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PSYCHOCHEMICAL PROGRAM (C) Status Report as of 31 December 1955

by

E. Ross Harr



3 May 1956

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Chemical Corps Research and Development Command CHEMICAL WARFARE LABORATCRIES Army Chemical Center, Maryland

Chemical Warfare Laboratories Report No. 2021

Directorate of Medical Research

FSYCHOCHEMICAL PROGRAM (C)
STATUS REPORT AS OF 31 DECEMBER 1955

by

E. Ross Hert

Clinical Research Division

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Colonel, Medical Corps

Colonel, Madical Corps Director of Medical Research

Subprojects No. 4-68-02-018-01 4-08-03-016-05

SEVERYID IN CHILDED

Deputy Commander, Scientific Activities

Typed: 10 April 1956

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Chemical Worfers Laboratories Report No. 2021

PSYCHOCHEMICAL PROGRAM (C) STATUS REPORT AS OF 31 DECEMBER 1955

PORTMARD

- This report summarizes toxicity data on 36 compounds and is one of a series of reports which will ultimately be consolidated and appear as sections of a single report. The ultimate report is expected to contain the following sections:
 - I. Introduction.
 - II. Chemical and Physical Properties of Cospounds Studied.
 - III. Toxicity Evaluation in Animals.

 - Detailed Pheroscologic Systemtion in Animals.
 Reperimental Evaluation in Laboratory Experiments on Homens.
 - VI. Evaluation on America in Military Districtions.

Since this report on animal toxicity is the first of this series to be prepared certain introductory and background material is incorporated here which will be expanded in the Introduction Section of the completed report.

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Chemical Warfare Laboratories Report No. 2021

PSYCHOCHEMICAL FROGRAM (C) STATUS REPORT AS OF 31 DECEMBER 1959

INTRODUCTION

- (C) In recent years major effort in the development of new CW agents has been directed toward more lethal agents. However, in certain military situations major advantage could be gained by the use of agents which produce mental derangement and through this pervert and render ineffective the complex coordinated activities required for military performance. Compounds which would fit this usage are referred to as psychochemical agents. It is considered feasible to use psychochemical agents for military use, and a research program concerned with the investigation and development of compounds for use as psychochemical agents is being carried out in the Chemical Warfare Laboratories under subprojects 4-06-02-018-01 Neurological Action of CW Agents, and 4-08-03-016-05 Psychochemical Agents. Applicable military characteristics for such agents were established and approved by Chemical Corps Technical Committee action (Reference CCTC Item 3060, 30 June 1955).
- (C) The term psychochemical agent has never been adequately defined. An attempt will be made to do so here. Psychochemical agents may be considered to be compounds capable of deranging mental processes by one or more actions on the higher parts of the central nervous system, thereby producing in humans such symptoms as anxiety, irritability, distorted perceptions of time and space, hallucinations, feelings of unreality and dissociation from the immediate environment. This might or might not include loss of consciousness. Such compounds may well have other pharmacologic actions, such as effects upon the autonomic nervous system, but this would be of secondary importance. On the basis of present knowledge it would appear likely that such compounds would produce their effects upon the central nervous system in amounts very much lower than those required for lethal effects.
- (C) A survey of the multitude of drugs included within the category of potential psychochemical agents has lead to concentrated study of three types: 1) mescaline and related compounds because of their frank, full-blown, and characteristic hallucinatory effects; 2) lysergic soid diethylamide (LSD 25) and related compounds because of their extreme potency in producing anxiety, hallucinations, and psychoses with an unusually wide margin between doses producing mental effects and lethal doses; and 3) the active ingredients of marijuana and related tetrahydrocannabinol derivatives because of the novel type of long lasting central nervous system depression seen with relatively small doses of a few of these compounds.
- (C) The complete attainment of various objectives in this program requires that the investigation of psychochemical agents be paralleled by investigation of compounds potentially useful in prevention or treatment

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of the effects. Potential prophylactic and therapeutic compounds appear to categorize themselves into three groups: 1) sedatives, such as the barbiturates; 2) tranquilizers, such as chlorpromazine and reserpine; and 3) specific antidotes, one example of which may be azacyclonol (Frenquel).

