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Special Report 18

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International Research at ARI: The European Science Coordination Office

Milton S. Katz and Michael Kaplan

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United States Army Research Institute
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**International Research at ARI:
The European Science Coordination Office**

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and
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FOREWORD

The behavioral sciences recapitulate the origin and development of natural science as essentially a European creation. The roots of American psychology reach back to the European laboratory, academy, and physician's couch. Today the United States is the leader in the behavioral sciences, measured by the amount of money invested, the number of people engaged in the sciences and profession, or the number of professional journals published. European scientific methodology and epistemology continue to have a significant role in the definition and development of the behavioral sciences. Ascribing the leadership role to America sometimes carries with it the tendency to think that little value, if any, can be placed on the behavioral sciences research in other nations. However, the methodology and epistemology of science are universal; scientific talent, ideas and developments show little respect for national boundaries. Further, research in the behavioral sciences in other countries has tended to follow different paths than in the United States because of cultural differences and societal guidelines. It is often directed at topics such as fear, courage, or shiftwork, which are not prevalent research issues in the United States, but are of significance to the U.S. Army.

To bring the best science to bear on the challenges facing the Army and leverage scarce R&D resources, the Army Research Institute (ARI) established its European Science Coordination Office in 1973. Establishment of this office was based upon the concept that European scientific developments could provide significant contributions to the U.S. Army programs. This concept had been clearly validated by the operations and contributions from the European Research Office established in the late 1940s by the U.S. Army Materiel Command. Collocated with the European Research Office, London, the ARI office has a rich program and has been for ARI and the Army a bridge to significant behavioral science research and development as well as to military psychology activities within the international community. The story of the accomplishments of this office and its impact is provided in the pages of this report.



Edgar M. Johnson
Technical Director, ARI and
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SUMMARY

The U.S. Army Research Institute established its European Science Coordination Office in London, England in 1973. The principal mission of the Office is to afford systematic coverage of, and contact with, the overseas behavioral research and development community. The Office has sustained contact with, and supported foreign research into, issues not accessible to U.S. researchers, such as the modification of performance caused by the effects of stress on unit cohesion, and leadership under stress, terrorism, and fanaticism. Overseas research off the U.S. beaten track, or reflecting different scientific philosophies and approaches, has also been made available to U.S. researchers. In the Office's 18 years of operation, well over one hundred publications in professional journals have been contributed to the scientific and military literature by a distinguished array of foreign scientists, and support from ARI has made possible the publication of at least one scientific book each year, covering a broad variety of behavioral research subjects (Appendix I). In this time, the Office has also sponsored several hundred research reports produced and delivered under overseas contracts and grants (Appendix II). These publications and reports constitute a significant contribution to basic behavioral research, not only strengthening the scientific underpinnings for explanatory and advanced development, but also on occasion affording direct application to U.S. military concerns.

International communication, and a sharing of information with our allies and other friendly nations, have been maintained and advanced through our support of the presentation of research results to international professional and military societies and working bodies including NATO Research Study and Working Groups, The Technical Cooperation Program (TTCP), International Applied Military Psychology Symposiums, the UK MOD (Ministry of Defence) Psychologists Conference, the Ergonomics Society, the Institution of Electrical Engineers, and many others (App. III). Doors have also been kept open with Eastern Bloc scientists in the more basic research endeavors, paving the way for expanded cooperation as relations between East and West improve.

As part of its analysis of changes or initiatives in foreign military and technical programs, the Office has collected and forwarded to the U.S. extensive information about such activities as the ALVEY and ESPRIT projects, computer applications in personnel selection, military training activities and developments, and overall government policy, e.g., privatization of UK MOD defense research establishments. The Office also assists in arranging reciprocal contacts and visits for information exchanges between U.S. DOD officials and foreign establishments and programs.

Inputs from the U.S. to overseas defense establishments through this Office include research results and concrete experience data on DOD/Army programs which have substantially influenced other nations' defense policy and programs. Noteworthy

examples include adoption by the UK Royal Army and MOD of the MANPRINT program, and issuance by the MOD of an extensive program for the use of simulation in military training, complete with funding commitment.

