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Description of document: Defense Intelligence Agency report, Biological Warfare Capabilities-NATO Countries and France, February 1972

Requested date: 23-October-2008

Released date: 10-June-2013

Posted date: 12-August-2013

Source of document: Commander
US Army Intelligence & Security Command Freedom of Information/Privacy Office
ATTN: IAMG-C-FOI
4552 Pike Road
Fort George G. Meade, MD 20755-5995
Fax: (301) 677-2956
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DEPARTMENT OF THE ARMY
UNITED STATES ARMY INTELLIGENCE AND SECURITY COMMAND
FREEDOM OF INFORMATION/PRIVACY OFFICE
FORT GEORGE G. MEADE, MARYLAND 20755-5995

REPLY TO
ATTENTION OF:

Freedom of Information/
Privacy Office

10 JUN 2013

This is in further response to your Freedom of Information Act (FOIA) request of October 23, 2008, and supplements our electronic message of May 12, 2010.

Coordination has been completed with another element of our command and other government agencies and records returned to this office for our review and direct response to you. We have reviewed the records and determined the records are partially releaseable to you. A copy of the records are enclosed for your use.

We have completed a mandatory declassification review in accordance with Executive Order (EO) 13526. As a result of our review information has been sanitized and 4 pages have been withheld in their entirety as the information is currently and properly classified TOP SECRET, SECRET and CONFIDENTIAL according to Sections 1.2(a)(1), 1.2(a)(2), 1.2(a)(3) and 1.4(c) of EO 13526. This information is exempt from the public disclosure provisions of the FOIA pursuant to Title 5 U.S. Code 552 (b)(1). It is not possible to reasonably segregate meaningful portions of the withheld pages for release. The records are enclosed for your use. A brief explanation of the applicable sections follows:

Section 1.2(a)(1) of EO 13526, provides that information shall be classified TOP SECRET if its unauthorized disclosure reasonably could be expected to cause exceptionally grave damage to the national security.

Section 1.2(a)(2) of EO 13526, provides that information shall be classified SECRET if its unauthorized disclosure reasonably could be expected to cause serious damage to the national security.

Section 1.2(a)(3) of EO 13526, provides that information shall be classified CONFIDENTIAL if its unauthorized disclosure reasonably could be expected to cause serious damage to the national security.

Section 1.4(c) of EO 13526, provides that information pertaining to intelligence activities, intelligence sources or methods, and cryptologic information shall be considered for classification protection.

In addition, information has been sanitized from the records and 4 pages have been withheld in their entirety as the release of the information would reveal sensitive intelligence methods. This information is exempt from public disclosure pursuant to Title 5 U.S. Code 552 (b)(7)(E) of the FOIA. The significant and legitimate governmental purpose to be served by withholding is that a viable and effective intelligence investigative capability is dependent upon protection of sensitive investigative methodologies. It is not possible to reasonably segregate meaningful portions of the withheld pages for release.

The withholding of the information described above is a partial denial of your request. This denial is made on behalf of Major General Stephen G. Fogarty, the Commanding General, U.S. Army Intelligence and Security Command, who is the Initial Denial Authority for Army intelligence investigative and security records under the FOIA. You have the right to appeal this decision to the Secretary of the Army. Your appeal must be postmarked no later than 60 calendar days from the date of this letter. After the 60-day period, the case may be considered closed; however, such closure does not preclude you from filing litigation in the courts. You should state the basis of your disagreement with the response and provide justification for a reconsideration of the denial. An appeal may not serve as a request for additional or new information. An appeal may only address information denied in this response. Your appeal is to be made to this office, for forwarding, as appropriate to the Secretary of the Army, Office of the General Counsel.

Coordination has been completed and we have been informed by the Central Intelligence Agency (CIA) that information is exempt from public disclosure pursuant to Title 5 U.S. Code 552 (b)(1) and (b)(3) of the FOIA.

The withholding of the information by the CIA constitutes a denial of your request and you have the right to appeal this decision to the Agency Release Panel within 45 days from the date of this letter. If you decide to file an appeal, it should be forwarded to this office and we will coordinate with the CIA on your behalf. Please cite CIA #F-2010-01292/Army #57F-09 assigned to your request so that it may be easily identified.

Coordination has been completed and we have been informed by the Defense Intelligence Agency (DIA) that their information is exempt from public disclosure pursuant to Title 5 U.S. Code § 552 (b)(1), (b)(2) (b)(3) and (b)(4) of the Freedom of Information Act and Executive Order (EO) 13,526 § 1.4 (c) (d) and (h). The statute invoked under Title 5 U.S. Code 552 (b)(3) is 10 U.S.C. §424, which allows for the protection of organizational and personnel information for DIA.

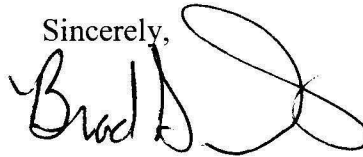
The withholding of the information by the DIA constitutes a partial denial of your request and you have the right to appeal this decision directly to the DIA. If you decide to file an appeal, it should be forwarded to the Director, Defense Intelligence Agency, ATTN: DAN-1A-FOIA, Washington, DC 20340-5100. Please cite MDR #0155-2010 assigned to your request so that it may be easily identified.

You have received all Army intelligence investigative records pertaining to this request.

There are no assessable FOIA fees.

If you have any questions regarding this action, feel free to contact this office at 1-866-548-5651, or email the INSCOM FOIA office at: INSCOM_FOIA_ServiceCenter@mi.army.mil and refer to case #57F-09.

Sincerely,

A handwritten signature in black ink, appearing to read "Brad S. Dorris". The signature is stylized with a large, looping flourish at the end.

Brad S. Dorris
Director
Freedom of Information/Privacy Office
Investigative Records Repository

Enclosure

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DEFENSE INTELLIGENCE AGENCY

BIOLOGICAL WARFARE CAPABILITIES

NATO COUNTRIES AND FRANCE (U)

PREPARED BY
US ARMY
ARMY MATERIEL COMMAND
FOREIGN SCIENCE AND TECHNOLOGY CENTER
NO FOREIGN DISSEM

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EFRW

December 1972

ST-CS-03-139A-72

Publication No.
ST-CS-03-139-72
Amendment A

US ARMY MATERIEL COMMAND
FOREIGN SCIENCE AND TECHNOLOGY CENTER
Charlottesville, Va. 22901

EE2021479

BIOLOGICAL WARFARE CAPABILITIES—NATO COUNTRIES AND FRANCE (U)

Publication No. ST-CS-03-139-72, February 1972, is amended as follows:

1. Make the following pen and ink changes:

Front cover, title page, and DD 1473: Delete "CAPABILITY" and substitute "CAPABILITIES".

Page iii, second paragraph, line 2: Delete "Tripartite" and substitute "Quadrupartite".
Line 3: After "the United Kingdom" add ", Australia,".

Page iv, third paragraph, line 1: Delete "September 1971" and substitute "1 May 1972". At end of paragraph add: "All pages changed are dated December 1972. Pages not changed have been reviewed and are considered to contain information, assessments, and conclusions that are valid as of December 1972."

Page 1, paragraph 1.a.: Add "Belgium is also a signatory of the 1972 BW Disarmament Convention."

Page 23, paragraph 1.b., line 1: Delete "in" and substitute "Amager Boulevard 80".
Paragraph 1.b.(2), line 1: Add "WHO" before "International" and delete "WHO" after "Standards". Paragraph 1.b.(3), line 1: Delete "The" and substitute "WHO". Delete "WHO" after "Center".

NATIONAL SECURITY INFORMATION
Unauthorized disclosure subject
to criminal sanctions

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Exempt from General Declassification
Schedule of Executive Order 11652
Exemption Category: 1, 2, 4
Declassify on: NA

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SI-CS-03-139A-72
December 1972

- ✓ Page 25, paragraph 4.a.: Add "Denmark is a signatory of the 1972 BW Disarmament Convention."
- ✓ Page 44, paragraph 12.b., line 1: Delete "Rhone" and substitute "Lyon".
- ✓ Page 51, paragraph 18.a., line 5: Delete "Sizer" and substitute "Analyzer".
- ✓ Page 53, paragraph 20.a., line 1: Delete "Major (Medecin Commandant)" and substitute "Medecin Commandant LTC (then Major)". Line 6: Delete "Major".
- ✓ Page 54, paragraph 20.d., line 5: Delete "Dr." and substitute "LTC".
- ✓ Page 60, paragraph 4: Add "Greece is a signatory of the 1972 BW Disarmament Convention."
- ✓ Page 69, paragraph 5: Add "Italy is a signatory of the 1972 BW Disarmament Convention."
- ✓ Page 69, paragraph 6, line 3: Delete "during 1971." and substitute "beginning in 1971 to replace the standard M-54 mask."
- ✓ Page 75, paragraph (2)(b), line 6: Delete "WHO" and substitute "UN". Delete "Agricultural" and substitute "Agriculture".
- ✓ Page 82, paragraph 4.a.: Delete "." and add "since Luxembourg is a signatory of the 1972 BW Disarmament Convention."
- ✓ Page 85, paragraph 1.a.(1), line 7: After "1925" add "and the BW Disarmament Convention of 1972,".
- ✓ Page 88, paragraph (2), line 3: Delete "Ermelo" and substitute "Wczep".
- ✓ Page 97, figure 15, line 5: Delete "(Adm) C. Groenewegen" and substitute "Dr. Ir: A. Rorsch".
- ✓ Page 99, paragraph 8.c.(4)(d), line 2: Delete "globegii" and substitute "globigii".
- ✓ Page 107, paragraph 5.b., line 6: Delete "no" and substitute "few".
- ✓ Page 114, paragraph 4: Add "Portugal is a signatory of the 1972 BW Disarmament Convention."

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December 1972

- ✓ Page 121, paragraph 4: Add "c. (U) Turkey is a signatory of the 1972 BW Disarmament Convention."
- ✓ Page 125, paragraph 3.a.: Add "Great Britain is also a signatory of the 1972 BW Disarmament Convention."
- ✓ Page 126, paragraph 4., title: Add "-NFD" to classification. Paragraph 4.a., title: Add "-NFD" to classification.
- ✓ Page 139, paragraph 1.a.: Add "In 1972 West Germany signed the BW Disarmament Convention."
- ✓ Page 142, paragraph 3.a.(1), line 2: Delete "Armament" and substitute "Military Technology".
- ✓ Page 144, paragraph f., classification: Delete "(C)" and substitute "(C-NFD)".
- Page 161, paragraph 19: Change "19" to "20".
- ✓ Page 168, paragraph 20: Change "20" to "21".

2. Remove old pages and insert new or revised pages as indicated below:

Remove	Insert
v thru xviii	o.i and o.ii
3 thru 12	iv.1 thru iv.3 (Reverse Blank)
15 and 16	v thru xviii
21 and 22	3 thru 12
25 and 26	15 thru 16.2
29 and 30	21 thru 22.2
33 and 34	25 and 26
45 and 46	29 thru 30.2
57 and 58	33 and 34
61 thru 63 (Reverse Blank)	45 thru 46.1 (Reverse Blank)
71 and 72	57 thru 58.2
79 and 80	61 thru 63 (Reverse Blank)
83 and 84	71 and 72
89 and 90	79 thru 80.2
95 and 96	83 and 84
	89 thru 90.2
	95 and 96

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Remove	Insert
101 thru 108	101 thru 108
111 and 112	111 and 112
117 and 118	117 and 118
121 thru 124	121 thru 124
127 thru 138	127 thru 138.4
147 and 148	147 and 148
155 and 156	155 and 156
159 and 160	159 thru 160.1 (Reverse Blank)
169 thru 176	169 thru 176.8
	178.1 and 178.2
	181 and 182

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ERRATUM

Page xix (Reverse Blank), an unclassified map entitled "European Members of NATO and France," is in printing and will be transmitted for insertion in this study in the near future.

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ADDENDUM

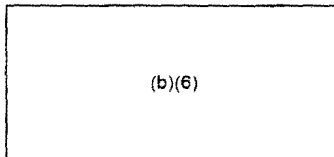
Attached page xix, a map entitled European Members of NATO and France, is provided for insertion in publication ST-CS-03-139-72, which was distributed in May 1972.

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BIOLOGICAL WARFARE CAPABILITIES-NATO COUNTRIES AND FRANCE (U)



ST-CS-03-139-72

DIA Task No. Y70-03-13

February 1972

WARNING

This document contains information affecting the National Defense of the United States within the meaning of the Espionage Laws (18 USC 793, 794); the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

This is a Department of Defense Intelligence Product prepared by the Foreign Science and Technology Center of the US Army Materiel Command, with contributions from the Department of the Navy Scientific and Technical Intelligence Center, and the Defense Intelligence Agency.

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December 1972

RELEASE COMMENTS

This DIA produced document, ST-CS-03-139-72, *Biological Warfare Capabilities--NATO Countries and France (U)*, dated February 1972, including Amendment A, dated December 1972, has been predetermined by the Defense Intelligence Agency to be NOT RELEASABLE.

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PREFACE

(U) This report will present a comprehensive evaluation of the capabilities of France and each member of the North Atlantic Treaty Organization (NATO), exclusive of the United States, to conduct biological operations and to defend themselves if attacked with biological weapons. Included is information on Order of Battle for biological warfare; identifications and descriptions of NATO materiel characterized for either offensive or defensive use in the event of biological warfare; commentary concerning production facilities and capabilities; evaluations when possible of stockpiles and storage capabilities; characterizations of doctrine and procedures governing the use of biological weapons; and descriptions of research, development, and testing programs in various member nations.

