO
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FRAMES	THE INFLUENCE OF PRACTICE>FRAMES< AND VERBAL ABILITY ON PROGRAMED INSTRUCTION PERFORMANCE	32/66/AUTOS
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FUEL	THE EFFECT OF>FUEL< CONSERVATION TRAINING, S/N 64 TANK GASOLINE CONSUMPTION	1-22/65/MOBIL

FUEL	SPECIAL LESSON PLANS- GASOLINE ENGINE>FUEL<SYSTEM	93/58/LIMIT
	EFFECT OF PROTECTIVE MASKING ON SMOKE GENERATOR>FUEL<SUPPLY TEAM PERFORMANCE: ARMY CHEMICAL CORPS	*132/59/PROTE
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	DEVELOPMENT AND EVALUATION OF AN IMPROVED FIELD RADIO REPAIR COURSE/>FUNCTIONAL<CONTEXT	149/59/REPAI
	THE IMPLEMENTATION OF>FUNCTIONAL<CONTEXT TRAINING IN A RADIO REPAIRMAN COURSE	150/59/REPAI
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FUNCTIONS	RESEARCH IMPLEMENTATION AS AFFECTED BY ARMY STAFFING>FUNCTIONS<AND OPERATIONS	249/68/GENRL
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	THE PREDICTION OF TRAINING REQUIREMENTS FOR>FUTURE<WEAPON SYSTEMS	191/61/UPSTR
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LORAN	FORECAST SHIP-CONSTRUCT TROUBLESHOOTING SCRAMBLED MANUAL>LORAN<RECEIVING SET: AN_UPN-12, AN_UPN-15	*223/66/TAS
	THE APPLICATION AND TEST OF THE FORECAST CONCEPT OF ELECTRONICS MAINTENANCE ON NAVY>LORAN<EQUIPMENT	223/65/TAS
	FORECAST TROUBLESHOOTING SCRAMBLED TEXT,>LORAN<RECEIVING_SET: AN_UPN-12, AN_UPN-15	*223/66/TAS
	FORECAST TROUBLESHOOTING MANUAL>LORAN<RECEIVING_SET: AN_UPN-12 AND AN_UPN-15,/ TEACHING AID	*223/66/TAS
LOUISIANA	TUMOR REGISTRY SYSTEM FOR>LOUISIANA<: PROPOSALS ON OBJECTIVES, CAPABILITIES, STRUCTURE	*187/70/TUMOR
	STAFFING AND TRAINING REQUIREMENTS FOR TUMOR REGISTRY CENTERS IN>LOUISIANA<	*187/69/TUMOR
LOW	PROGRAMED INSTRUCTION AND>LOW<ALTITUDE AERIAL OBSERVATION	123/66/OBSER