In all, the record of the European Science Coordination Office's activities shows a favorable return in scientific and defense-related research productivity. One consequence of the Office's research support operations is the development of a pool of foreign researchers of high caliber, and with allied interests, to address U.S. and international issues. Another is the sharing of information and understanding between U.S. and foreign researchers and practitioners, as well as among agencies. Still another outcome is the acquisition of research and data not otherwise accessible in the U.S. Finally, where the interests of the U.S. and foreign partners coincide, research and information exchange activities foster a collegiality and community of purpose, with each party benefitting from the interaction and collaboration.

INTERNATIONAL RESEARCH AT ARI: THE EUROPEAN SCIENCE COORDINATION OFFICE

THE U.S. ARMY RESEARCH INSTITUTE

The Army Research Institute (ARI) is the U.S. Army's principal resource for personnel-related science. As such, ARI has the mission of producing, supporting and bringing together research in manpower, personnel, and training. The goal is to optimize Army personnel performance and combat readiness. Toward this goal, ARI performs and disseminates state-of-the-art research and gathers and distributes findings on future systems, personnel technology, and new techniques with potential application to the Army's requirements. The know-how comes from in-house research, development, and application; from contract research by universities and industrial and non-profit organizations; and from sustained knowledge of existing and developing personnel technology.

In addition to its headquarters operation in Alexandria, VA, ARI maintains CONUS field units collocated with Army training and operational centers, and two overseas coordination offices. Situated at US Army HQ, Europe, ARI's USAREUR Field Unit supplies on-the-ground technical advisory support (TAS) and assistance, transferring ARI products to soldiers and units of US forces in Germany, and conveying field requirements back to ARI Headquarters. The second overseas site is in London, England.

ARI'S EUROPEAN ACTIVITIES

In 1973, ARI established the Army Research Institute European Science Coordination Office (ARIESCO) in London in recognition of, and to capitalize on, the existence of a substantial and robust military behavioral community working on scientific and technological developments relevant to the US Army. Since other US Army science/technology watch offices abroad concentrate almost exclusively on engineering and physical/biological developments, there had been no systematic coverage of military or civilian behavioral research and development until ARIESCO came into being. It is collocated with, and supplements, the range of engineering and science activities covered by the U.S. Army Research Development and Standardization Group (UK).

ARIESCO is concerned principally with basic research, and coordinates with the day-to-day applied activities of the USAREUR Field Unit. London's emphasis is on cooperative exchange of behavioral research information with allied and friendly European military and civilian researchers, on supporting some unique research, and on gathering scientific information from universities, industry and military abroad. The main function of the Field Unit is to convey useful information and research results to our forces in Europe, expediting the transfer of technology and sensing the behavioral research and development needs of units in the field, which can then be followed up by ARI's three laboratories.

ARIESCO'S MISSION AND ACTIVITIES

INITIATE, EXECUTE AND MANAGE OVERSEAS RESEARCH

Since its inception in 1973, the ARIESCO has developed a broad and intensive knowledge of behavioral science research activities in government, universities, and industry abroad. Based on familiarity with U.S. defense research programs, successive chiefs of the Office have scouted and identified outstanding foreign researchers and research programs engaged in work relevant and complementary to U.S. efforts. A list of successive chiefs is Appendix IV. Each incumbent has been selected and assigned on the basis of strong professional and personal qualifications in the performance of research, and for his extensive, authoritative scientific knowledge.

Upon review and coordination with ARI headquarters, meritorious proposals - chiefly basic research - have been selected and funded. Until the mid-1970s, the funding instrument was the research grant, which was replaced by the contract instrument as the means of funding. In the main, research procurement has been an advantageous buy for the U.S. because of differences in salaries and overheads abroad compared with those which yield an equivalent return in the U.S.

The criteria guiding selection and support of promising overseas proposals reflect unique opportunities to complement research activities and talents in the U.S. research community. For proposed research to be considered favorably, it must: (1) be potentially relevant to the U.S. defense mission and to scientific needs, (2) afford the

SOME UNIQUE ASPECTS OF EUROPEAN RESEARCH
<ul style="list-style-type: none">• Conduct experiments not permitted by U.S. cultural and societal guidelines• Gather data from life-threatening situations• Utilize original sources on terrorism• Compare specialized populations cross-nationally• Benefit since research is expensive to accomplish

Figure 1. Some Unique Aspects of European Research

opportunity to gather data not available or obtainable in the U.S. (See Figure 1), (3) contribute to the pool of basic scientific knowledge, (4) have potential for transfer and ultimate impact in practice, and (5) offer access to the skills and expertise of prominent foreign researchers, and capitalize on national differences in scientific approach. Data will often be drawn from the experience of armed forces abroad to compare with, and add to, those available from U.S. forces.