(U) Diverse information exchange agreements exist between the various NATO members. There are ~~Quadrupartite~~ ^{Australia} agreements between the United States, the United Kingdom, and Canada; Mutual Weapons Defense Development Exchange Agreements are in force between the United States and many of the Western European countries; and similar exchange agreements exist between the FINABEL nations (France, West Germany, The Netherlands, Italy, and Belgium). These liaisons, and indeed the nature of the NATO alliance itself, have mitigated the necessity for such a study in the past. However, recent changes in the national policy of the United States, curtailing biological warfare programs, emphasize the need to remain abreast of pertinent research and development activities in Western European countries which are technologically advanced. Moreover in the face of ever-shrinking dollars expended on research and development programs within the United States Department of Defense, such studies may illuminate scientific and technical advancements which can be incorporated into more limited programs now in progress in this country.

(U) The data base and analyst experience which must be committed in support of this effort are not available within any single office in the intelligence community. Accordingly, inputs for this report have been solicited from various groups. The US Army Foreign Science and Technology Center is responsible for basic coverage by area and subject matter. The US Navy Scientific and Technical Intelligence Center was tasked to develop sections of this study dealing with the naval offensive and defensive biological warfare capabilities of the NATO countries. The Foreign Technology Division, US Air Force, was queried for inputs covering aerospace offensive and defensive applications. And, finally appropriate elements of the Defense Intelligence Agency were responsible for information concerning Order of Battle, training, doctrine, policy, production, and stockpiles.

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(U) As the prime producer of this study, the Foreign Science and Technology Center was charged with the final collation, preparation, and editing of copy material.

(U) Constructive criticisms, comments, and suggestions for changes are solicited. Critical evaluations from readers of this report will provide direct guidance so that future updatings of this study will result in a product which is most responsive to the varied needs of the user.

(U) Although the cutoff date for information in this document is 1 May 72 major updatings have been made up to the date of final approval for printing.

(U) This study is being disseminated devoid of bibliographic material to facilitate wider distribution. A compiled bibliography has been published separately and can be made available to authorized recipients upon written request to Defense Intelligence Agency, ATTN: DT-1A, Washington, D. C. 20301. Individuals making such requests are cautioned that the addition of the bibliography to (or its association with) the study makes mandatory a more restricted distribution of the study. When the bibliography is attached the study must carry the additional caveats NO DISSEMINATION ABROAD and CONTROLLED DISSEMINATION.

(U) Comments, questions, and requests for additional information concerning this study may be addressed to the Defense Intelligence Agency, Washington, D. C. 20301, ATTN: DT-1A.

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CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	SIGNATURE, RANK/RATE AND ORGANIZATION OF INDIVIDUAL ENTERING CHANGE

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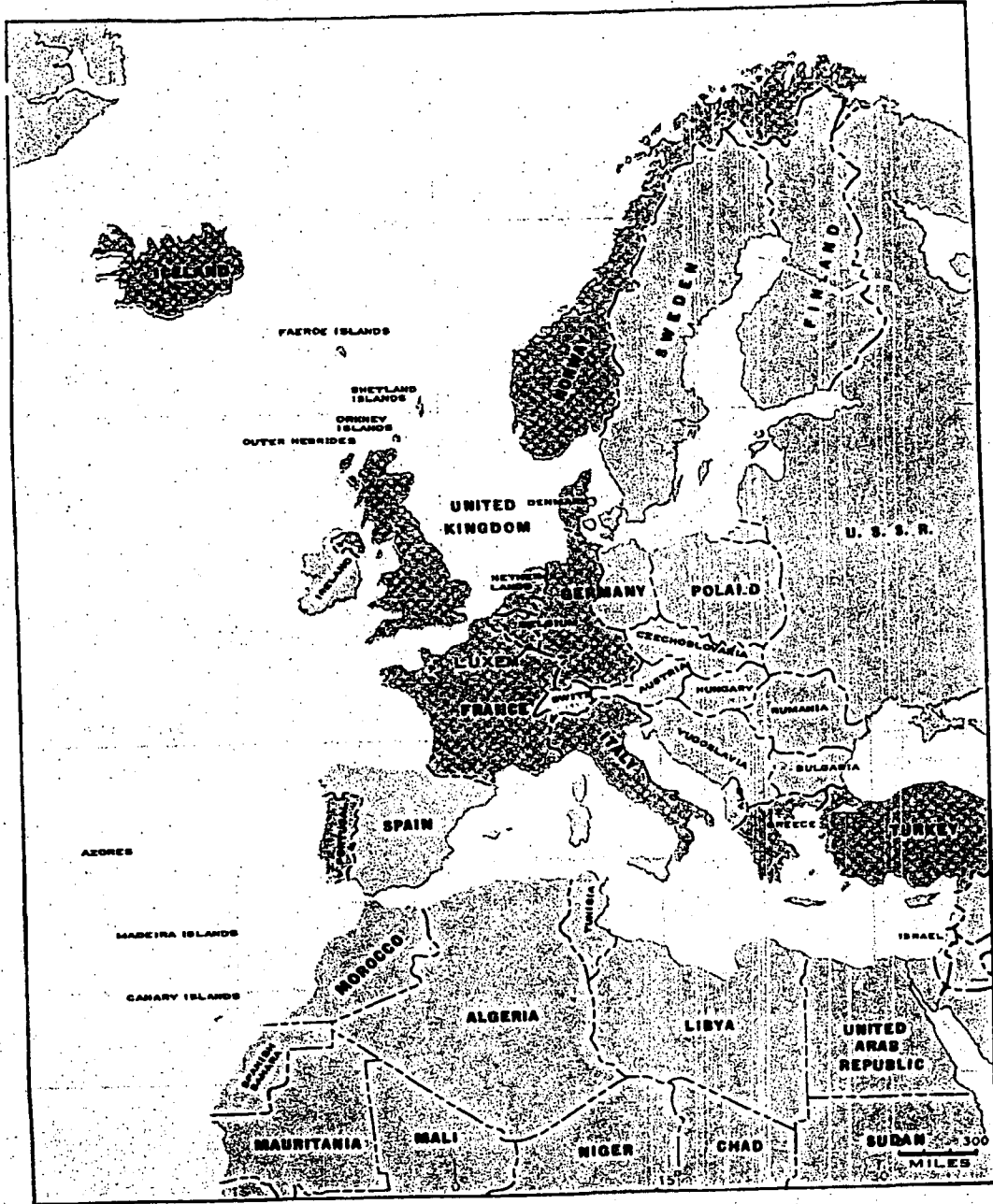
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EUROPEAN MEMBERS OF NATO AND FRANCE

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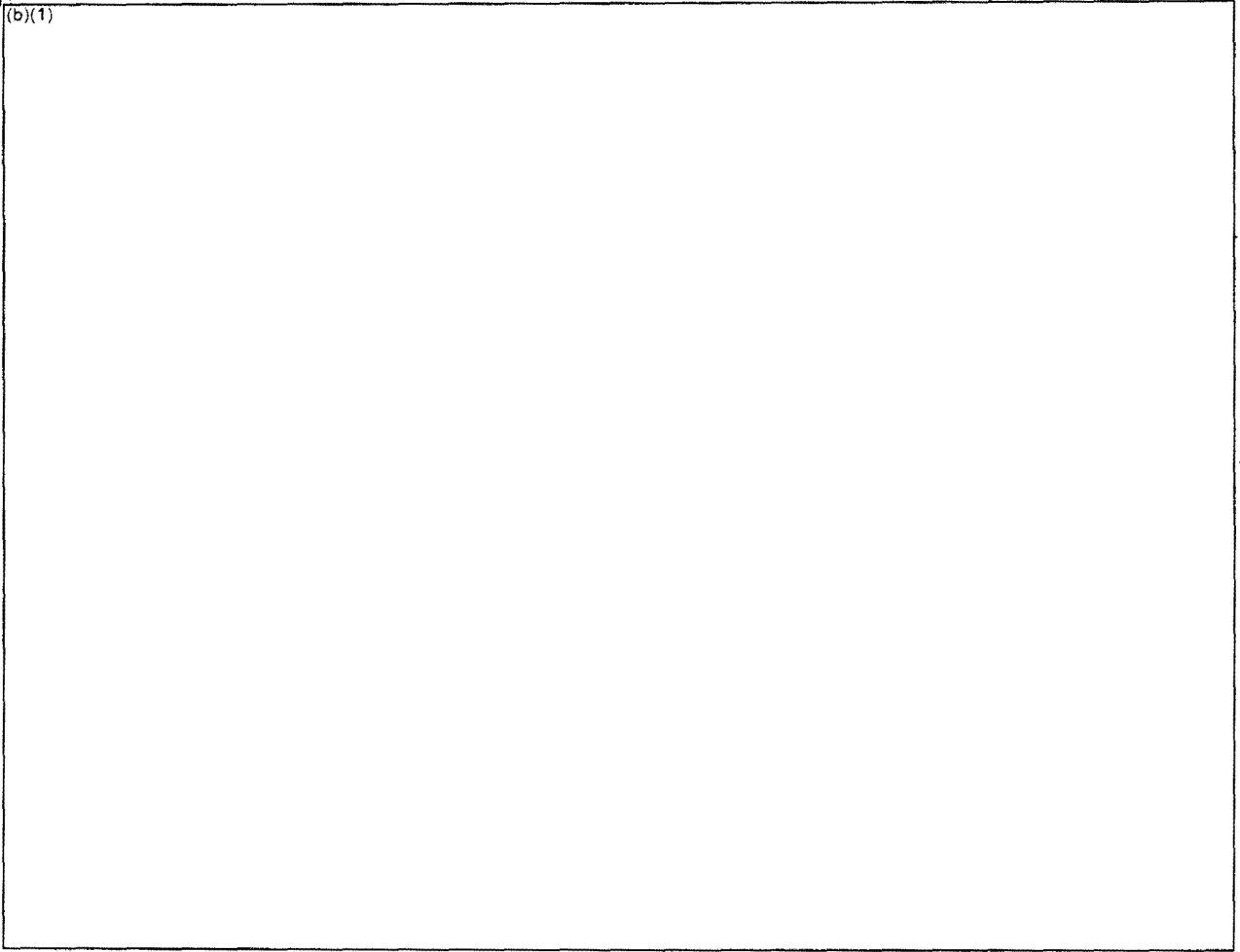
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SUMMARY

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Section I.

BELGIUM

A. INTRODUCTION

e 1. ~~(S)~~ Historical Background

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2. ~~(S)~~ Competence in Microbiology and Public Health

a.

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b. (U) Biomedical research is comparatively high in quality, but is limited by a shortage of funds and personnel. Substantial contributions have been made in physiology, biochemistry, microbiology and pharmacology. Only limited medical research has been conducted at military installations. An effective veterinary research program has made the country essentially free of major epizootics (animal epidemics). Belgian investigators have studied foot-and-mouth disease, African swine fever, brucellosis, anthrax, rabies, hemorrhagic fever, and Aujeszky's disease. All of the organisms causing these diseases could be of interest to a biological warfare program.

c. ~~(S)~~ (b)(1)
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3. (U) ~~(S)~~ Geographical and Political Factors

a. ~~(S)~~ (b)(1)
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b. (U) The Belgian nation has existed as a political entity only since 1830. Unlike the Netherlands and Denmark, a national culture does not exist but two cultures dominate: one follows the strong cultural tradition of France, and the other seeks some cultural parity with the Dutch, Germans, and British. Within each sector, there are sharp ethnic divisions which affect stability in scientific affairs as well as politics. Nominally, Belgium is a monarchy, but the Council of Ministers headed by the Prime Minister actually conducts government affairs. The Prime Minister and his associates are appointed by the King from nominees submitted by the parties in parliament. The Ministerial Committee on Science Policy, with the Prime Minister presiding, defines and coordinates scientific activities.

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B. ORDER OF BATTLE

4. ~~(S)~~ Military Personnel and Organizations

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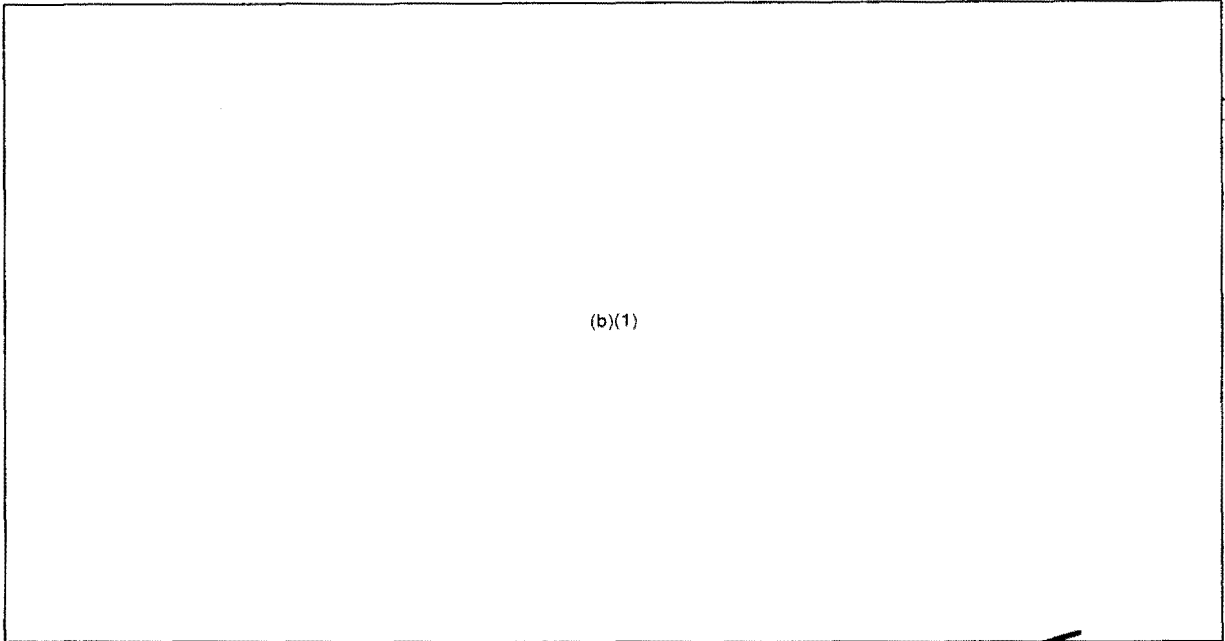
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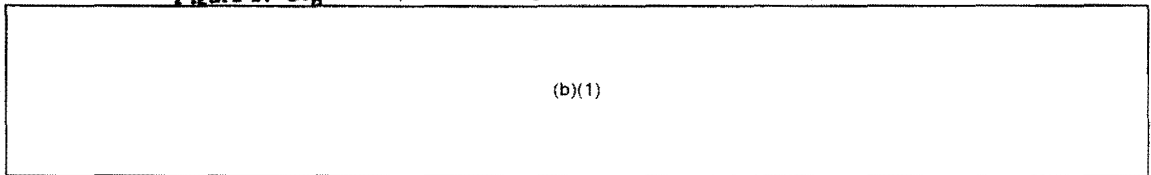
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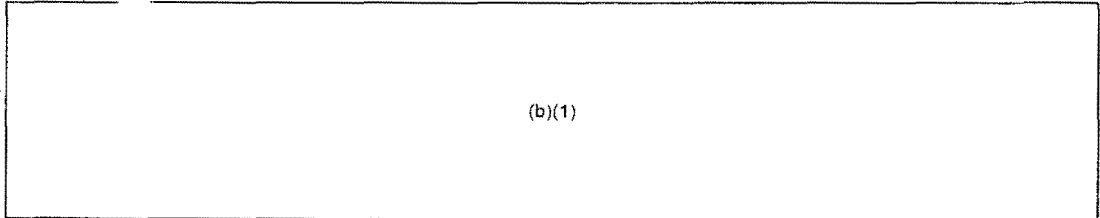
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Figure 1. Organization of the Belgian Ministry of National Defense (U).