- (U) Pharmacologic evaluation in animals and in man will form the subjects of subsequent reports.
- (C) A total of 45 compounds have to date been delivered to Clinical Research Division of these laboratories for study. These may be divided into 34 mescaline derivatives, two indoles, one aniline derivative, and 8 tetrahydrocannabinols. The mescaline group is most usefully subdivided according to the number and location of methoxy groups on the benzene ring. (One group of 8 has a methylene-dioxy linkage rather than two methoxy groups.) The individual members of these various groups differ in number and arrangement of carbon atoms in the alkyl chain between the benzene ring and the amino group.
- (C) A formidable difficulty in the screening of suggested compounds has been the obvious necessity for testing in man at the earliest possible stage of investigation. To insure reasonable safety and to comply with legal requirements, toxicity is determined in 5 different species of experimental animals before trials are instituted in Plat. It is this toxicity study, reported in the form of LD50 and confidence limits (calculated according to the method of Litchfield and Wilcoxon), which forms the bulk of this report.

Toxicity Studies

Of the total group of 45 compounds, 22 have been investigated for (C) toxicity to the extent of determining LD50 in at least 5 species of animal. For 6 of these 22, work is incomplete. In 3 cases the supply of compound has been exhausted; in 3 others work is still in progress. An additional 14 compounds have been investigated for toxicity to the extent of determination of LD50 by intraperitoneal injection in mice. Part of this work was done under contract numbers DA18-108-CML-3968 and CML-5663 with the University of Michigan; the principal investigator being Dr. M. H. Seevers. An additional portion of the work was done in Field Toxicology Branch of these laboratories, and a further portion by personnel of Neurology Branch, these laboratories. All of these data together with the identifying numbers of the compounds and their structural formulae have been compiled in Table I. The reference note given at the extreme right of the table indicates the laboratory in which the work was done and the report where details may be found.

Comment on Toxicity Data

(S) These tabulated data which represent 120 determinations of LD50 on 36 different compounds in one or more of 7 species of animals represent a total utilization of more than 5,000 animals. It must be understood that no compound is accepted or rejected for further study on the basis of

toxicity determination. When sufficient information has been obtained to permit the calculation of the ratio of dose effective in producing disturbances to lethal dose then it will be the value of this ratio which will permit selection of compounds for further study, not the absolute magnitude of the dosages involved.

- (U) Careful perusal of the table indicates that there is no single species which is consistently more sensitive or less sensitive. For economic reasons the accuracy of the LD50 determination in monkeys and in dogs is somewhat less than in smaller and less expensive animals. Examples could be cited where all species show approximately the same sensitivity to a compound and other examples could be cited where the lethal dose in one species in as much as 10 times the comparable dose for another species even though the route of administration is the same.
- (C) It is unfortunately true that there is not yet enough work on a sufficient number of related compounds to permit any conclusions as to the relationship of chemical structure to toxicity.

Symptoms Produced by Various Compounds.

- (C) The following compounds have been investigated only by intraperitoneal injections in mice and no symptometology has been reported; 1290, 1291, 1302, 1303, 1305, 1312, 1313, 1314, 1320, 1321, 1323, 1324, 1325, and 1538.
- (C) In addition, compound 1315 is presently under investigation. This investigation has not progressed to the point where statements can be made.
- (S) For the other compounds there exist in reports from the University of Michigan or from Field Toxicology Branch, these laboratories, or Neurology Branch, these laboratories, details of the symptoms developed in animals being used for toxicity determinations. Except for the tetrahydrocannabinol derivatives, almost all of these compounds produce convalsions before death. In many cases hypersensitivity to stimuli, hyperactivity, tremors, or ataxia are reported in addition. The three tetrahydrocannabinol derivatives which have thus far been studied (1477, 1476, and 1465) all produced a depressant type respons. Compound 1476 is conspicuous for its long duration of action.
- (S) Behavior suggestive of ballucinations has been reported in dogs given 1304, 1505, and possibly, 1537. In cass this phenomenon has been observed following 1316, 1322 and 1539. In monkeys, this is reported after 1505. Difficulty in vision is reported in monkeys after 1475. This latter is inferred from the animal bumping into obstacles as he moves from place to place.