Some research efforts, and consequently access to crucial data, are denied to U.S. researchers by regulations governing treatment of experimental subjects. In others, involving realistic, life-threatening, stressful situations, such as combat or bomb disposal, the U.S. lacks opportunity because of the (fortunately) rare occurrence of such situations here. Incidents of combat, terrorism, and bombing are comparatively frequent occurrences abroad. Learning from such incidents can contribute significantly to scientific knowledge, and to military doctrine, training, and practice.

As an example, Prof. Shlomo Breznitz of the University of Haifa, with complete cooperation from the Israel Defense Forces, has successfully conducted experimental research with Israeli infantry troops about the effects of information communicated on soldiers' endurance of prolonged stress. The results of this research have been applied by the Israel Ministry of Defense to practice in correcting the harmful actions of leaders in the field. Collection of these data was supported by this Office, and they are thus available to the U.S. With ARI support, Prof. Breznitz has also conducted revealing research into the effects of false alarms and the credibility of warning systems.

Very little research has been conducted in the U.S. on terrorism, primarily because of the lack of opportunity here. Through support from ARI, Prof. Maxwell Taylor, at University College, Cork, Republic of Ireland, has been able to conduct research into the complicated area of the origins and nature of extreme behavior. His book, Terrorism, published in 1988, is a contribution to the understanding and detection of terrorist activities.

Prof. S. Jack Rachman conducted research at the University of London, on the subject of courage under dangerous conditions. He moved to the University of British Columbia, where he continues his efforts to reveal the personal factors which make for effective courageous performers of life-threatening tasks such as bomb disposal. His findings are an important contribution to the selection and assignment of appropriate personnel who characteristically display genuine courage under stress and threat.

Regarding research off the beaten track in the U.S.: when the U.S. Army Vice-Chief of Staff tasked ARI in the mid-1980s to produce research information on unconventional techniques for enhancing human performance, four evaluative state-of-the-art reports were quickly forthcoming from Europe through this Office: Mollon's (University of Cambridge) on sleep learning; Davidoff's (University College, Swansea) on hemispheric learning; Palmer's (University of Utrecht) on parapsychology; and Brener's (University of Hull) on meditation.

These reports contributed essential elements to the later National Research Council's committee report on enhancing human performance.

The several hundred publications and research reports supported by ARIESCO produce a remarkable spectrum of coverage in behavioral science (See Figure 2). They include investigations of basic human perception, motor performance, text comprehension and sleep-wake cycles. These findings represent a rich addition to the