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5. ~~(S)~~ CBR Training

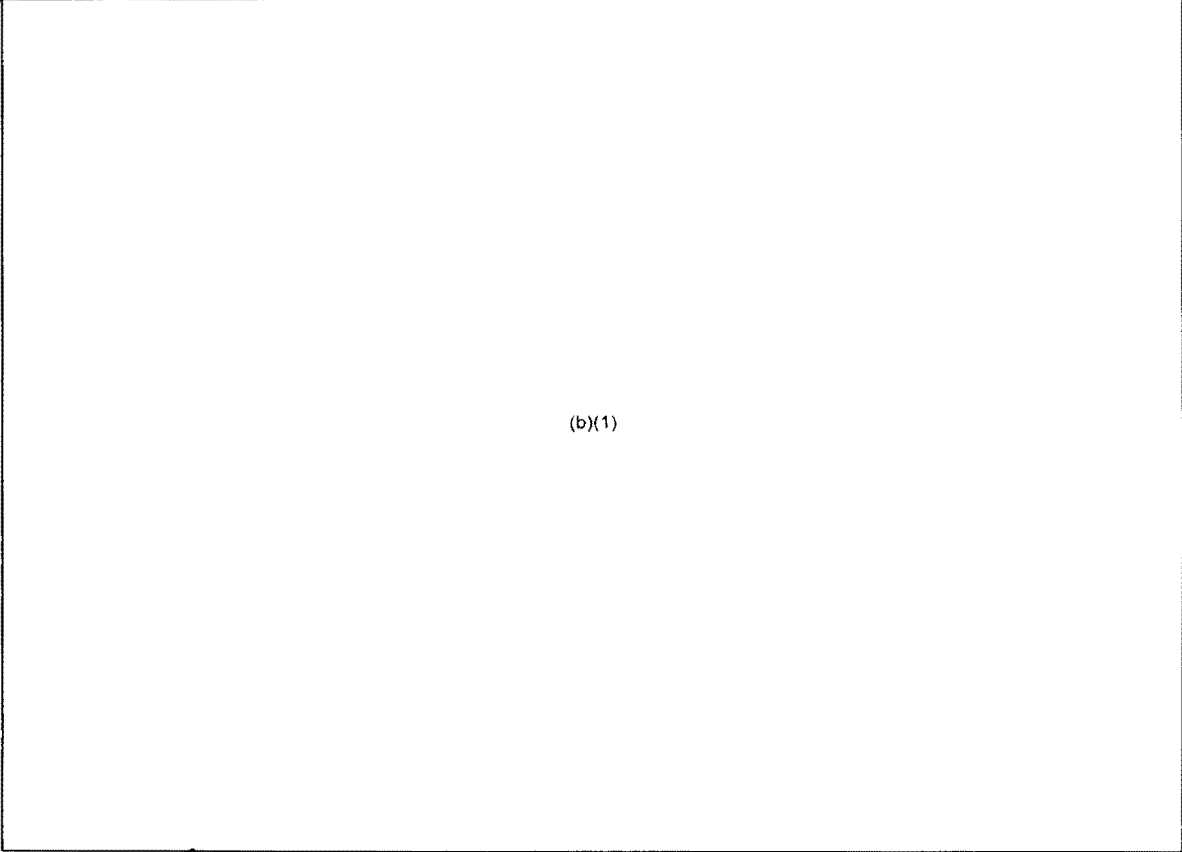


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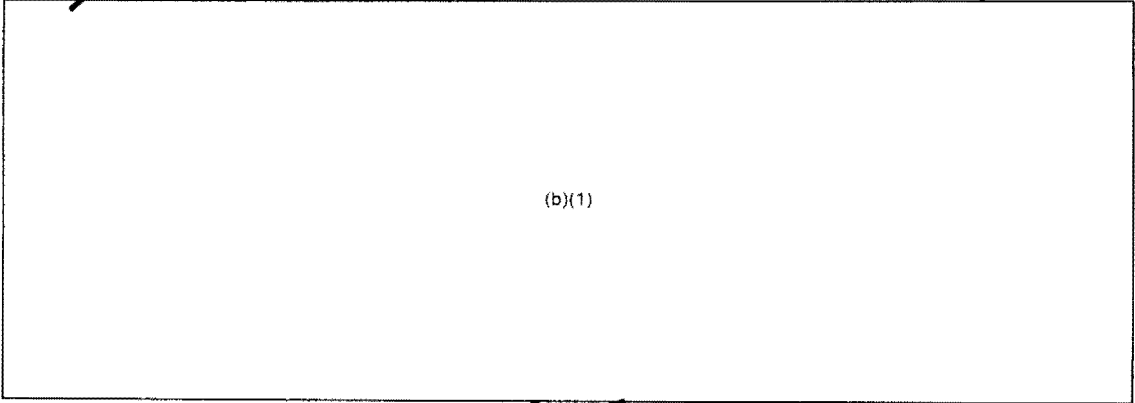
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6. ~~(C)~~ Civil Defense



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[Redacted] (b)(1)

7. ~~(S)~~ Military Equipment *c* [Redacted] (b)(1)
[Redacted] (b)(1)

C. DOCTRINE AND PROCEDURES

e 8. ~~(S)~~ Offensive [Redacted] (b)(1)

9. ~~(S)~~ Defensive *e* [Redacted] (b)(1)
[Redacted] (b)(1)

D. BW MATERIEL, PRODUCTION, AND STOCKPILING

10. ~~(S)~~ Materiel *e* [Redacted] (b)(1)
[Redacted] (b)(1)

11. ~~(S)~~ Agent Production *c* [Redacted] (b)(1)
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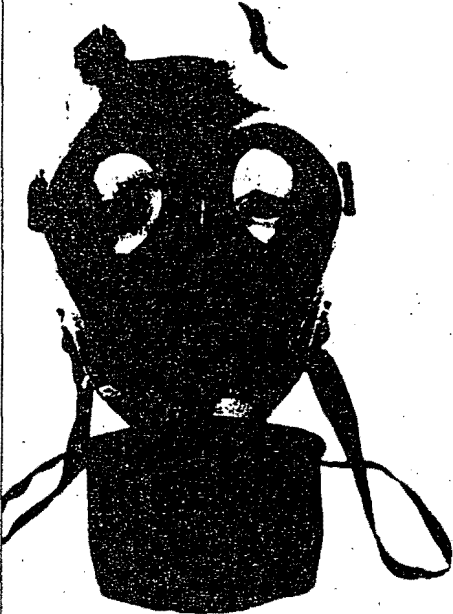
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12. ~~(S/NFD)~~ stockpiles and Storage Facilities

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Figure 2. Belgian Model M-51
protective mask (U).

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Table 1. Major Belgian Pharmaceutical
Production Companies (U)

Company	Location	Products
Parke-Davis	Bornem	Biologicals
Abbott Laboratories	Brussels	Antibiotics
Belge-Canadienne Continental Pharma	Brussels	Biologicals
Belgo-Pharma	Brussels	Biologicals, Antibiotics
Christiaens, A.	Brussels	Biologicals
Ciba	Brussels	Biologicals
Coutelier, Freres	Brussels	Biologicals, Antibiotics
Roche Products	Brussels	Biologicals
Sidsa	Brussels	Biologicals
U.C.B.	Forest	Biologicals
Therapeutic Research and Industry-R.I.T.	Genval	Biologicals, Antibiotics
Pfizer Corporation	Jette	Biologicals, Antibiotics
Coutelier Brothers Bio-Products	Schaerbech	Biologicals
Louis Sanders	Saint Gilles	Biologicals
Tuypens Laboratories	Saint Niklaas	Biologicals, Antibiotics

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~~(S,NFD)~~

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E. RESEARCH, DEVELOPMENT, AND TESTING

13. ~~(S)~~ Military Facilities

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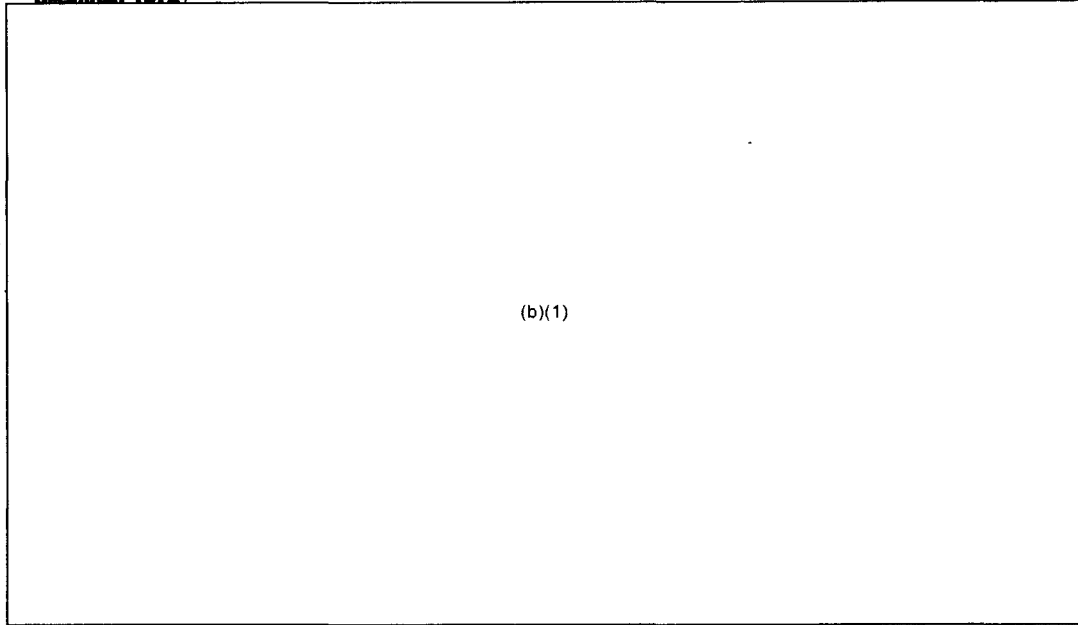
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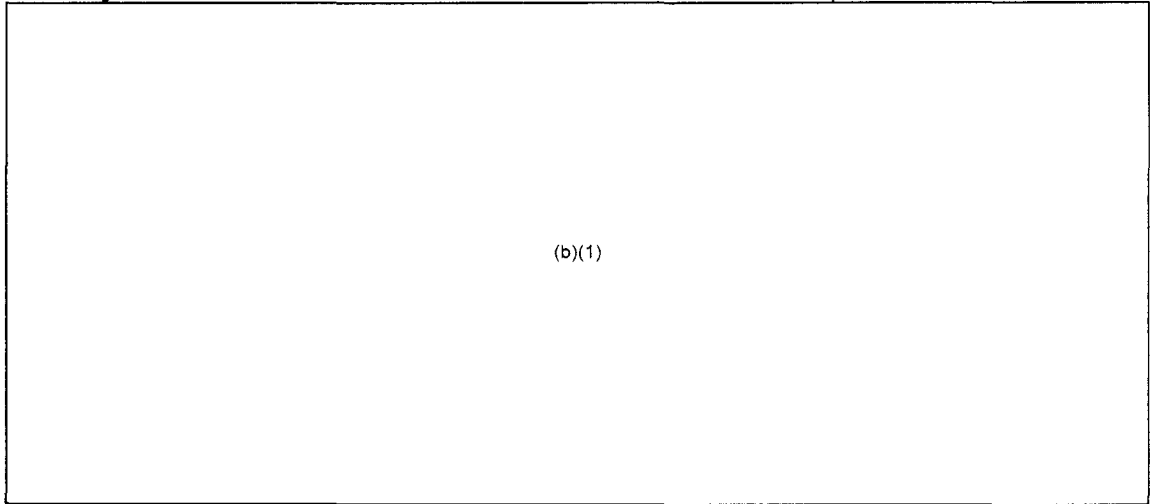
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e



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14. ~~(C)~~ Civilian Institutes and Facilities



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e c. Other Facilities.

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F. CONCLUSIONS

15. ~~(C)~~ Policy and Procedures

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16. Capability

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G. TRENDS AND FORECASTS

17. Trends

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18. Forecasts

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Section II.