	TRAINING RESEARCH ON>LOW<ALTITUDE VISUAL AERIAL OBSERVATION: DESCRIPTION OF FIVE FIELD EXPERIMENTS	120/62/OBSER
	AUTOMATED EDUCATION IN THE TRAINING OF>LOW<ALTITUDE AERIAL OBSERVERS	121/64/OBSER
	>LOW<ALTITUDE AERIAL OBSERVATION: AN EXPERIMENTAL COURSE OF INSTRUCTION	123/62/OBSER
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	SOME COMMENTS ON THE DISPLAY OF CRT GRAPHIC INFORMATION FOR VERY>LOW<LEVEL FLIGHT	97/66/LOWFL
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	AIRWORTHINESS CERTIFICATION- SYSTEM CONSIDERATIONS AND PROCEDURAL SOLUTIONS	99/66/LOWFL
	HUMAN FACTOR PROBLEMS ASSOCIATED WITH FLIGHT AT>LOW_ALTITUDE< AND HIGH SPEED	251/60/LOWFL
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LOW COST	THE DEVELOPMENT OF A>LOW_COST<PERFORMANCE-ORIENTED TRAINING MODEL	137/70/APSTA
LOW LEVEL	SURVEY OF ACTIONS INFLUENCING ARMY>LOW_LEVEL<NAVIGATION	99/71/LOWFL
LOW-ALTITUDE	PERFORMANCE OF GROUND OBSERVER IN DETECTING, RECOGNIZING, ESTIMATING RANGE,>LOW-ALTITUDE<AIRCRAFT	*293/66/ER-44
	PICTORIAL NAVIGATION DISPLAYS AIDS>LOW-ALTITUDE<NAVIGATION	99/66/LOWFL
	FACTORS INFLUENCING THE VISUAL DETECTION AND RECOGNITION OF>LOW-ALTITUDE<AIRCRAFT	298/66/ER-44
LOWENTRY	LET'S TAKE A LOOK AT NEW PROJECT: TASK>LOWENTRY</ NAVIGATION TRAINING	96/71/LOWFL
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MAI	A STUDY OF THE EFFECTS OF MANIFEST ANXIETY AND SITUATIONAL STRESS ON>MI<RIFLE FIRING	141/62/PRESS
MAJ	AAFCS>M-83<MECHANIC PROFICIENCY TESTS I - COMPARISON OF MECHANICS WITH, WITHOUT RIFLE EXPERIENCE	*147/57/MAJAM
	IMPORTANCE OF ELECTRONICS MAINTENANCE ACTIVITY ANALYSES, IMPLICATIONS FOR TRAINING, I >M-83<	* 96/66/ELOWL
	A PERFORMANCE TEST FOR THE AAFCS>M-83<RADAR MECHANIC AND OBSERVATIONS ON TROUBLE SHOOTING BEHAVIOR	146/55/MAJAM