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-Commander, Air Force Armament Center, Eglin Air Force Base, Plorida ATTM: ACXB -Commander, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio, ATTM: WCRDF-6 -Commander, Air Technical Intelligence Center, Wright-Patterson Air Force Base, Ohio, ATTM: ATISD-1b -Readquarters, Air Materiel Command, Wright-Patterson Air Force Base, Chio, Dayton, Chio, ATTM: MCWB -Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Chio, ATTM: MCWB -Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Chio, ATTM: MCWB -Commander, Headquarters, Air Research & Development Command, P. O. Box 1395, Baltimore 3, Md., ATTM: Directorate of Human Factors, HUTHM -Commandant, USAF School of Aviation Medicine, Randolph Air Force Base, Randolph Field, Texas, ATTM: Research Secretarist -The Surgeon, Headquarters, Tactical Air Command, Langley Air Force Base, Virginia -Director, Project Big Ben, University of Pennsylvania, Philadelphia 4, Pa. -Commanding General, Quartermaster Research and Development Center, Natick, Mass., ATTM: Technical Library -Director, Air University Library, ATTM: AUL-6243, Maxwell Air Force Base, Alabama -Commanding Officer, Army Environmental Health Laboratory, Bidg. 1235, Army Chemical Center, Maryland -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland -Operations Research Group, Building No. 363, Army Chemical Center, Maryland -Oumar Liaison Office, Building No. 363, Army Chemical Center, Maryland -Oumar Chemical Center, Maryland -Commanding No. 330, Army Chemical Center, Ma. Arr Force Development Field Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	48	-Lt Colonel Leonard C. Miller, Representative for Cml C, US Army
Force Base, Ohio, ATTM: WCRE-6 -Commander, Air Technical Intelligence Center, Wright-Patterson Air Force Base, Ohio, ATTM: ATISD-1b -Readquarters, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, Dayton, Ohio, ATTM: MCWB -Readquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, ATTM: MCWB -Readquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, ATTM: MCWB -Commander, Headquarters, Air Research & Development Command, P. O. Box 1395, Baltimore 3, Md., ATTM: Directorate of Human Factors, HDTRH -Commandant, USAF School of Aviation Medicine, Randolph Air Force Base, Randolph Field, Texas, ATTM: Research Secretariat -The Surgeon, Readquarters, Tactical Air Command, Langley Air Force Base, Virginia -Director, Project Big Ben, University of Pennsylvania, Philadelphis 4, Pa. -Commanding General, Quartermaster Research and Development Center, Natick, Mass., ATTM: Technical Library -Director, Air University Library, ATTM: AUL-6243, Maxwell Air Force Base, Alabama -Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland -Operations Research Group, Building No. 483, Army Chemical Center, Maryland -Operations Research Group, Building No. 483, Army Chemical Center, Maryland -ONNARC Liaison Office, Building No. 330, Army Chemical Center, Maryland -ONNARC Liaison Office, Building No. 330, Army Chemical Center, Maryland -ONNARC Liaison Office, Building No. 330, Army Chemical Center, Maryland -Camadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland -Camadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	49	-Commander, Air Force Armament Center, Eglin Air Force Base, Florida
Force Base, Ohio, ATTM: ATISD-1b -Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, Dayton, Ohio, ATTM: MCWB -Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, ATTM: MCDD -Commander, Headquarters, Air Research & Development Command, P. O. Box 1795, Baltimore 3, Md., ATTM: Directorate of Human Factors, RDTRH -Commandant, USAF School of Aviation Medicine, Randolph Air Force Base, Randolph Field, Texas, ATTM: Research Secretarist -The Surgeon, Headquarters, Tactical Air Command, Langley Air Force Base, Virginia -Director, Project Big Ben, University of Pennsylvania, Philadelphis 4, Pa. -Commanding General, Quartermaster Research and Development Center, Natick, Mass., ATTM: Technical Library -Director, Air University Library, ATTM: AUL-6243, Maxwell Air Force Base, Alabama -Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTM: Technical Library -Commanding Officer, Raval Unit, Bldg. 51, Army Chemical Center, MdPresident, Chemical Corps Board, Bldg. k83, Army Chemical Center, Maryland -Operations Research Group, Building No. 483, Army Chemical Center, Maryland -CONARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -Conmanding Army Technical Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	50	-Commander, Wright Air Development Center, Wright-Petterson Air Force Base, Ohio, ATTN: WCRDF-6
Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, ATTN: MCD Commander, Headquarters, Air Research & Development Command, P. O. Box 1395, Baltimore 3, Md., ATTN: Directorate of Human Factors, HDTRH Commandant, USAF School of Aviation Medicine, Randolph Air Force Base, Randolph Field, Texas, ATTN: Research Secretariat The Surgeon, Headquarters, Tactical Air Command, Langley Air Force Base, Virginia Director, Project Big Ben, University of Pennsylvania, Fhiladelphis 4, Pa. Commanding General, Quartermaster Research and Development Center, Natick, Mass., ATTN: Technical Library Director, Air University Library, ATTN: AUL-6243, Maxwell Air Force Base, Alabama Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTN: Technical Library Commanding Officer, Naval Unit, Bldg. 51, Army Chemical Center, Md. President, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland Operations Research Group, Building No. 463, Army Chemical Center, Maryland CONARC Liaison Office, Building No. 330, Army Chemical Center, Maryland Conmanding Army Technical Representative, Building No. 330, Army Chemical Center, Maryland Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	51	-Commander, Air Technical Intelligence Center, Wright-Patterson Air Force Base, Ohio, ATTN: ATISD-1b
-Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, ATTM: MCD -Commander, Headquarters, Air Research & Development Command, P. O. Box 1395, Baltimore 3, Md., ATTM: Directorate of Human Factors, HDTRH -Commandant, USAF School of Aviation Medicine, Randolph Air Force Base, Randolph Field, Texas, ATTM: Research Secretariat -The Surgeon, Readquarters, Tactical Air Command, Langley Air Force Base, Virginia -Director, Project Big Ben, University of Pennsylvania, Philadelphis 4, PaCommanding General, Quartermaster Research and Development Center, Natick, Mass., ATTM: Technical Library -Director, Air University Library, ATTM: AUL-6243, Maxwell Air Force Base, Alabama -Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTM: Technical Library -Commanding Officer, Naval Unit, Bldg. 51, Army Chemical Center, MdPresident, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland -Operations Research Group, Building No. 483, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland -ConARC Lisison Office, Building No. 330, Army Chemical Center, Maryland	52	-Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, Dayton, Ohio, ATTN: MCWB
-Commander, Headquarters, Air Research & Development Command, P. O. Box 1395, Baltimore 3, Md., ATTN: Directorate of Human Factors, RIVIRM -Commandant, USAF School of Aviation Medicine, Randolph Air Force Base, Randolph Field, Texas, ATTN: Research Secretariat -The Surgeon, Readquarters, Tactical Air Command, Langley Air Force Base, Virginia -Director, Project Big Ben, University of Pennsylvania, Philadelphis 4, Pa. -Commanding General, Quartermaster Research and Development Center, Natick, Mass., ATTN: Technical Library -Director, Air University Library, ATTN: AUL-6243, Maxwell Air Force Base, Alabama -Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTN: Technical Library -Commanding Officer, Naval Unit, Bldg. 51, Army Chemical Center, Md. President, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland -Operations Research Group, Building No. 483, Army Chemical Center, Maryland -Confact Liaison Office, Building No. 330, Army Chemical Center, MdArr Force Development Field Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	53	-Headquarters, Air Materiel Command, Wright-Patterson Air Force
Base, Randolph Field, Texas, ATTN: Research Secretariat The Surgeon, Readquarters, Tactical Air Command, Langley Air Force Base, Virginia Director, Project Big Ben, University of Pennsylvania, Philadelphis 4, Pa. Commanding General, Quartermaster Research and Development Center, Natick, Mass., ATTN: Technical Library Director, Air University Library, ATTN: AUL-6243, Maxwell Air Force Base, Alabama Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTN: Technical Library Commanding Officer, Naval Unit, Bldg. 51, Army Chemical Center, Md. President, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland Operations Research Group, Building No. 483, Army Chemical Center, Maryland COMARC Liaison Office, Building No. 330, Army Chemical Center, Mary Chemical Center, Maryland Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	54	-Commander, Headquarters, Air Research & Development Command, P. O. Box 1395, Baltimore 3, Md., ATTN: Directorate of Human Factors,