CANADA

A. INTRODUCTION

1. (U) Historical Background and Competence in Microbiology and Public Health

a. The North American territory now known as Canada was partially colonized by the French and the English in the 16th and 17th centuries. Ownership of these colonies, primarily located in the St. Lawrence Valley, changed several times as a result of successive wars between the two nations. The territory was finally ceded to England under the terms of the 1763 Treaty of Paris. Expansion of Canada to its present size was the result of exploration and the movement of populations from east to west. The Dominion of Canada came into being July 1, 1867 when the colonies were united in a federation; it is now the largest self-governing country in the Commonwealth of Nations. Until the beginning of the twentieth century, Canada was largely a pioneer country, and research was related to the primary industries. World War II drove industrial development forward at a rapid pace. Today Canada plays an increasing role in international affairs. She cooperates closely with the US in the defense of North America, sends forces to NATO's Atlantic and European sectors, and plays an active role in Commonwealth and United Nations affairs. In 1969 a planned and phased reduction in Canada's NATO forces in Central Europe was announced which was to be completed in 1973. This would cut Canada's military contribution by more than half and eliminate nuclear strike weapons. Increased emphasis is to be given to the defense of sovereignty, to internal security, and to national development.¹⁻³

b. Canada does not have a long history of basic research in the sciences. In 1916 the government set up the National Research Council as a government agency to promote research. The council immediately began to encourage and to stimulate research in the universities which had until then fostered little activity of this sort. A few years later the Council established its own laboratory system, and during World War II, it took on the responsibility of research for the armed services. After the war, the Defense Research Board (DRB) was established and given the responsibility for military research.² Many Canadian universities offer graduate studies in microbiology, and the research programs are of high quality. The pharmaceutical industry, both domestically and foreign-owned, has developmental research programs for vaccines and antibiotics. There are enough microbiologists in Canada to support a national professional society, the Canadian Society of Microbiologists, and a large number of Canadian microbiologists are members of US

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professional societies. Ten Canadian Journals of Research, including the Canadian Journal of Microbiology, are published under the guidance of a standing committee of the National Research Council.

c. Public health is primarily the responsibility of the provincial governments. The federal government has jurisdiction over health matters of a national character and provides financial assistance to provincial health services. The Department of National Health and Welfare controls food and drugs, quarantine and immigration medical services, and provides health services to Indians and Eskimos. Most provincial governments operate public health laboratories which are responsible for the prevention, diagnosis, and treatment of communicable diseases; for providing public health nursing; and for child and maternal health programs. Municipalities provide sanitation and some of the larger cities have an active program in other aspects of the public health within the provinces. All levels of government are aided and supported by a network of voluntary agencies working in different health fields.^{1 2}

2. (U) Geographical and Political Factors

a. Canada covers an area of almost 4,000,000 square miles and is the second largest country in the World. Ninety percent of the population is located along the southern border in about one-fifth of the total area. Most of the arable land, as well as the major cities and industrial centers, is located here.¹

b. Canada is a federation of 10 provinces and administers two territories. The Constitution reserves certain rights to the provincial governments, the remainder being vested in the Federal Government at Ottawa. The Federal Government of Canada is patterned on the British parliamentary system, and the ultimate administrative authority is the Cabinet which is selected by the Prime Minister. Queen Elizabeth II, Queen of Canada, is Head of State and is represented at Ottawa by a Governor General. Parliament consists of the Queen, the Senate, and the House of Commons. Senators are appointed on a regional basis, and members of Parliament are elected by universal suffrage.^{2 4}

c. Canada takes an active part in exchange of defense science information with her allies through bi-, tri-, and quadripartite agreements, in addition to participation on various NATO committees. Bipartite agreements exist separately with the Netherlands, the Federal Republic of Germany, Norway, France, and Greece. Cooperation with the Netherlands is limited entirely to research on chemical and biological warfare.^{3 6} Tripartite agreements have been negotiated between Canada, the United Kingdom, and the United States, while

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the quadripartite agreements include the above three plus Australia. Information and assistance on biological warfare research is a portion of agenda topics.

B. ASSESSMENT

3. ~~(S)~~ Order of Battle

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d. ~~(S)~~ CBR Training Schools.

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c. (U) Civil Defense. Civil Defense planning is integrated with the overall plan for national defense, with the aim of survival in event of direct attack. Canadian civil defense is organized at all levels of government. The federal government is responsible for planning, policy, and financial assistance; provincial governments, for organization and implementation; the municipal governments, for execution of plans and policy. Training has been carried out at all levels.¹

4. (U) Doctrine

Canada has ratified the BW Disarmament Convention and is a signatory of the 1925 Protocol. Canada has no BW weapons systems. Organization, training, and equipment for BW is directed completely toward defense. Canada does monitor CBR capabilities of other countries. Its CBR program is integrated with that of the United States, UK, and Australia.

5. ~~(S)~~ BW Materiel

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6. ~~(S-NED)~~ Production Facilities and Capabilities

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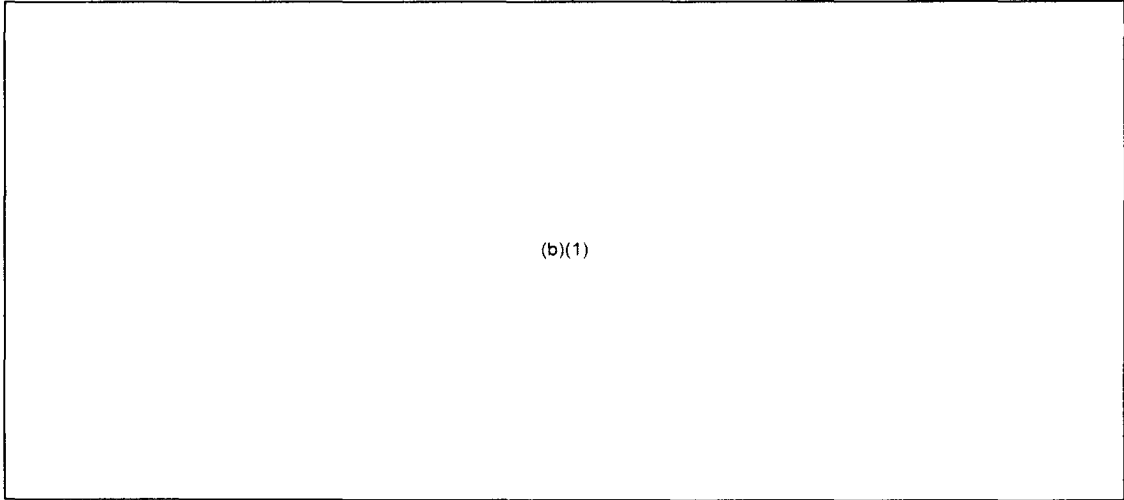
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Figure 3. Canadian MK2 protective mask (U).

7. ~~(S-N/D)~~ Stockpiling and Storage Facilities

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Item	Quantity
Protective Mask, M8 (Headwound)	20
Protective Mask, Cdn No. 2, Mk2	63,000
Protective Mask, M14 (C1A1)	1,200
Protective Coveralls	14,680
Protective Hood	13,130
Protective Gloves	28,000



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Figure 4. Canadian CBR protective clothing (U).

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~~B.~~ ~~Research and Development~~

a. ~~Administration and Areas of Interest~~

(1) (U) Biological warfare research and development is administered by the Defence Research Board (DRB), an agency in the Department of National Defence, and is concerned only with defensive aspects. In addition to an in-house research effort, grants are made to universities to work on unclassified problems, and aid in the form of matching grants is given to industry to encourage defense-related research. In 1970, six grants totaling \$39,900 were made to universities for research on defense against biological agents.³

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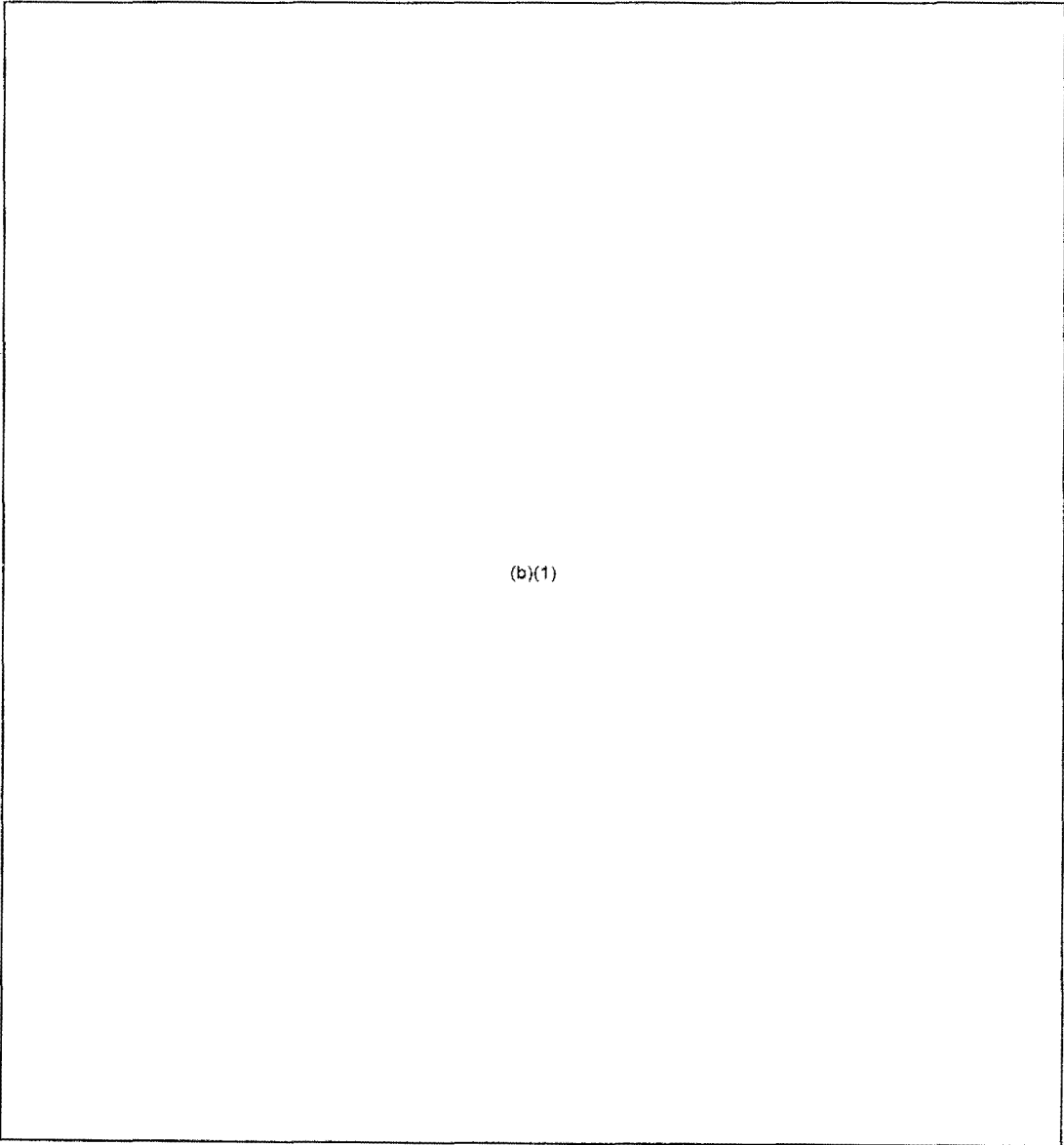
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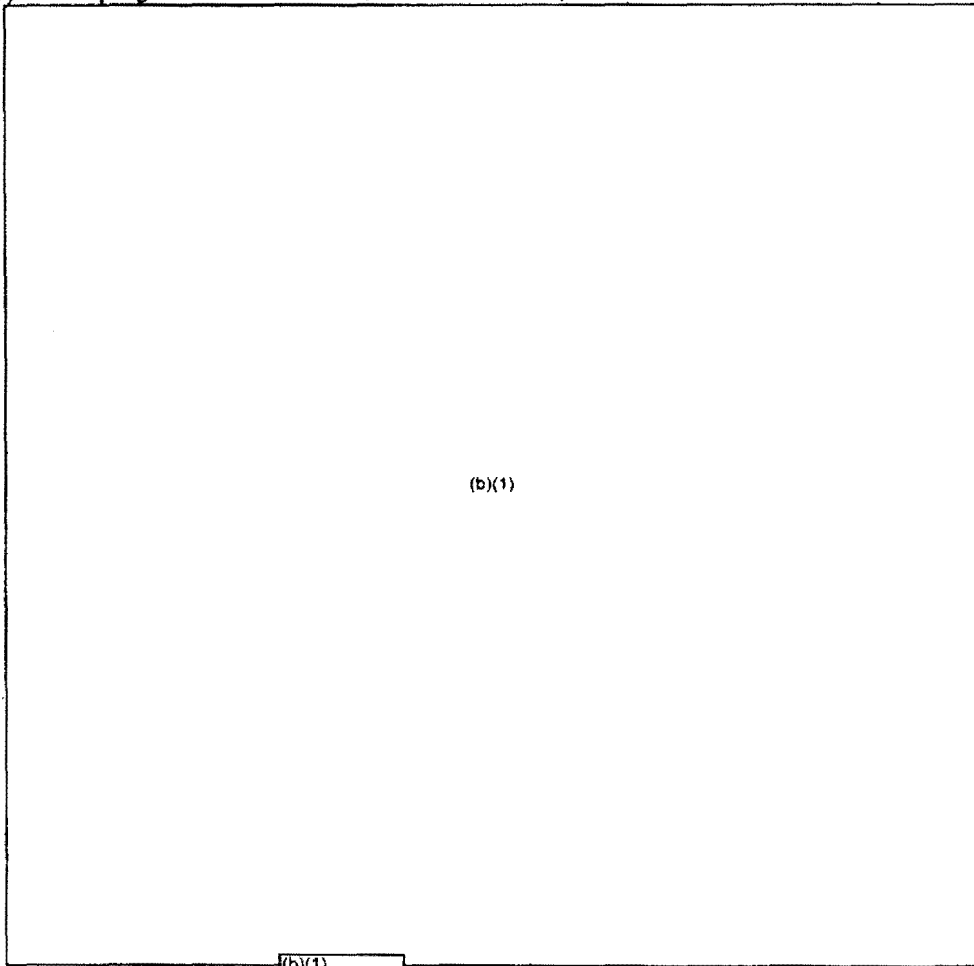
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(2) (U) A biological warfare field sampling training kit was developed in the mid-sixties. The kit contains components with which one man can secure surface, air, solid, and water samples in the field and transport them to a laboratory.³⁵ No information was available as to whether this kit is still used for training purposes, or whether a different type of sampling device is being used by the Canadians in the field.