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MACHINE TACHOT	A FEASIBILITY STUDY OF A SPECIAL>MACHINE TACHISTICAL-AURAL RUSSIAN LANGUAGE COURSE	4/56/STATA
MACHINES	CRITICAL COMBAT SKILLS OF RIFLE SQUAD LEADERS>MACHINE<GUNS: 7.62_MM, M60	84/69/LEAD
	CRITICAL COMBAT SKILLS OF RIFLE PLATOON LEADERS>MACHINE<GUNS: 7.62_MM, M60	84/69/LEAD
MACHINES	DEVELOPMENT OF METHODS OF PREPARING MATERIALS FOR TEACHING>MACHINES<	143/56/AIR
	MEN,>MACHINES<, AND THE SOLDIER: MEN OF MANY TALENTS, MAINTENANCE/ TECHNICAL WRITERS	244/66/ARMY
MAINTAINING	TEN NEW CONCEPTS FOR>MAINTAINING< TACTICAL SYSTEMS	111/65/AM
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	IDENTIFICATION OF TECHNIQUES>MAINTENANCE<TRAINING REQUIREMENTS	111/66/SAI
	A DESCRIPTION AND ANALYSIS OF TEN NEW CONCEPTS FOR ELECTRONICS>MAINTENANCE<	111/66/MAI
	TECHNIQUES FOR DEVELOPMENT OF TECHNICAL>MAINTENANCE<PERSONNEL ANALYSIS OF ACTIVITIES, TASKS, IMPACT, ATTRIB	*111/67/SAI
	ANALYSIS OF ELECTRONICS>MAINTENANCE<TASKS	111/66/SAI
	THE PERFORMANCE OF ORGANIZATIONAL>MAINTENANCE< TRACK VEHICLE MECHANICS AND MAINTENANCE SUPERVISORS	111/66/MAI
	LESSON PLANS FOR OPERATION AND OPERATOR>MAINTENANCE< OF SIDEWINDER GUIDANCE AND CONTROL SYSTEM	*153/57/MISSI
	PROGRESS REPORT ON TASK ANALYSIS OF TECHNICAL>MAINTENANCE< TRAINING	111/67/SAI
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	TECHNIQUES TO TRANSLATE CRITICAL INCIDENTS INTO PRACTICAL TROUBLESHOOTING>MAINTENANCE<	111/67/SAI
	RESEARCH ON MISSILE>MAINTENANCE< TECHNIQUES	111/67/MAINT
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	THE IMPROVEMENT OF TROUBLESHOOTING EFFICIENCY THROUGH IMPROVED>MAINTENANCE< MANUALS	111/67/MAINT
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	A SURVEY OF ORGANIZATIONAL>MAINTENANCE< OF THE NIKE AJAX MISSILE	111/66/MAINT