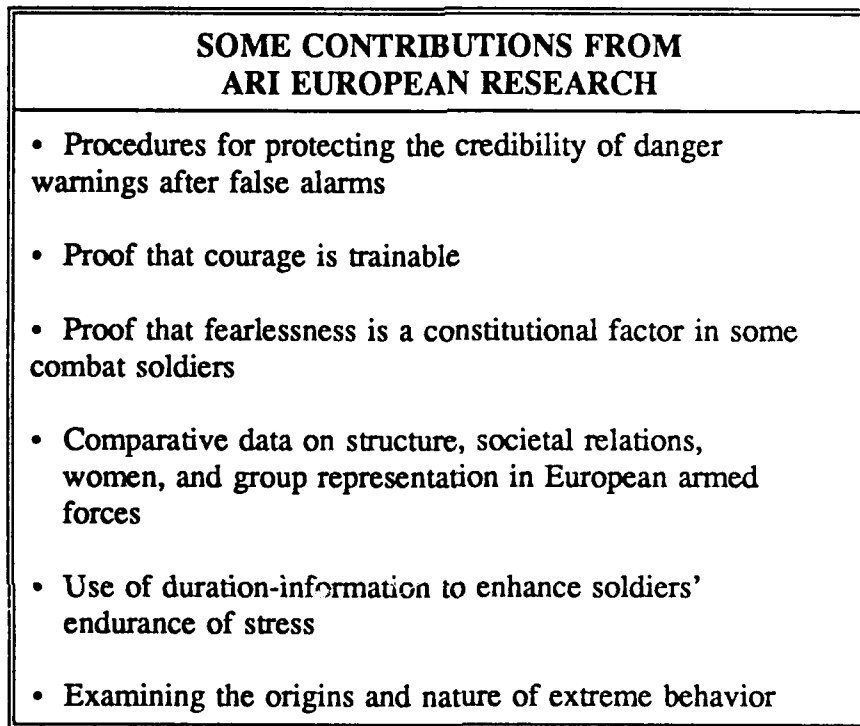


Figure 2. Some Contributions from ARI European Research

basic research knowledge base. Particularly noteworthy are Lavie's (Technion Research & Development Foundation) publications on sleep and wakefulness cycles, and Mollon's (University of Cambridge) book on color vision, both of which are substantial contributions to basic knowledge in behavioral science.

Many research efforts come to grips with issues of immediate concern to the U.S. military. Among these are work on the psychometrics of selecting and assigning personnel, vehicle control, stress, leadership and unit cohesion, organizational design, training, continuous operations, decision making, and human problems in using computers. Stoll's (University of Zurich) critical evaluation decisively discredits the controversial Defense Mechanism Test for pilot selection which is in use, with questionable worth, by a couple of European armed forces. Shye's (Israel Institute of Applied Social Psychology) seminal work in psychometric scaling provides new, powerful statistical tools for personnel measurement.

The design and use of expert systems is the subject of Michie's (Turing Institute) powerful research, and Pask's (Systems Research Development) innovative work in "conversational systems theory" anticipated and underlies many of the current developments in the field of intelligent software applications programming, and is of special value in training, particularly the creation of intelligent tutoring systems.

LIAISON AND TECHNOLOGY WATCH

Appendix V contains the most recent one-year summary of ARIESCO's liaison activities, which is typical of prior years: closest interactions are with the Army Personnel Research Establishment (APRE), ARI's counterpart in the United Kingdom. APRE and ARI share an intense interest in, and responsibility for, research pertaining to all Army personnel and manpower matters. Although there may be differences in detail, both armies face the same essential problems and issues. It is no wonder, then, that each is interested in learning how the other deals with specific concerns. Accordingly, exchanges of research information take place frequently. In addition to direct communication in person and by telephone, APRE and ARIESCO regularly participate in international organizations such as the NATO Defense Research Study Groups (RSGs) and Workshops, and The Technical Cooperation Program (TTCP).

However, ARIESCO's British liaison activities are broader than this important connection to APRE. They also involve the UK Ministry of Defense, and numerous staff, research, and operating divisions of the Army, Air Force, and Admiralty. Elsewhere, information exchanges are maintained with defense researchers and officials in the Netherlands, France, West Germany, Portugal, Sweden, Italy, and Israel, and on occasion with other countries.

The interactions entail not only dissemination and exchanges of research information, but also agreements to conduct international validations of research findings, psychometric instruments tests, collaborative research, and scientist exchanges. Much is accomplished in international working and study groups, and in limited attendance meetings such as the International Applied Military Psychology Symposiums (IAMPS) and the topical meetings of the NATO RSGs and TTCP panels.

Civilian organizational contacts are equally important. Many of these are established with universities through research contracts let by ARIESCO. Still others arise out of participation in professional society affairs such as the Ergonomics Society and the Institution of Electrical Engineers, where connections are made with university, industrial, and military researchers and programs.

The successful establishment of MANPRINT and training simulation as programs and initiatives for overseas ministries of defense and defense material suppliers has been materially aided and hastened by the breadth and depth of communication and information supplied in each of the communities addressed.

In addition to its direct substantive efforts, the Office lends assistance to visiting U.S. officials and researchers by hosting or setting up meetings, itineraries, and appointments with appropriate persons or groups. Travel arrangements, security, and visit clearances, hotel reservations, and other amenities are all more readily arranged on the ground. Similar assistance is given to foreign researchers in identifying appropriate contacts, and arranging for visits to the U.S. The Office is in a position to respond rapidly to information requests from the U.S., such as one by the ADCSPER for cost, operational, and experience data on the British Army's selection of officer candidates by situational assessment. Other defense officials have used this Office to access needed information about European research, technology, and systems developments (e.g., Tech. Directors LABCOM and MICOM).