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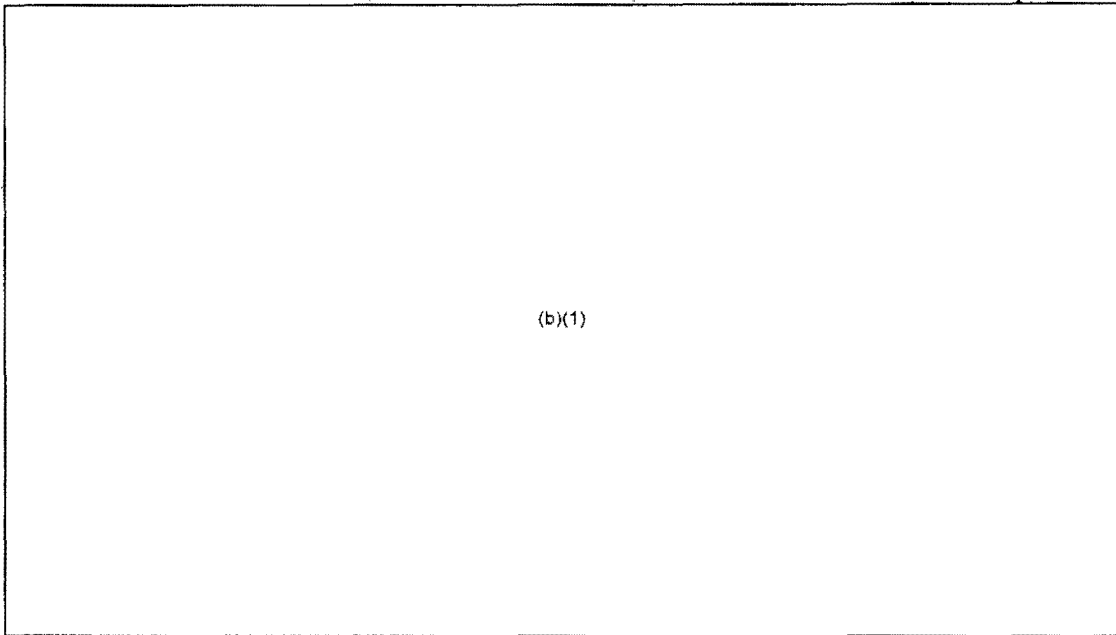
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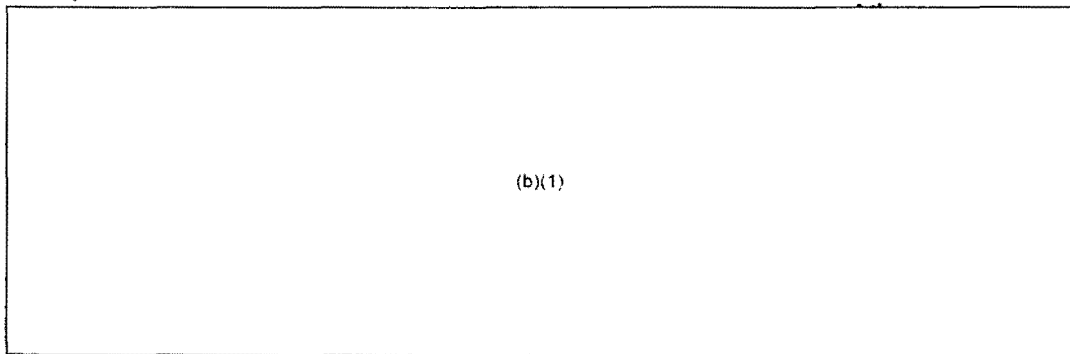
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9. ~~(C)~~ Naval Aspects of BW



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10. ~~(S)~~ Conclusions



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C. TRENDS AND FORECASTS

(S) ~~11. Trends~~

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Section III.

DENMARK

A. INTRODUCTION

1. ~~(S)~~ Historical Background and Competence in Microbiology and Public Health

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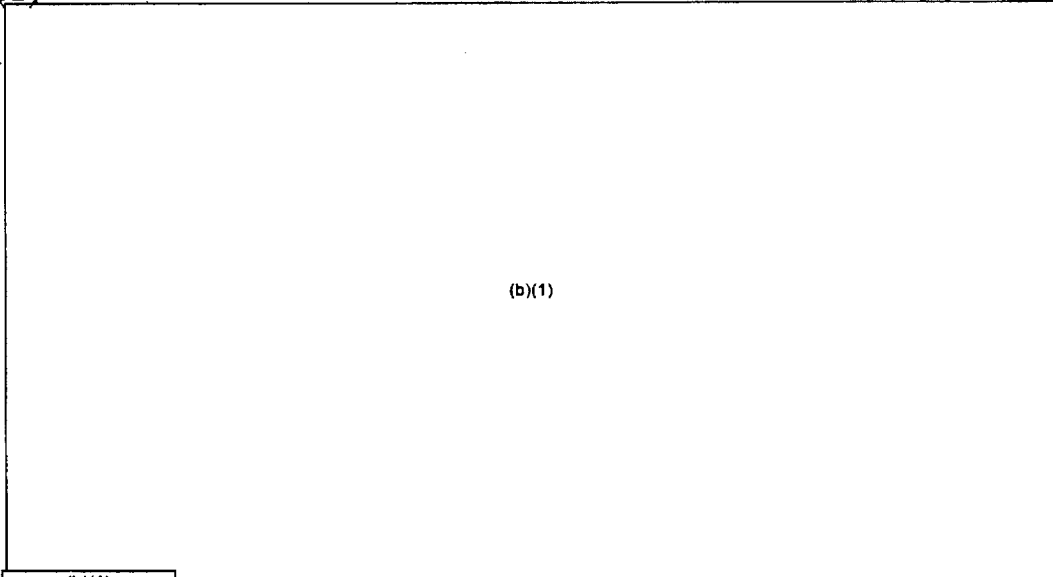
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2. (U) Geographical and Political Factors

a. Denmark is situated on the access route from the Baltic Sea to the Atlantic Ocean. Military forces stationed there could control movement through the three narrow straits of the Danish Archipelago. Its territory includes the Jutland Peninsula which borders on the Federal Republic of Germany, the large islands of Sjaelland and Fyn plus a number of smaller islands nearby, and the island of Bornholm 88 miles distant in the Baltic.⁴

b. Denmark is a constitutional monarchy with a multiparty system headed by a prime minister, and is politically stable. Social concerns as well as defense are emphasized in national spending. As with security, it looks to regional and international organizations to bolster its economic well being.⁴

B. ASSESSMENT

3. ~~(C/NFD)~~ Order of Battle

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b. (U) In the wartime structure of the Royal Danish Army, each brigade will have one engineer company among its component units. In every unit of battalion size, up to 20 men are appointed and trained as atomic, biological, and chemical (ABC) specialists to aid in forming survey and decontamination teams. Approximately 70 hours of training are required for these specialists. There are no BW troops in the Danish Army; however, any ABC mission would, in all probability, be carried out by the engineer company.⁸

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d. (U) The joint ABC school was established in 1953 and comes under the jurisdiction of the Inspector General of the Corps of Engineers. Training at the Defense ABC school is provided for personnel from all branches of the Danish armed forces. There are nine different courses offered, ranging in duration from 3 days to 6 months; these are mainly for officers and NCO's. Enlisted men receive a few hours of ABC training during their basic training. The school is currently located at Copenhagen but is expected to be moved near Farum and colocated with the Sjælland Engineer Regiment. Personnel are sent to other NATO countries to attend ABC courses, and school instructors attend other NATO-country schools so that they can maintain and up-date, as required, the content and standards of their course.⁸

e. (U) Personnel of the Civil Defense Organization receive the same training in BW defense as do the military. In addition special civil defense courses are offered as needed.⁸

4. ~~(C/NFD)~~ Doctrine and Procedures.

~~(C/NFD)~~

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b. (U) Defense. Although the use of BW agents is rejected by Danish forces, emphasis is placed on maintaining a defensive capability. Civil defense and military protective measures against a BW attack are no different than those employed in peacetime for epidemics. The Danes would be unlikely to object to the use of biological weapons by NATO forces defending Danish soil against an enemy employing such weapons.

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5. ~~(C/NFD)~~ BW Material

a. (U) No development or stockpiling of BW weapons has been reported.



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Figure 6.
M-56 protective suit (U).

b. ~~(C/NFD)~~

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Figure 7. Danish M-49/53 protective mask (U).

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Table II. Major Danish Pharmaceutical Production Companies (U)

Company	Location	Products
Leo Pharmaceutical Products Trading Ltd.	Copenhagen	Antibiotics
Novo Industri	Copenhagen	Antibiotics
Ferrosan	Copenhagen	Antibiotics
Dumex	Copenhagen	Antibiotics
Pharmacia	Copenhagen	Biologicals
Gea	Copenhagen	Biologicals
Alfred Benzon	Copenhagen	Biologicals
H. Lundbeck	Copenhagen	Biologicals

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7. ~~(C-NPD)~~ Stockpiling and Storage Facilities

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(c) Table III. Known Stockpiled Materiel, Denmark (U)

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8. ~~(C-MFD)~~ Research and Development

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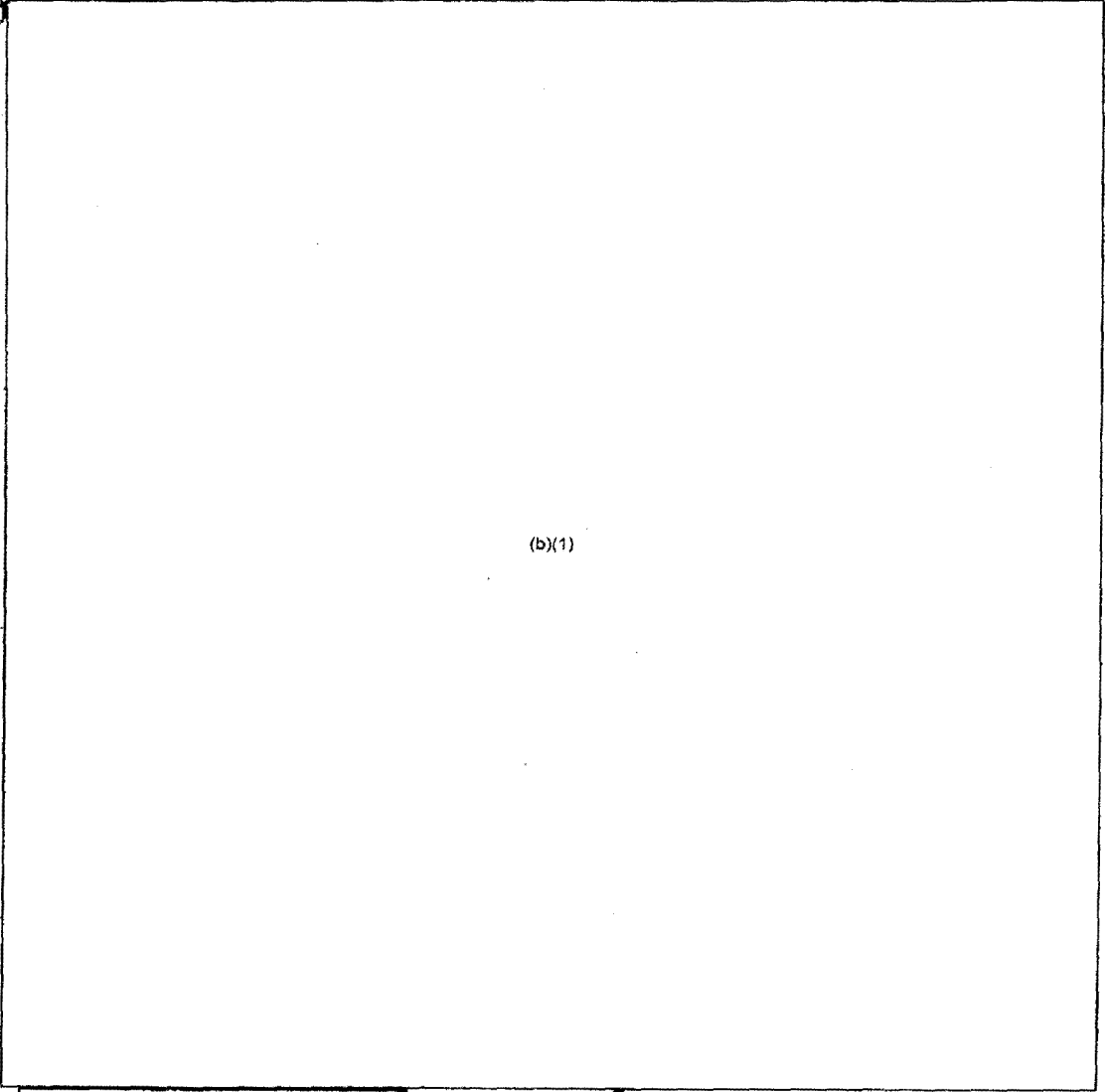
b. (U) The National Veterinary Institute for Virus Research is located on the island of Lindholm (0° 21'E-55° 02'N), and its primary task is production and distribution within Denmark of vaccines and sera to combat Foot and Mouth Disease (FMD). Dr. Michelson, the Director of the laboratory, stated that fairly extensive precautions are taken to prevent the escape of this infectious agent. The personnel change into laboratory clothing for work, and shower when they leave contaminated areas.²⁶ This is the only laboratory in Denmark where personnel are known to work with a highly infectious agent and where physical facilities are available for the safe handling of microorganisms in large quantity.