	JOB PERFORMANCE TEST FOR IMPROVING NIKE AJAX ELECTRONICS>MAINTENANCE< MEN WITH AND WITHOUT EXPERIENCE	* 177/64/ELOWL
	PROGRESS REPORT ON TASK ANALYSIS OF ELECTRONICS>MAINTENANCE< EFFICIENCY THROUGH JOB RESPONSE ANALYSIS	111/67/SAI
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	COLLECTED PAPERS, PROGRAMED INSTRUCTION WORK SET AND TRAINING AIDS, OPERATIONS>MAINTENANCE<	*145/64/MAJAM
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MAINTENANCE	FROM RESEARCH TO PRACTICE IN ELECTRONICS>MAINTENANCE<TRAINING	243/68/GENRL
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	THE APPLICATION AND TEST OF THE FORECAST CONCEPT OF ELECTRONICS>MAINTENANCE<ON NAVY LORAN EQUIPMENT	221/65/TAS
	>MAINTENANCE<PERSONNEL AND TRAINING RESEARCH- A BIBLIOGRAPHY	94/58/MAINT
	CRITICAL COMBAT SKILLS OF RIFLE SQUAD LEADER: HUMAN>MAINTENANCE<UNDER CAMPAIGN CONDITIONS	89/69/LEAD
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	A SURVEY OF ORGANIZATIONAL>MAINTENANCE<OF THE MEDIUM TANK	109/58/MORIL
	STUDIES OF FIELD ACTIVITIES OF ARMY ELECTRONICS>MAINTENANCE<PERSONNEL	136/55/RADAR
	ORDNANCE IFC ELECTRONICS>MAINTENANCE-FIELD<ACTIVITY ANALYSIS, TRAINING IMPLICATIONS, II- T_3H	• 57/57/FICON
	ORDNANCE IFC ELECTRONICS>MAINTENANCE-ACTIVITY<ANALYSIS, IMPLICATIONS FOR TRAINING, I -- M-33	• 56/56/FICON
	TRAINING REQUIREMENTS FOR ELECTRONIC SYSTEM>MAINTENANCE--ANEW<METHOD OF SKILL, KNOWLEDGE ANALYSIS	• 63/62/FDREC
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	CRITICAL COMBAT SKILLS OF RIFLE SQUAD LEADER:>MAINTENANCE<OF CLOTHING AND EQUIPMENT	84/68/LEAD
	THE TECHNICIAN AS A DATA PROCESSING SYSTEM WITHIN THE ELECTRONICS>MAINTENANCE<COMPLEX	86/63/JOHTR
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MAN	FOCUS ON>MAN<	230/59/GENRL