Recent examples, frequently duplicated in the past, of the impact of liaison activities include the adoption of MANPRINT by the UK Ministry of Defence/Royal Army, UK defense equipment suppliers, and other national defense organizations, including Switzerland, West Germany, France, Israel, and the Netherlands. The success of the U.S. MANPRINT initiative among our allies will lead to markedly improved defense systems for soldiers, with a likely bonus in standardization. Providing publications and cost-effectiveness data to UK MOD/Army Training 4 (simulation) laid the basis for the training simulation policy promulgated by the MOD, including substantial funds to introduce extensive simulation training facilities into the Royal Army. A probable fallout will be the procurement by the UK of U.S.-manufactured simulation gear. This Office arranged for and participated with DMA-DTIC (MATRIS) in the introduction of, and initial negotiations toward inclusion of, UK MOD research and development project information and data in the U.S. defense research data base. The eventual success of this initiative should bring with it both a vast increase in the pool of behavioral research information and timely opportunities for cooperative international research and development.

Appendix A

Publications

Through the Assistance of ARI European Research Program

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Appendix B

Final Contractor Reports Received

Reports in this list may be obtained through one of the following procedures: Where reports show a DTIC accession number (AD- - -), this number may be used for ordering from the Defense Technical Information Center, Defense Logistics Agency, Cameron Station, Alexandria, VA 22304-6145, phone (202) 274-7633, in the case of personnel and agencies of the U.S. Department of Defense. Other Government agencies and the general public should place their orders with the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161, phone (703) 487-4650. Inquiries concerning the other reports may be sent to the Director, Basic Research, U.S. Army Research Institute, 5001 Eisenhower Avenue, Alexandria, VA 22333-5600.

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Appendix C

Sample of Scientific Presentations Supported

- Bonnet, C. (1980). Fourth European Conference on Visual Perception. Credit Lyonnais Agence U-421.
- Cohen, A.S. (1983). European Conference on Eye Movements. Eidgenossische Technische Hochschule, Zurich.
- Haider, M. (1978). European Seminar on Performance-Time Functions. University of Vienna.
- Hartley, J., Trueman, M. & Pigram, J. (1984). The effects of headings in the form of questions versus headings in the form of statements with low-ability pupils, AERA Annual Convention, New Orleans.
- Heller, F.A. (1982). Toward a research model for the analysis of public decision-making processes. NATO Advances Study Institute, Williamsburg, VA.
- Heller, F.A. (1984). The role of longitudinal method in leadership decision making studies. Seventh Biennial Leadership Symposium. Tavistock Institute of Human Relations.
- Hill, A.R. (1973). Military user performance with orthomaps. Panel on Cartography, Athens.
- Hill, A.R. (1975). Eye movement studies in cartographic communication. International Symposium on Cartographic Communication, London.
- Hill, A.R. (1976). Map user studies. British Cartographic Symposium, Aberdeen.
- Humphreys, P. (1977). Decision Aids: Aiding Decisions. Sixth Research Conference on Subjective Probability, Utility and Decision Making. Warsaw.
- Jesuino, J. Congresso Nacional do Stress, 5-7 Nov 1987 at Universidade de Coimbra: Lideranca E Stress Efeitos de Attenuacao.
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- Moore, B.C.J. & Patterson, R.D. (1986). (Eds). Auditory Frequency Selectivity. NATO ASI Series A: Life Sciences Vol 119. New York: Plenum Press.
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- Pereira, O. & Jesuino, J. 22nd Simposium International de Psicologia Militae Aplicada, 12-16 May 1986, Stress, E Lideranca nas Unidades de Fuzilleiros.
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- Reinberg, A., Bourdeleau, P., Andlauer, P., Levi, F. & Bicakova-Rocher, A. (1985). Internal desynchronization of circadian rhythms and tolerance to shift-work, Seventh International Symposium on Night-and Shift-Work., IGLS, Austria.
- Super, D.E. (1980). Work Importance Study, National Institute for Careers Education and Counselling. Cambridge.
- Sutherland, M.S. (1980). European Conference on Visual Perception. University of Sussex.
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- deWolff, C. (1981). Professional Training and Practice and the Role of Universities in Work Psychology. Catholic University of Nijmegen, Neth.
- Zakay, D. Proceedings of the Eleventh Research Conference on Subjective Probability, Utility and Decision Making, Cambridge, England (SPUDM-11). Presentation title: "Aiding in Overcoming the Base Rate Fallacy." (Date not known).