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C. TRENDS AND FORECASTS

11. ~~(C)~~ Trends

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Section IV,

FRANCE

A. INTRODUCTION

~~(S)~~ Historical Background

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2. ~~(S)~~ ^U Competence in Microbiology and Public Health

a. (U) France has a long tradition of excellence in scientific research, with some research institutes dating back as far as the Renaissance. Public organizations also exist which can be traced back to the sixteenth century. Louis Pasteur, recognized as the "Father of Microbiology," is noted for his work between 1857 and 1885 on fermentation and pasteurization of wine, beer, and dairy products and on the prevention of anthrax and rabies. France's competency in microbiology is exemplified by the internationally renowned Pasteur Institute which was founded in the 1880's as a private establishment concerned with fundamental studies in microbiology, its theory and applications, and with public health. One of its special concerns remains the non-commercial production of sera and vaccines. It holds large reserves of sera in case of an epidemic emergency. In 1964 its facilities included seventy services and laboratories with a staff of 230 scientific personnel. Today, there are twenty-one Pasteur Institutes throughout the world--Paris, Lille, Lyon, Tunis, Casablanca, Hanoi, Saigon, Dakar, etc. Programs in progress involve many fields of scientific research in microbiology, virology, and their biological and industrial applications.^{1 2}

b. (U) France has other private, government, and military laboratories which support excellent research in microbiology and immunology. In recent years significant contributions have been made in molecular biology, biochemistry, microbiology, virology, parasitology, and radiobiology. The 1965 Nobel Prize in Medicine and Physiology was awarded to three French scientists for their research in molecular biology concerned with regulatory activities of the body cells.

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3. (S) Geographical Factors

a. (U) France is the largest of the European countries in area, located at the western end of the historic avenue of military movement across Northern Europe. The coast is only 19 nautical miles from the UK and the borders of France are within 1000 nautical miles of the greater part of Europe, including Western USSR. It has an area of about 213,000 square miles inhabited by a population of about 50,131,000 (1966). Two-thirds of the land is flat, rolling lowlands or hills, and about one-third is mountainous in topography.

b. (U) The climate of France varies. Migratory pressure systems and associated weather fronts contribute greatly to the day-to-day changes throughout France and Corsica. In most of France, the winters are mild and rainy with occasional outbreaks of cold and freezing temperatures. Militarily, there are three main geographic regions—the Lowlands and Hills, the Eastern and Southern Mountain Rim, and Corsica. In the first region, the terrain is generally favorable for ground operations. The climate is relatively mild, and snow falls infrequently. A dense network of roads affords facilities for rapid movement throughout the region. Conditions for airmobile and airborne operations generally are favorable.

c. (U) The region of the Eastern and Southern Rim is an almost unbroken area of rugged country, ranging from the very high, jagged peaks of the Alps and Pyrenees to the high rolling surfaces and deep gorges of the Massif Central. This region would present great difficulties for ground operations, and most of the region is unfavorable for air operations. Fog, turbulence, and extensive cloud cover are common to the area particularly from November through January.

d. (U) The small, rugged island of Corsica is dominated by a rocky or forest-and-scrub-covered backbone that is compartmented into many steep-sided valleys by mountain spurs; conditions are generally unfavorable for ground or air operations. 11

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4. (S-NPD) Political Factors

a. (U) France has had a republican form of government for nearly a century, but chronic governmental instability has had an impact on the manner in which Premiers have

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fulfilled their tasks. They have had a tendency to concentrate on immediate problems rather than on long-range questions of domestic and foreign policy.¹³ This has had some effect on France's program of research on biological warfare caused by a cyclical pattern of public expression regarding their effort. In the main, and most recently, public statements have present.¹⁴ In September 1971 the French Council of Ministers completed a bill for submission to Parliament that prohibits the use of biological weapons in time of war.¹⁵ The French seem to feel that this enacted French law is sufficient and therefore have not signed the 1972 BW Disarmament Convention.

b. ~~(S-NFD)~~

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B. ORDER OF BATTLE

5. ~~(S-NFD)~~ Military Personnel and Organizations Responsible for BW

a. ~~(S-NFD)~~ Organizations Within or Under MOD.

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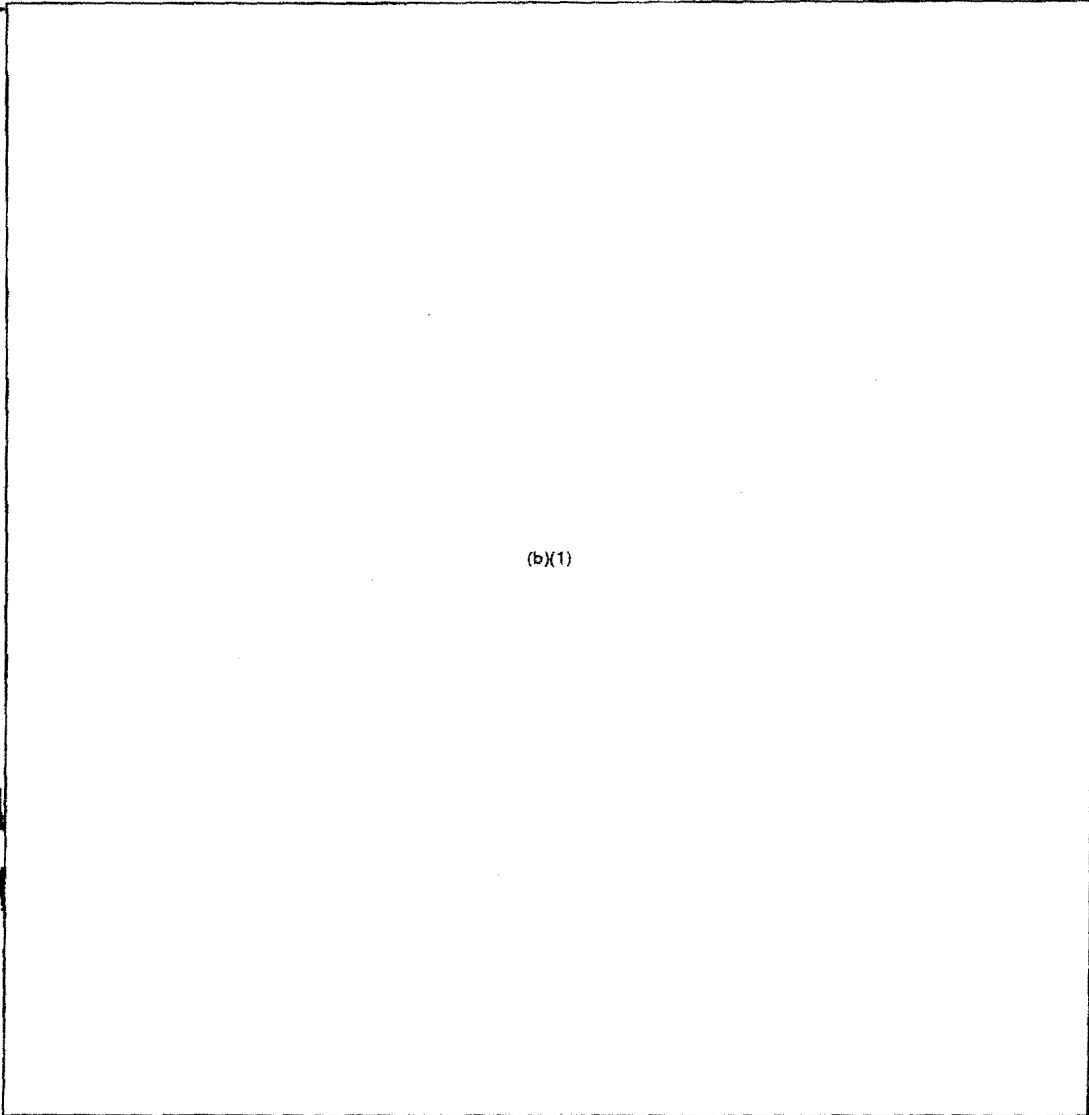
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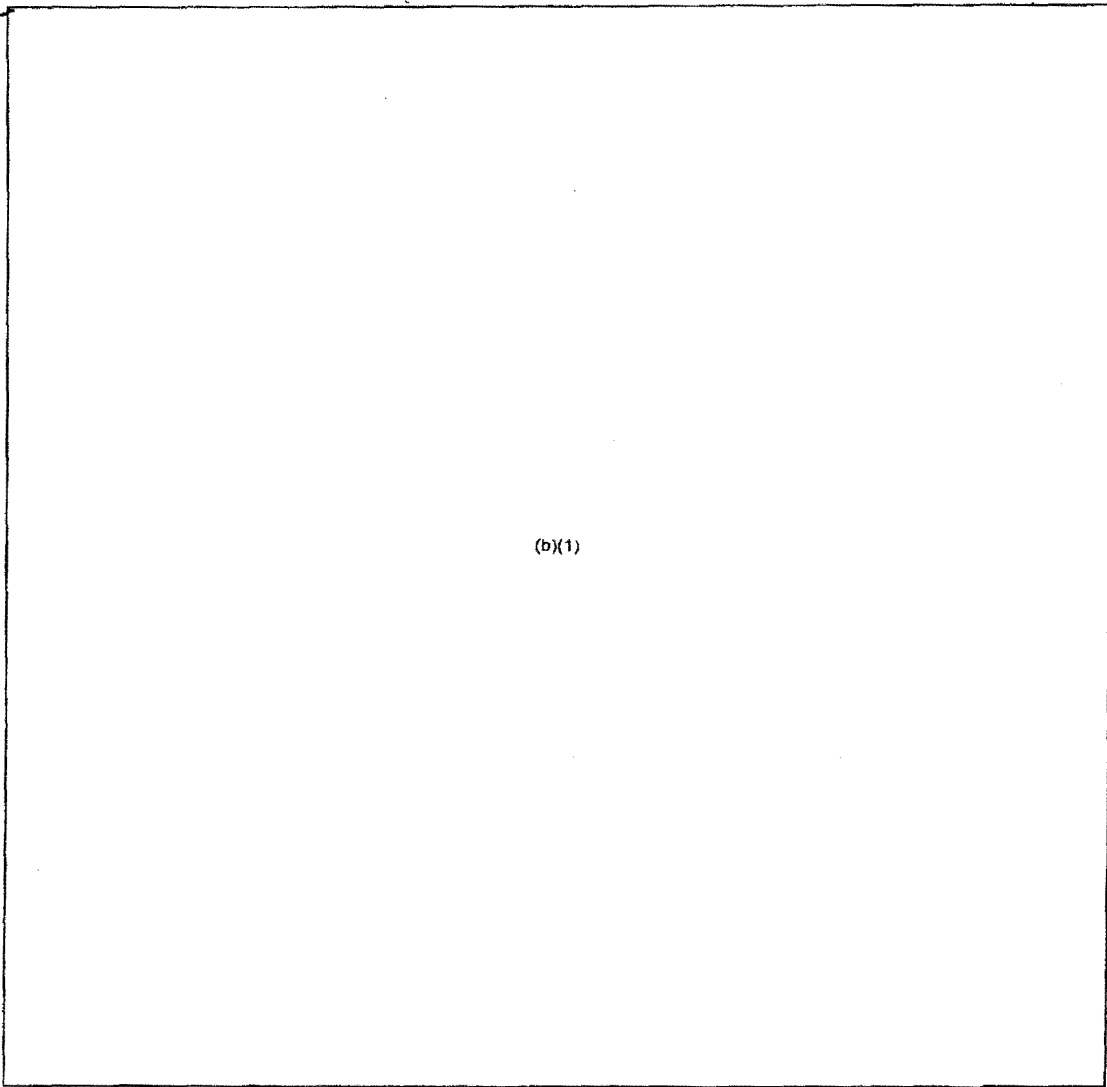
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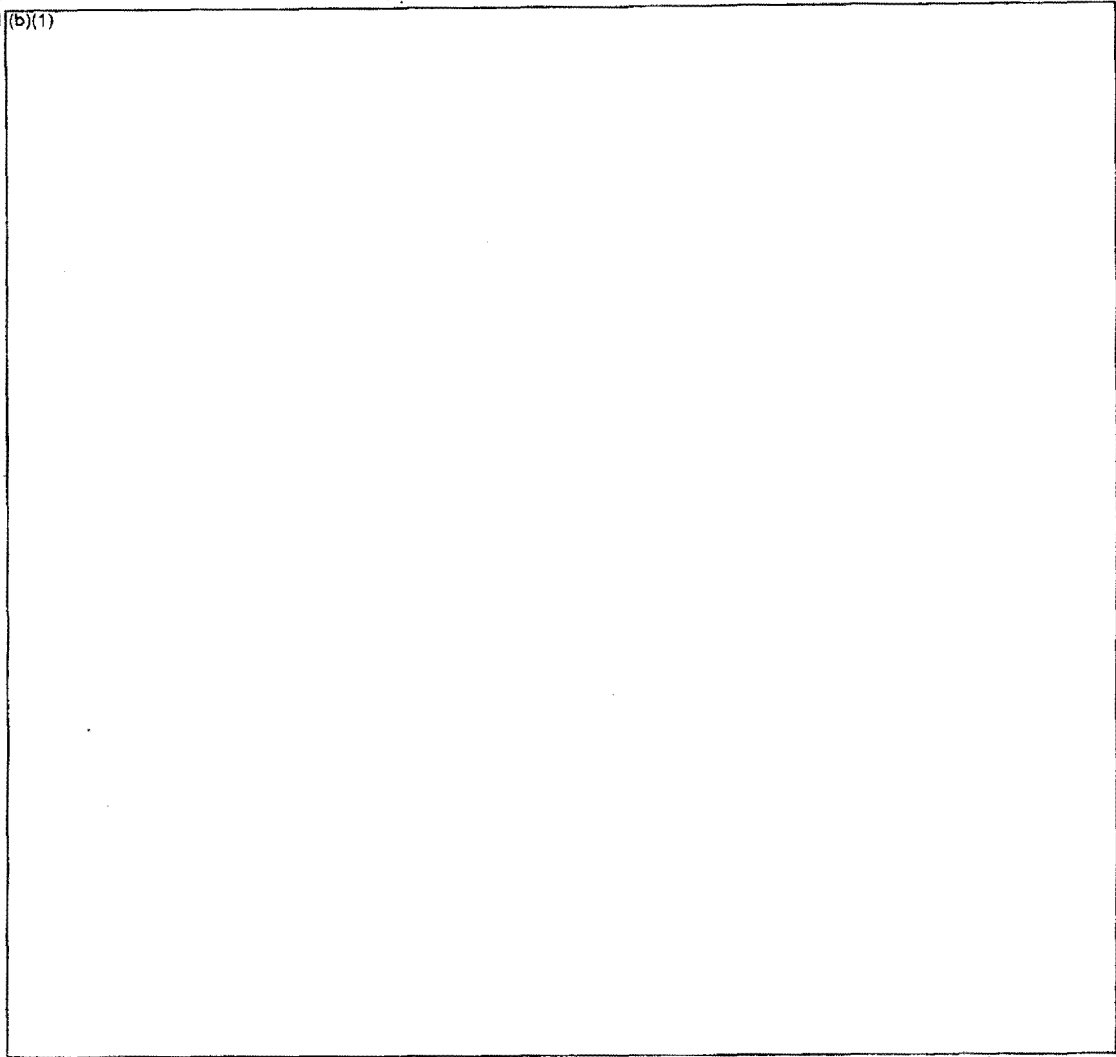
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6. ~~(C)~~ Military Equipment