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MAN-RIFLE	THE>MAN-RIFLE<WEAPON IN ATOMIC WAR	229/58/GENRL
MANAGEMENT	AN EXPERIMENTAL PROGRAM OF INSTRUCTION ON THE>MANAGEMENT<OF TRAINING	145/72/TMANM
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MANAGER	>MANPOWER RESEARCH ON OFFICER TRAINING AND EDUCATION: LEADER,>MANAGER<, TECHNICAL SPECIALIST	*263/72/GENRL
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MANDARIN	DEVELOPMENT AND EVALUATION OF A TACTICAL>MANDARIN<CHINESE LANGUAGE COURSE/ FINAL DESCRIPTION	64/65/EDNTA
MANEUVER	CRITICAL COMBAT SKILLS OF RIFLE PLATOON LEADER: SQUAD FORMATIONS, BATTLE DRILL, FIRE AND>MANEUVER<	• 67/69/LEAD
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	SPREAD OF INFORMATION DURING AN ATOMIC>MANEUVER<	64/56/ORNL
	DESERT ROCK IV- REACTIONS OF AN ARMORED INFANTRY BATTALION TO AN ATOMIC BOMB>MANEUVER<	67/55/HUMRR
	CRITICAL COMBAT SKILLS OF RIFLE SQUAD LEADER: FORMATIONS, BATTLE DRILL, FIRE,>MANEUVER<	• 67/69/LEAD
MANEUVERS	PREPARATION OF SOLDIERS FOR ATOMIC>MANEUVERS<	67/56/ORNL
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MANIFEST	RIFLE MARKSMANSHIP AS A FUNCTION OF>MANIFEST<ANXIETY AND SITUATIONAL STRESS	131/56/PRESS
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MANIPULATIONS	THE EFFECTIVENESS, MEASUREMENT AND EXPERIMENTAL>MANIPULATION< OF VISUAL HALLUCINATIONS	214/62/ORNL 6
MANPACK	RECORDS FIELD RADIO REPAIRMEN, III- AM TRANSMITTER, RECEIVER,>MANPACK<RECEIVER-TRANSMITTER, RT-77/GRC-9	*194/55/MANPAC
MANPOWER	MOTIVATION AND INCENTIVES IN>MANPOWER<ANALYSIS	262/72/GENRL
	PREFERENCES FOR>MANPOWER<TRAINING, AS DEVELOPED BY HUMRRO	*263/69/GENRL
	MANUAL>MANPOWER< JOB ASSIGNABILITY AS A JOINT FUNCTION OF APTITUDE AND EXPERIENCE	192/72/TIEI