Appendix D

European Science Coordination Office Chiefs

Dr. Lynn D. Baker, 1973-1974

Dr. Michael Kaplan, 1974-1977

Dr. William H. Helme, 1977-1979

Dr. Arthur J. Drucker, 1979-1981

Dr. Michael Kaplan, 1981-1987

Dr. Milton S. Katz, 1987-

APPENDIX E

Technical Contributions to other Governments

19 December 1990

PERI-BE

MEMORANDUM FOR Dr. Michael Kaplan
FROM Dr. Milton Katz

1. The purpose of this memorandum is to supply instances of this office's contributions on behalf of ARI to the benefit of our ally, the government of the United Kingdom, and to cite examples of technical advice and service given from this location to the UK and other friendly nations and individuals, principally during the past year.

2. CONTRIBUTIONS TO THE UK GOVERNMENT

Training Simulation

- Provided to the UK MOD, Army Training (AT4), crucial data and reports on U.S. training systems experience including SIMNET and MILES, to influence the Ministry's Army Plans and Resources Committee in the preparation of a policy document, "Introduction of Modern Technology into Army Training". The decision paper has been adopted as policy (see letter at enc. 1).

MANPRINT

- Continuation and intensification of efforts initiated by predecessor, Dr. Michael Kaplan, supplied data and information to support top level UK MOD decision to establish a UK MANPRINT Office (Oct. 1989) and select new systems for implementation of MANPRINT (Army Personnel Research Establishment-see letter at enc. 2). Follow-up continues with COL Kinsella-Bevan, Director of MANPRINT Office in implementation of program. Also, have briefed and provided other assistance to LCDR J. Strain who has been designated by the Royal Navy to produce a decision paper for policy with respect to implementing MANPRINT in Royal Navy procurements. Other MOD divisions (e.g., Assist Chief of staff, C31) and leading UK defense contractors have requested and received information and briefings from this office (e.g., British Aerospace, Marconi, GEC, Thorn-EMI). Briefings and other information have been supplied to other allies and friendly nations, including the MODs of the Federal Republic of Germany, Switzerland, France, Israel, the Netherlands, Italy directly and through NATO research Study Groups.

Defense Technical Information Center

- Assisted U.S. Defense Logistics Agency (DTIC) personnel in introducing MOD management and staff to DTIC facilities and first steps toward UK implementation (see letter at enc.3).
- Supplied HOSIV simulation program documentation and discs to Admiralty Research Establishment for use in designing and evaluating systems.

3. EXAMPLES OF TECHNICAL ADVICE AND SERVICE

- Fulfilled request for data on number of personnel in training in the U.S. Army as input for decisions about UK Air Force training policy to RAF Support Command, Brampton.
- Technical advice and assistance on implementation of ARI's Unit Climate Questionnaire in the UK Army to MAJ Duncan Robertson RA.
- Delivered address on US DOD and ARI Manpower, Personnel and Training to biennial meeting of all UK defense psychologists (see enc. 4).
- Advised Dr. P. Walraven, Netherlands National Defense Research Organization, on arrangements for human factors scientist exchanges with the U.S.
- Technical advice and research information to Surgeon Commander R. Jolly, RN, on stress, military unit cohesion and electrophysiological measurement.
- Technical advice to Dr. P. Robotis, Middlesex Hospital, regarding recruiting techniques for personnel to serve under stressful conditions.
- Supplied numerous ARI (and other U.S.) personnel research reports for use by the Royal Air Force to Ministry of Defense, Science 3(Air). Also provided to APRE, TTCP and NATO groups (encs. 5 and 6).
- Dealt with request from J. Anderson, Assoc. Dir., Army Personnel Research Establishment, for arrangement to use obsolete U.S. ASVAB or equivalent personnel classification tests with UK recruits to broaden validation.
- Arranged for presentations by Dr. Earl Alluisi, OUSDRE, to invite participation in U.S. 6.4 MPT program by UK Senior Psychologists (Navy), Senior Psychologist, Science 3 (Air), Army Personnel Research Establishment, and Admiralty Research Establishment.

4. Also, afforded assistance, briefings and contacts for VIPs from the U.S., such as Mr. R. Vitali, Tech. Director, LABCOM, and Mr. W. McCorkle, Tech. Director, Missile Command.