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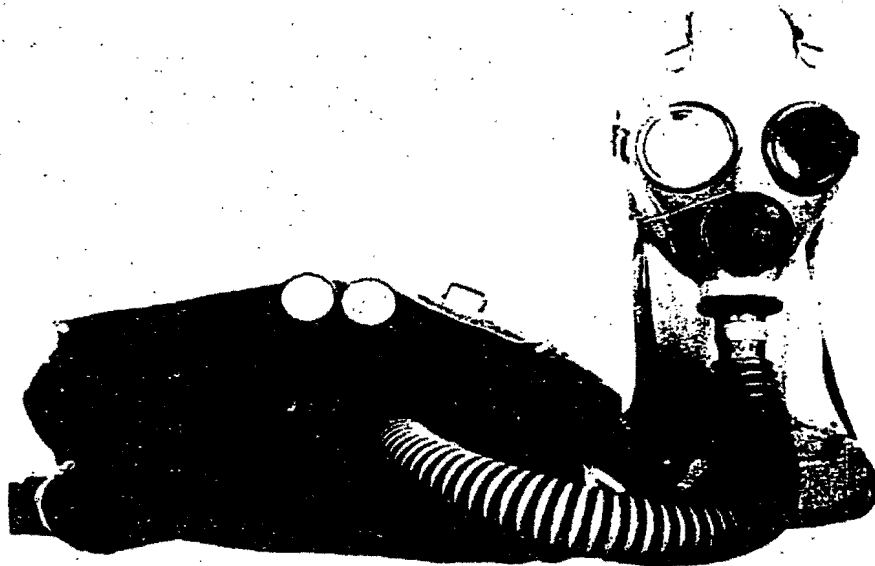


Figure 8. French Model ANP 51 protective mask (U). (UNCLASSIFIED)

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C. DOCTRINE AND PROCEDURES

7. ~~(S)~~ (NFD) Offensive

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D. BW MATERIEL

9. ~~(S)~~ (NFD) Offensive

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b. (U) Agents Developed. There is no identification of any specific biological agent as being available for biological operations.

10. ~~(S,NFD)~~ Defensive

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d. (U) Vaccines, Sera, and Chemotherapeutics. The French pharmaceutical industry is well developed and is capable of producing BW defense-related antibiotics, sera, and vaccines in sufficient quantities for domestic needs and to permit stockpiling. Producers of BW defense-related pharmaceuticals are cited in Table IV. A number of military medical depots are utilized for the storage of BW defense-related materiel; however, details on types standardized and quantities in storage are not available. Two of the depots are located in the Paris area; they are the Armed Forces Central Pharmacy and the Central Stores Depot. The Central Pharmacy Depot is located in Lunel. In addition, general logistical facilities are located at Bordeaux, Caen, Chartres, Lyon, Marseille, Saint-Cyr, and Sainte Menehould.¹³

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Table IV. French Producers of BW Defense-Related Pharmaceuticals (U)

Company	Location	Products
Laboratoires des Carmes	Besancon	Antibiotics
Sarget-Ambrine Laboratoires	Bordeaux	Biologicals
Laboratoires Sarbach	Chatillon-Sur-Chalaronne	Biologicals Veterinary Products
Merieux Institute	Lyon	Biologicals Veterinary Products
Liplia Society	Lyon	Veterinary Products
Unipol	Marseille	Veterinary Biologicals
Chardonner Establisements	Moullins	Veterinary Biologicals
Laboratoire Roger Bellon	Neuilly-Sur-Seine	Biologicals Veterinary Products
Laboratoires Servier	Neuilly-Sur-Seine	Antibiotics
Fevrier, Decoisy, Champion	Paris	Biologicals
Pasteur Institute	Paris	Biologicals
Laboratoire Lyocentre	Paris	Biologicals
Laboratoires Delagrang	Paris	Biologicals Veterinary Products
Laboratoires Fournier	Paris	Biologicals
Laboratoires Le Brun	Paris	Antibiotics
Laboratoires Toraude	Paris	Biologicals

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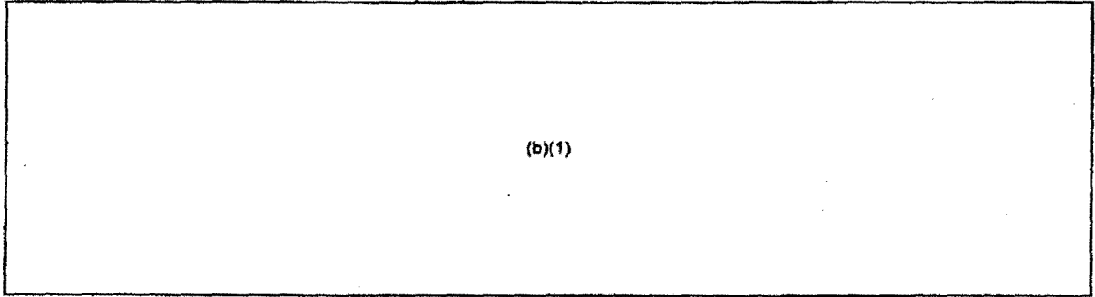
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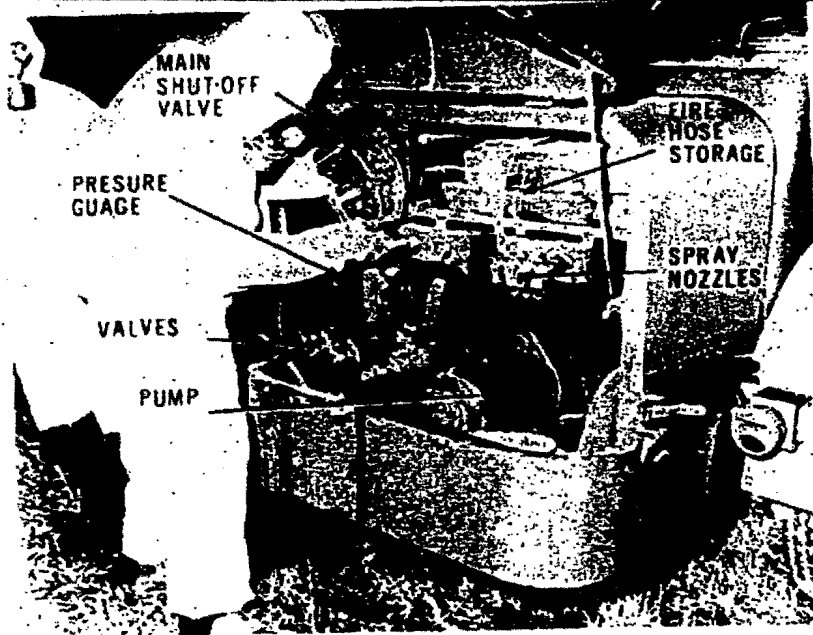
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Figure 9. French 600-liter decontamination apparatus (U).

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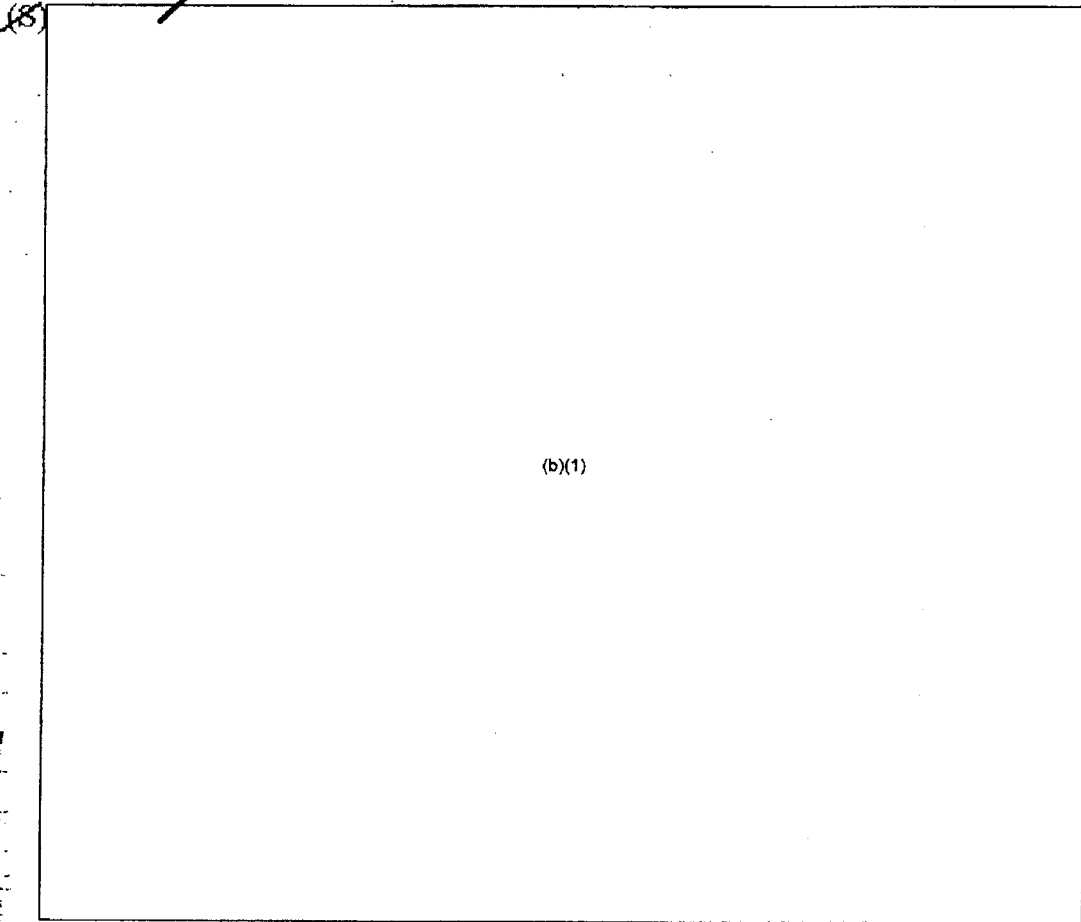


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E. BW PRODUCTION FACILITIES AND CAPABILITIES

11. ~~(S)~~ Military



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12. ~~(S)~~ Civilian

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F. STOCKPILING AND STORAGE FACILITIES

13. ~~(S-NPD)~~ Military Capabilities

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14. ~~(U)~~ ~~(S/NFD)~~ Civilian Facilities

a. (U) The Pasteur Institute, Paris, is France's largest manufacturer of biologicals and has quantities of unidentified sera and vaccines stored for use in the event of epidemic emergencies.¹²

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c. (U) Other civilian institutes capable of producing and storing a variety of biologicals useful for the prevention or treatment of biological warfare casualties are listed in Table I (paragraph 10).

G. BW RESEARCH AND DEVELOPMENT

15. ~~(U)~~ ~~(S/NFD)~~ Institutes, Facilities, Test Sites

a. ~~(U)~~ ~~(S/NFD)~~ Military Installations.