	PROJECT>MANPOWER<VIEW, TRAINING REQUIREMENTS FOR OPERATORS AND USERS OF FUTURE STRIKE SYSTEMS	*177/66/STINT
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MANUAL	FORECAST SITE INSTRUCTOR TROUBLESHOOTING>MANUAL<, CORAN >>IVING SITE AN UPN-12, AN UPN-15	*224/66/TAS
	>MANUAL< PROPERTIES FOR DERIVING TRAINING OBJECTIVES FOR JUNIOR OFFICERS	157/66/JAMOP
	ASSET INSTRUCTION IN LAND NAVIGATION, PROFICIENCY TEST>MANUAL<	127/56/PATRO
	FOR RATES M-6A OPERATOR, >MANUAL< OF OPERATING PROCEDURES	147/56/RADAR
	THE DEVELOPMENT AND EVALUATION OF AN IMPROVED ELECTRONICS TROUBLESHOOTING>MANUAL<	20/55/MAINT
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	TYPE AST TROUBLESHOOTING>MANUAL<, HUMAN RECEIVER, SETS AN/UPN-12 AND AN/UPN-15/7 TRACKING AID	*224/66/TAS
MANUALS	IMPROVED>MANUALS< FOR MAN-MACHINE SYSTEMS THROUGH TASK ANALYSIS	232/61/GENRL
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	TECHNICAL>MANUALS< OF MAINTENANCE SUPPORT: MAINTENANCE RATIONALE, RESEARCH FINDINGS, & PROJECTIONS	*242/67/GENRL
MANUAL TRACK	THE EFFECTS OF>MANUAL< TRACKING ON PASSIVE SONAR DETECTION/AERIAL NAVIGATION TRAINING/ TARGET RATE %	213/71/GENRL
MAP	THE EFFECTS OF>MAP<SCALE ON PASSIVE SONAR DETECTION/AERIAL NAVIGATION TRAINING/ TARGET RATE %	213/71/GENRL
	A SURVEY OF>MAP<USES REQUIREMENTS	136/55/RADAR
	THE EFFECT OF TRAINING IN ACCURACY OF ANGLE ESTIMATION/ AERIAL NAVIGATION TRAINING/>MAP<MEMORY TIME	213/71/GENRL
	TRAINING MADE >MAP< READING IN THE CRITICAL SKILLS OF>MAP<READING	1 /55/MAP
	IMPROVING THE ABILITY OF THE INDIVIDUAL SOLDIER TO EMPLOY>MAP< AND AERIAL NAVIGATION AIDS IN LAND NAVIGATION	1 /72/MAP
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MAPS	THE EFFECTS OF>MAP<SCALE ON PASSIVE SONAR DETECTION/AERIAL NAVIGATION TRAINING/ TARGET RATE %	213/71/GENRL