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-Director, Project Big Ben, University of Pennsylvania, Philadelphis 4, Pa. -Commanding General, Quartermaster Research and Development Center, Natick, Mass., ATTN: Technical Library -Director, Air University Library, ATTN: AUL-6243, Maxwell Air Force Base, Alabama -Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTN: Technical Library -Commanding Officer, Naval Unit, Bldg. 51, Army Chemical Center, Md. -President, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland -Operations Research Group, Building No. 483, Army Chemical Center, Maryland -CONARC Lisison Office, Building No. 330, Army Chemical Center, Md. -Air Force Development Field Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	56	-The Surgeon, Readquarters, Tactical Air Command, Langley Air Force
-Commanding General, Quartermaster Research and Development Center, Natick, Mass., ATTN: Technical Library -Director, Air University Library, ATTN: AUL-6243, Maxwell Air Force Base, Alabama -Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTN: Technical Library -Commanding Officer, Naval Unit, Bldg. 51, Army Chemical Center, MdPresident, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland -Operations Research Group, Building No. 483, Army Chemical Center, Maryland -CONARC Lisison Office, Building No. 330, Army Chemical Center, Mary Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	57	-Director, Project Big Ben, University of Pennsylvania, Philadelphia
Force Base, Alabama -Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTM: Technical Library -Commanding Officer, Maryland, ATTM: Technical Library -Commanding Officer, Naval Unit, Bldg. 51, Army Chemical Center, Md. -President, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland -Operations Research Group, Building No. 463, Army Chemical Center, Maryland -CONARC Liaison Office, Building No. 330, Army Chemical Center, Md. -Air Force Development Field Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	58-60	-Commanding General, Quartermaster Research and Development Center,
-Commanding Officer, Army Environmental Health Laboratory, Bldg. 1235, Army Chemical Center, Maryland 63-66 -Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army Chemical Center, Maryland, ATTM: Technical Library 67 -Commanding Officer, Naval Unit, Bldg. 51, Army Chemical Center, Md. 68 -President, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland 69 -Operations Research Group, Building No. 463, Army Chemical Center, Maryland 70 -CONARC Lisison Office, Building No. 330, Army Chemical Center, Md. 71 -Arr Force Development Field Representative, Building No. 330, Army Chemical Center, Maryland 72-77 -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland 72-77 -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	61	-Director, Air University Library, ATTM: AUL-6243, Maxwell Air
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-Commanding Officer, Naval Unit, Ridg. 51, Army Chemical Center, MdPresident, Chemical Corps Board, Bldg. 463, Army Chemical Center, Maryland -Operations Research Group, Building No. 463, Army Chemical Center, Maryland -CONARC Lisison Office, Building No. 330, Army Chemical Center, MdArr Force Development Field Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	63-66	-Commanding Officer, Chemical Warfare Laboratories, Bldg. 330, Army
-President, Chemical Corps Board, Bldg. 463 Army Chemical Center, Maryland -Operations Research Group, Building No. 463, Army Chemical Center, Maryland -CONARC Liaison Office, Building No. 330, Army Chemical Center, MdAir Force Development Field Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland -Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland	67	
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		-Canadian Army Technical Representative, Building No. 330, Army Chemical Center, Maryland

78-83 -British Liaison Officer, Building No. 330, Army Chemical Center Maryland

-Dr. V. Sim, Chief, Clinical Research Division, (THRU: Medical Library, Reports Section, Bldg. 355, Army Chemical Center, Md.)

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