MARKSMANSHIP	STUDY OF>MARKSMANSHIP< TRAINING/ & QUALIFICATION/ OF MEDICAL PERSONNEL/>MARKSMANSHIP<	• 57/57/FICON
	>MARKSMANSHIP< PROFICIENCY AS A FUNCTION OF APTITUDE AND EXPERIENCE	192/72/TIEI
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MATERIALS	DEVELOPMENT OF METHODS OF PREPARING>MATERIALS<FOR TEACHING MACHINES	139/68/RADOP
	DEVELOPMENT OF TECHNICAL TRAINING>MATERIALS<FOR NIKE HERCULES JUNIOR OFFICERS/ PROGRAMED INSTRUCT	158/66/SAMDF
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MATHEMATICAL	STUDY OF>MATHEMATICAL<SKILLS REQUIREMENTS FOR BASIC ELECTRONICS IN U.S. ARMY AIR DEFENSE SCHOOL	*223/64/TAS
MBT	WORK UNIT>MBT<- TRAINING GUIDELINES FOR THE US_FRG MAIN BATTLE TANK	135/68/MBT
MEAN	STATISTICAL JUDGMENT: A STUDY OF>MEAN<LENGTH AND MEAN INCLINATION	237/64/GENRL
MEANING	CONDITIONING OF CONNOTATIVE>MEANINGS<AS A FUNCTION OF SENSORY DEPRIVATION AND SOCIAL ISOLATION	216/63/RR-6
MEASURE	DEVELOPMENT OF A VERBAL>MEASURE<FOR USE IN STRESS STUDY	61/59/FIGHT
	EFFECTS, TRAINING RESPONSE MODE, TEST FORM,>MEASURE<ON ACQUISITION SEMI-ORDERED FACTUAL MATERIALS	* 32/61/AASIC
	DEVELOPMENT OF A>MEASURE<OF SKILL AT RECEIVING INTERNATIONAL MORSE CODE	139/57/RADOP
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	>MEASUREMENT<OF THE JOB PROFICIENCY OF NIKE AJAX PLATOON LEADERS	157/60/SAMDF
	FIELD STRESS- A PRELIMINARY STUDY OF ITS STRUCTURE,>MEASUREMENT<, AND RELATIONSHIP TO COMBAT	53/57/FIGHT
	THE OCCURRENCE,>MEASUREMENT<AND EXPERIMENTAL MANIPULATION OF VISUAL HALLUCINATIONS	214/62/RR-6
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	THE PROBLEM OF SIMPLE COMBINATION SCORES IN>MEASUREMENT<	103/55/NAPRE
	THE EFFECTS ON FLIGHT PROFICIENCY>MEASUREMENT<RELIABILITY OF DIFFERENCES ON CHECK PILOT STANDARDS	91/59/LIFT
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	AN INVESTIGATION OF TWO>MEASURES<OF PALMAR SWEAT UNDER FIELD CONDITIONS	202/55/YUCCA
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	INVARIANCE OF MOTIVATIONAL>MEASURES<DERIVED BY FACTOR ANALYSIS	58/56/FIGHT
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	>MEASURES<OF ABILITY AND PROGRAMED INSTRUCTION PERFORMANCE/ INDIVIDUAL DIFFERENCES	22/65/HR-11
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	POSSIBLE COMBAT APPLICATION OF EXPERIMENTAL STEALTH>MEASURING<DEVICE	127/57/PATWI
MECHANIC	DEVELOPMENT OF A WORK_SAMPLE CRITERION FOR GENERAL VEHICLE>MECHANIC<	82/70/JOHN
	AAFCS M-33>MECHANIC<PROFICIENCY TEST: I - COMPARISON OF MECHANICS WITH, WITHOUT FIELD EXPERIENCE	*137/57/AADAM
	THE AAFCS M-33>MECHANIC<PROFICIENCY TESTS: PART II - DEVELOPMENT AND CROSS-VALIDATION	*137/57/AADAM
	THE AAFCS M-33>MECHANIC<- ANALYSIS OF FIELD ACTIVITIES AND PROBLEMS WITH IMPLICATIONS FOR TRAINING	136/56/AADAM
	A PERFORMANCE TEST FOR THE AAFCS M-33 RADAR>MECHANIC<AND OBSERVATIONS ON TROUBLE SHOOTING BEHAVIOR	138/55/AADAM
MECHANICAL	A TEST - RETEST STUDY OF TWO TESTS MEASURING>MECHANICAL<ABILITY	62/59/FIGHT
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	DEVELOPMENT OF A PROFICIENCY-ORIENTED TRAINING PROGRAM FOR HAWK RADAR>MECHANICS<	73/69/HAWK
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MEDIATION	VERBAL>MEDIATION<IN REVERSE ASSOCIATION- THE ROLE OF TEMPORAL FACTORS	216/65/RR-5
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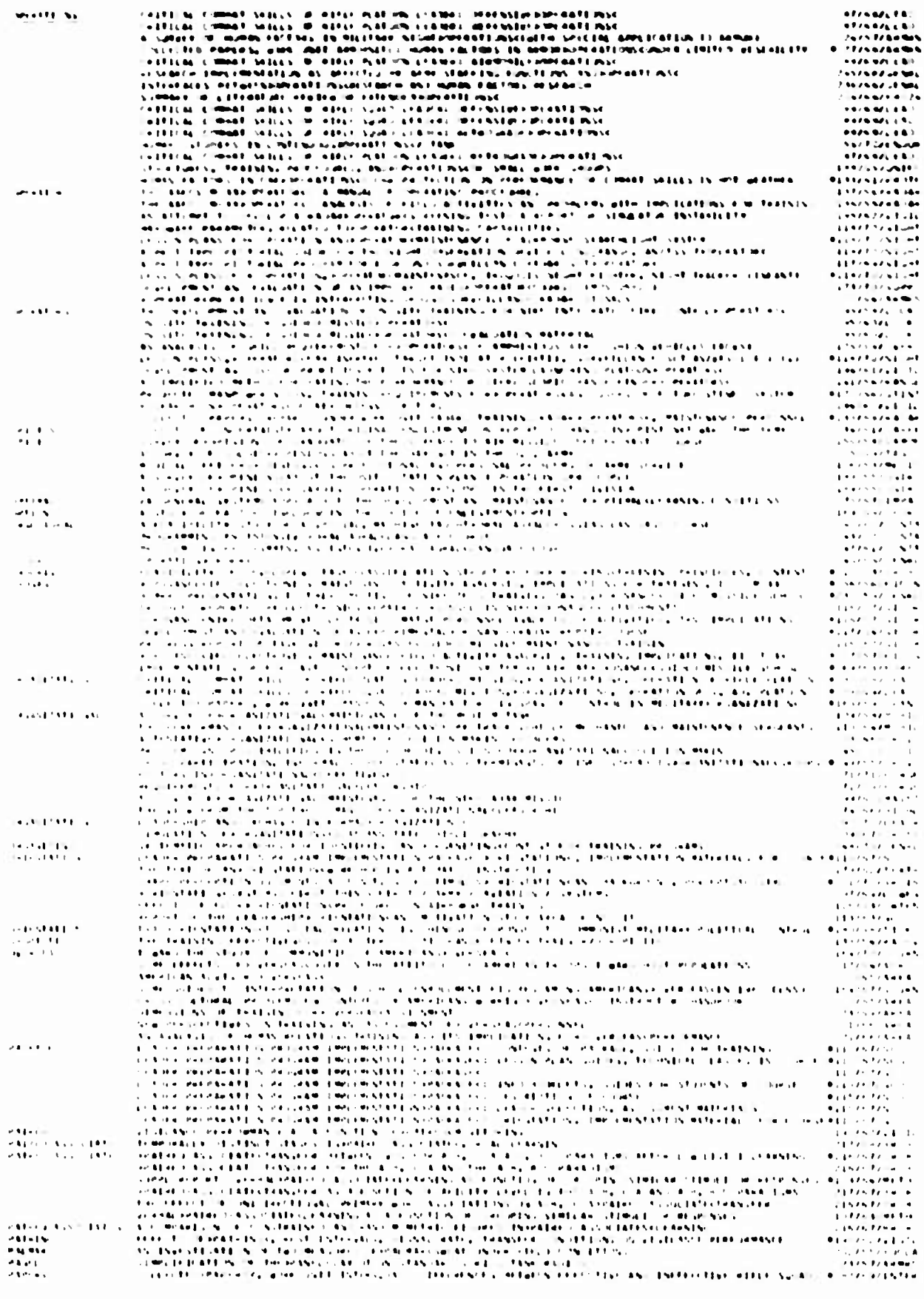

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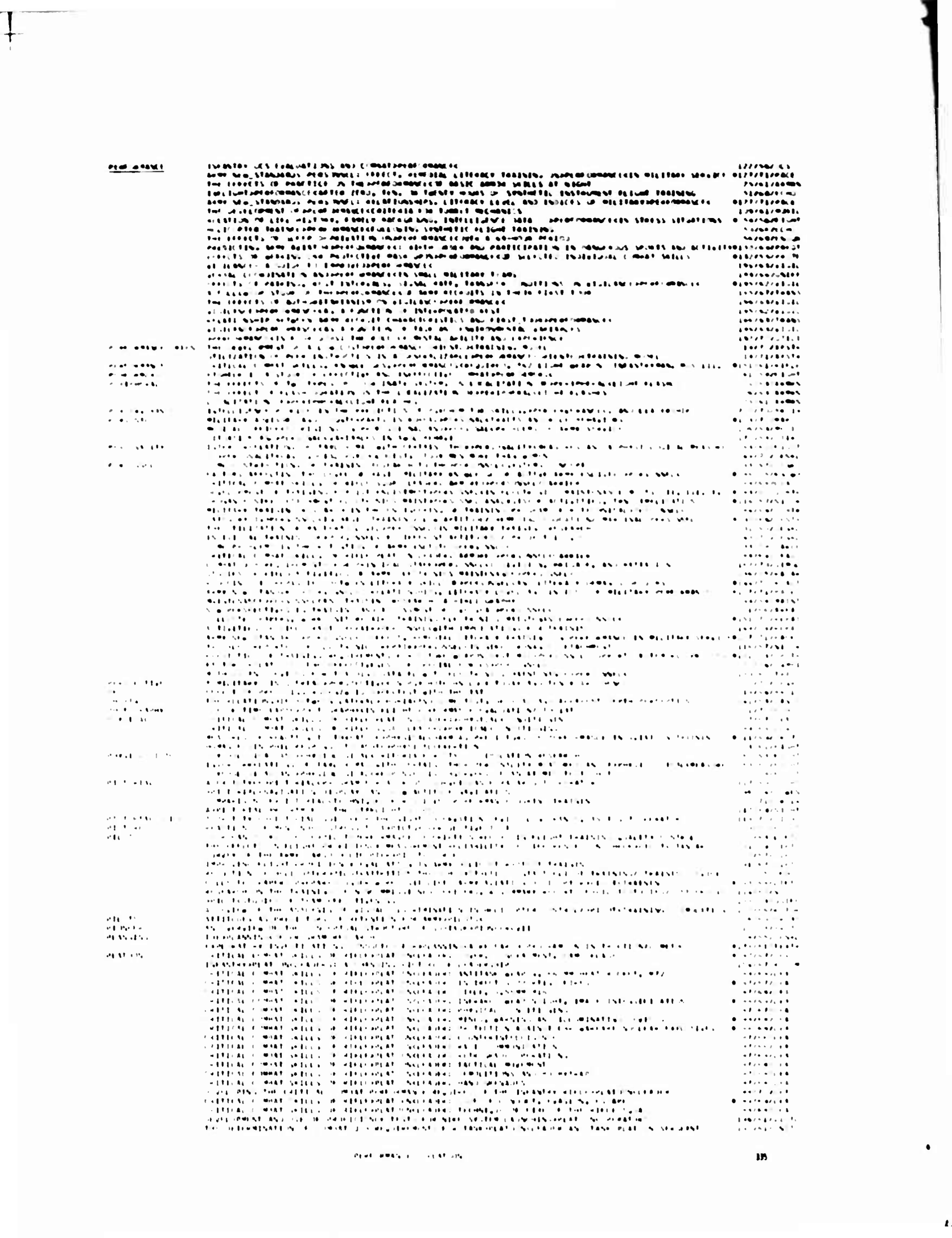

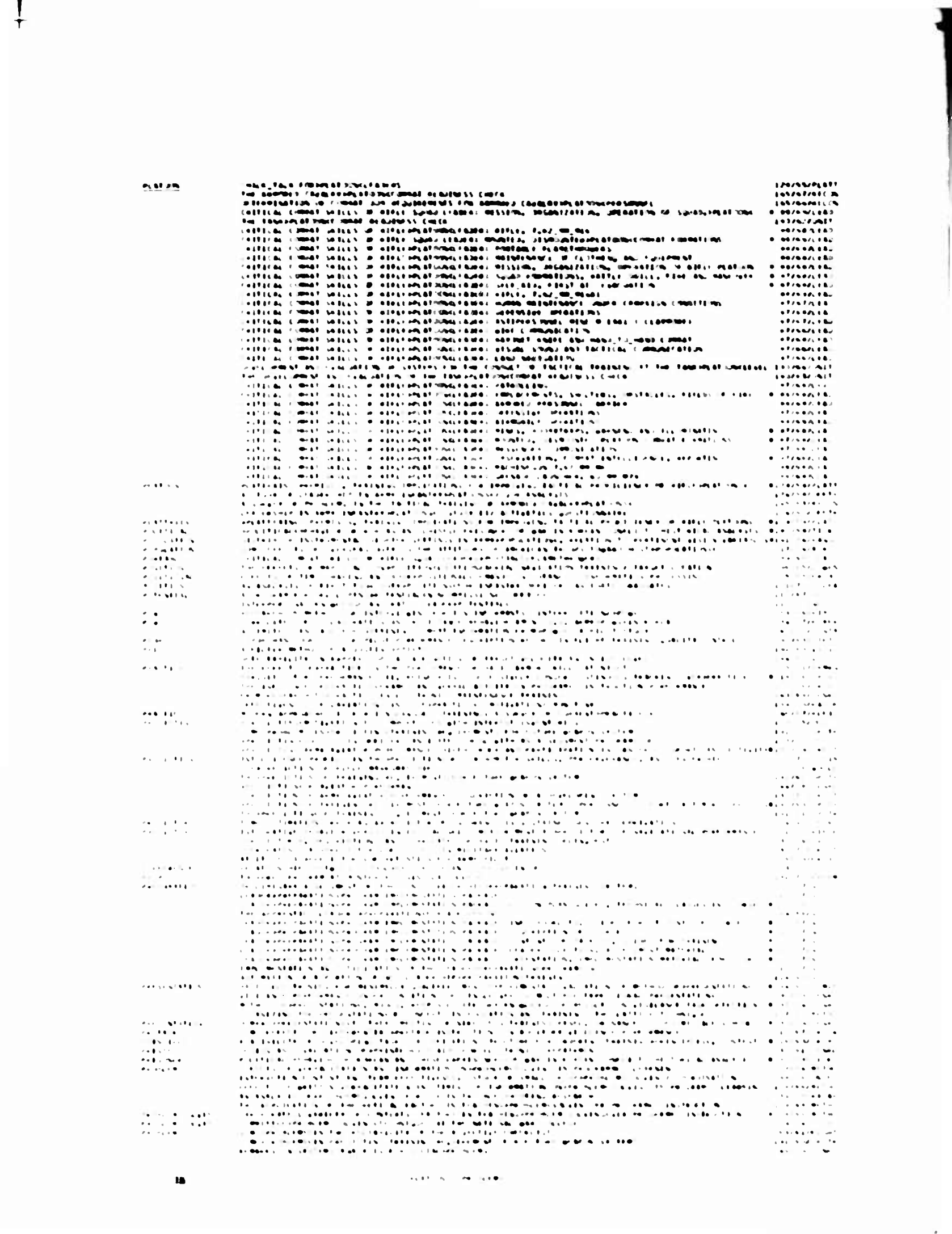

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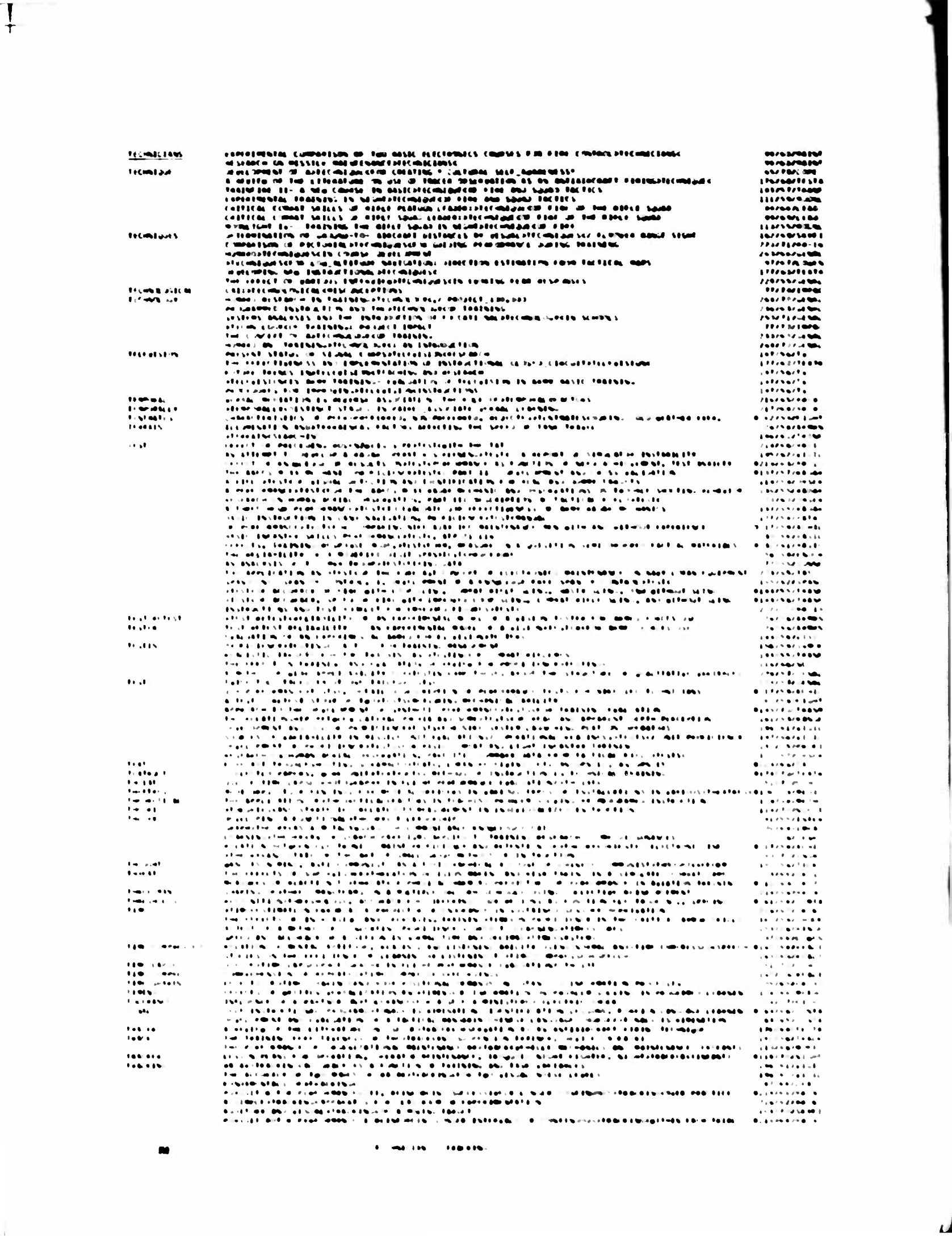

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