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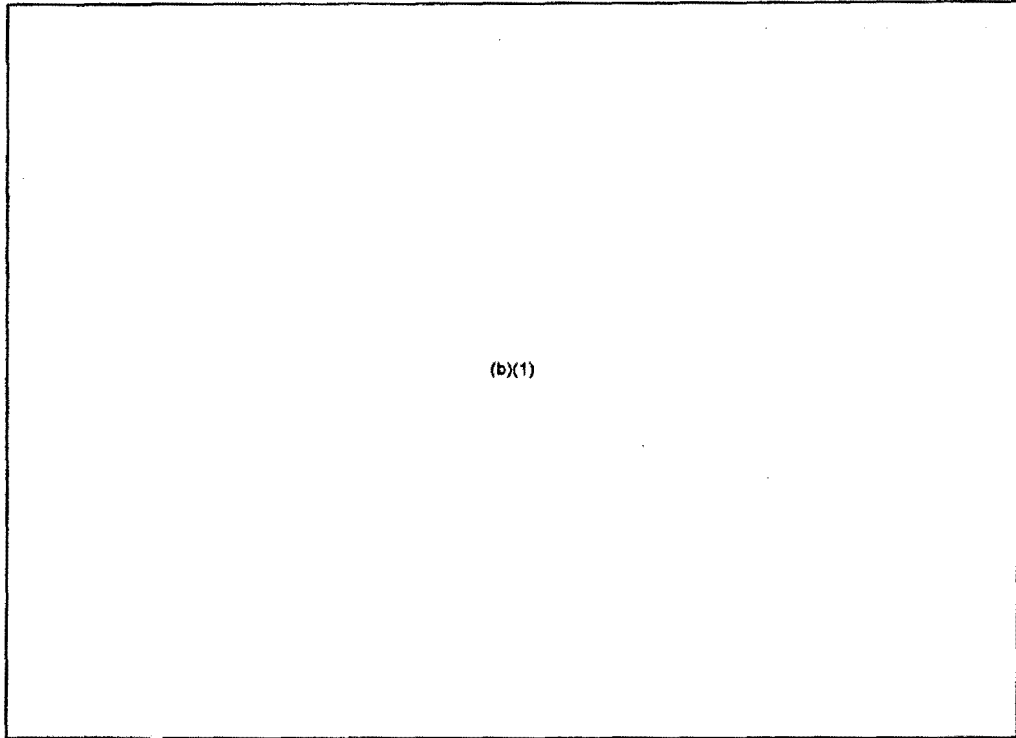
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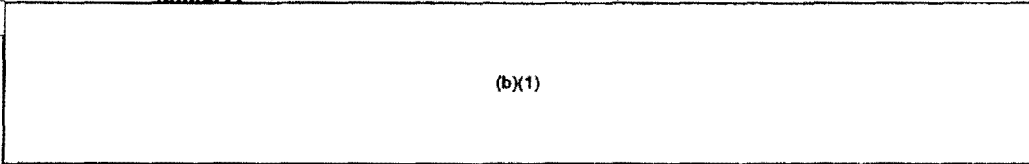
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b. ~~(C-REF)~~ Selected "Civilian" Institutes Funded in Whole or in Part by the Military.

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(2) (U) The Pasteur Institute has a history of productive investigation in microbiology from the time of Pasteur, to the discovery of lysogeny by Lwoff, and the premier efforts in molecular biology by a school of investigators headed by Jacob and Monod. There are five main divisions: Microbiology (which includes Bacteriology); Viral

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Diseases; Ecology of Pathogenic Agents and their Vectors (which includes Mycology and Parasitology); Molecular Biology; and Immunology. Microbiology is being pursued more vigorously at the Pasteur Institute today than every before. A rabies vaccine inactivated with beta propiolactone is now being prepared from infected young sheep and infected suckling mice.

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(3) (U) The Merieux Institute, *Institut Merieux*, in Lyon is one of the largest, most modern biological and pharmaceutical houses in France. The institute also does work under contract to the Microbiology Division of the Research Center of the Health Services of the Armed Forces. The institute claims to be a world leader in producing a vaccine effective against foot-and-mouth disease. It sells this vaccine world-wide, and procures raw materials from all of western Europe, and the USSR, Bulgaria, East Germany, Hungary, and Rumania. Numerous research grants are given by the institute to universities throughout France. Elaborate and extensive freeze-drying equipment is available to support operations on a commercial scale. The expertise, and laboratory and production facilities available would be of immediate usefulness for stockpiling defensive materiel in anticipation of biological warfare. These same assets are probably readily adaptable for offensive applications if the need should arise.⁵⁰

(4) (U) Station Centrale de Pathologie Vegetale, Institut National de la Recherche Agronomique, Paris, does extensive research in the field of agriculture, including work on yellow rust (stripe rust) of cereal plants. Such studies clearly have potential biological warfare applications.

(5) (U) Personnel at Ecole Nationale Veterinaire d'Alfort teach and conduct extensive research on various animal diseases. Published work on brucellosis contains results of research potentially applicable to biological warfare R&D programs.

(6) (U) Universite de Strasbourg, Institut de Recherches Nucleaires, Strasbourg-Cronenbourg, Laboratoire des Virus des Plantes docs research on turnip yellows virus and the molecular biology of other plant viruses applicable to anti-plant biological warfare.

16. ~~(C-NPD)~~ Biological Agent Development

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b. ~~(C-NED)~~ Genetics.

(1) (U) The genetic manipulation of microorganisms to yield biological warfare agents with improved characteristics is usually a long term research process which exploits techniques generally available to competent investigators. Dr. Andre Lwoff and his associates, Jacob and Monod, have done outstanding research in cell genetics for which they have been made Nobel Laureates. New construction is underway to provide a modern laboratory for these people and their associates adjacent to the Pasteur Institute. It can be anticipated that this group will continue with their research in genetics and molecular biology which could be exploited by a French BW effort.

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c. ~~(NED)~~ Aerobiology.

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d. ~~(CONF)~~ Production and Process Research

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(2) (U) Process Research.

(a) (U) Capabilities. A new freeze-drying system has been developed by the French at the Center for Cryogenic Studies, Grenoble. Rapid freezing of suspensions is achieved, followed by extremely rapid removal of water at rates which may rival those achieved by the R.I.N. Greaves method. In contrast to the loss of microorganisms during the latter freezing process, the French appear to obtain excellent recoveries. In 1969 the unit was composed of two parts: a cylindrical freezing unit, and a drying apparatus. In that configuration, the freezing of the biological specimen was done in the open, and the sterility of the product could not be assured. However, a prototype unit under development was

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observed which was entirely self-contained. It was effective in operation, but like most prototypes needed some refining. The advantage provided by this modification is that sterility of the product being freeze-dried can be maintained; moreover, handling of the product during the process will be obviated. The new system has been used to rapidly freeze-dry bacteria, viruses, vaccines, toxins and anti-toxins. The optimal parameters of material and methods for each of these separate preparations have been experimentally established.***

(b) (U) Equipment. French food processors claim to have the largest freeze-drying plant in the world, the SICALY, installed at Saint-Cyr in Bourgh, which can process at the rate of 2.4 metric tons per 17 hour cycle. This industrial competency and high capacity indicates that France would have no difficulty, technologically, in freeze-drying large quantities of biological warfare agents if it became necessary.***

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(S) 17. ~~(S-NEE)~~ Dissemination Research

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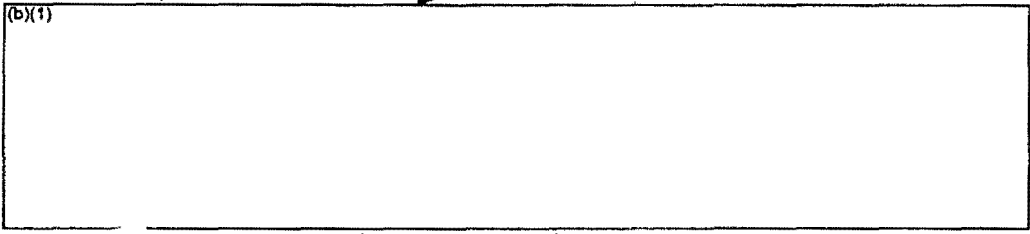


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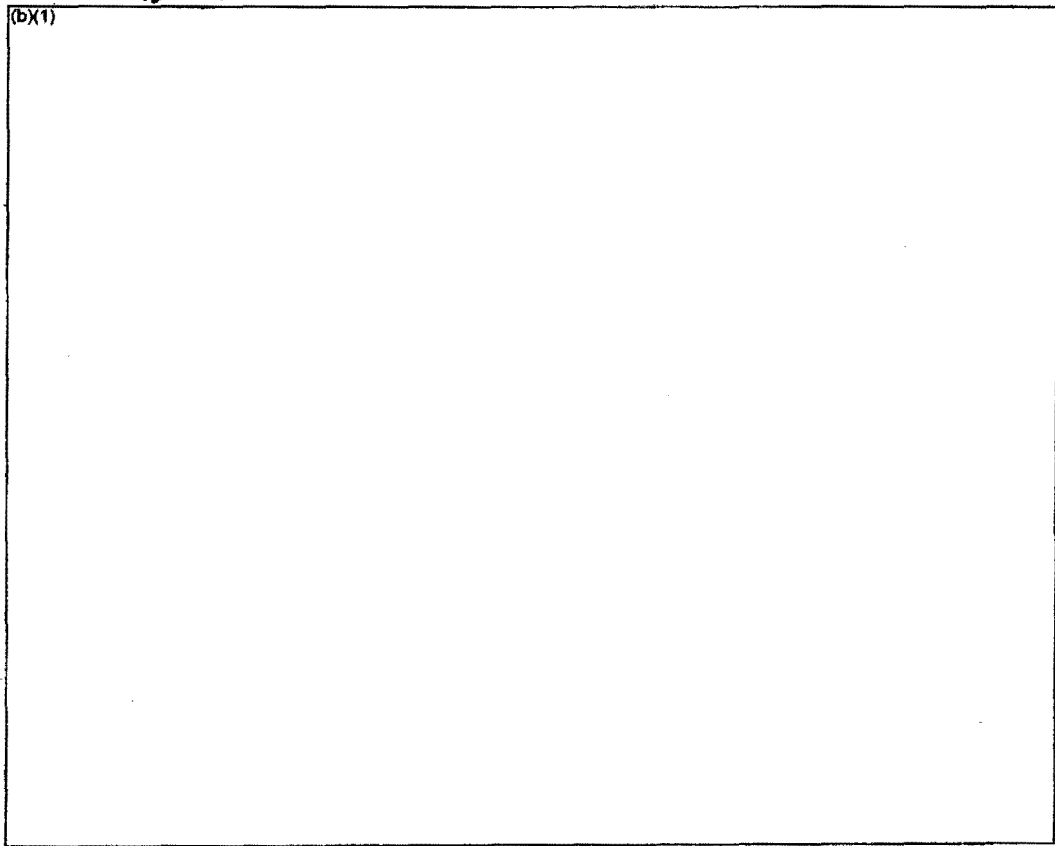
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18. ~~(S/NFD)~~ Detection and Identification Concepts and Studies

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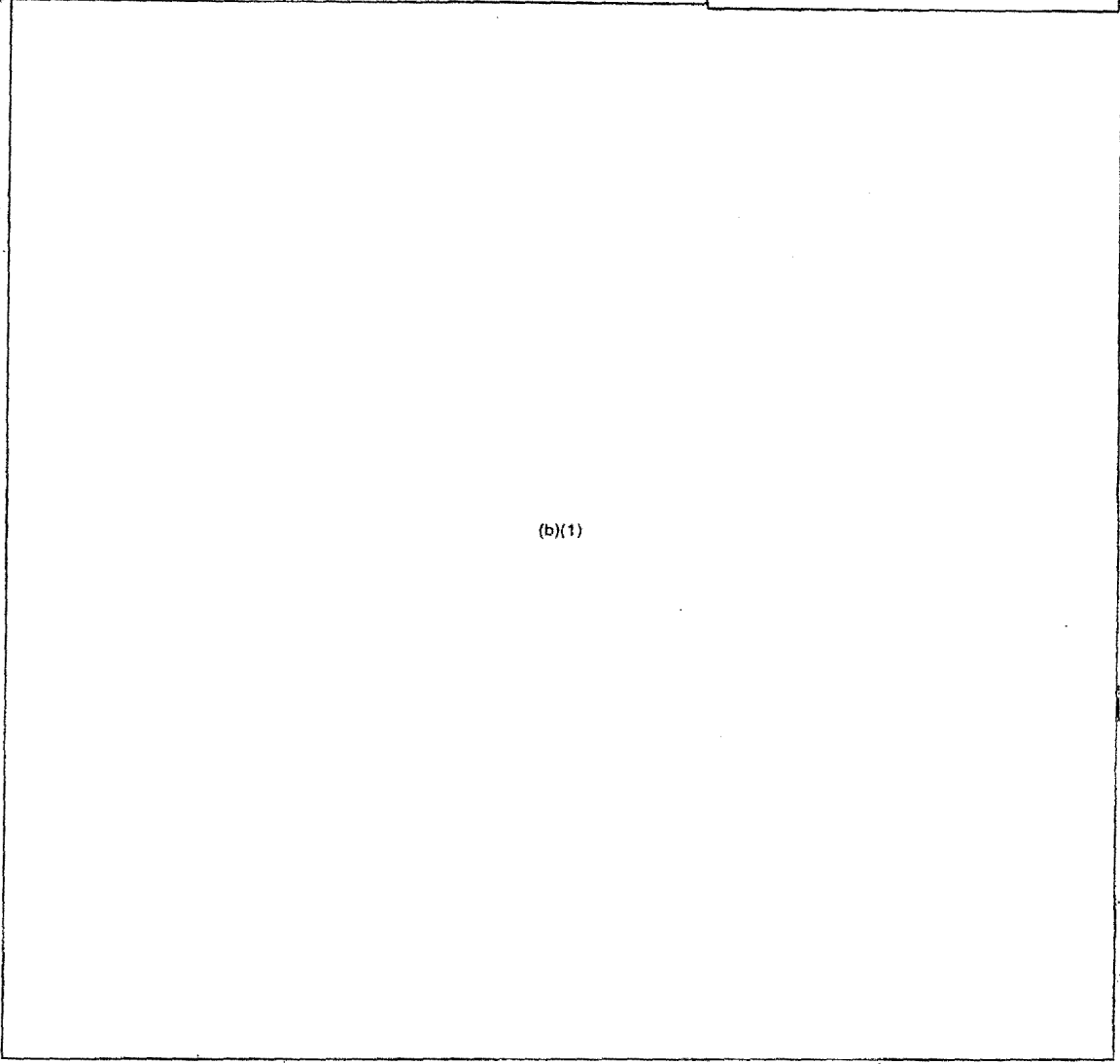


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19. ~~(C-NED)~~ Vaccines, Sera, and Chemotherapeutic Agents

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20. ~~(C-NED)~~ Aerosol Immunization

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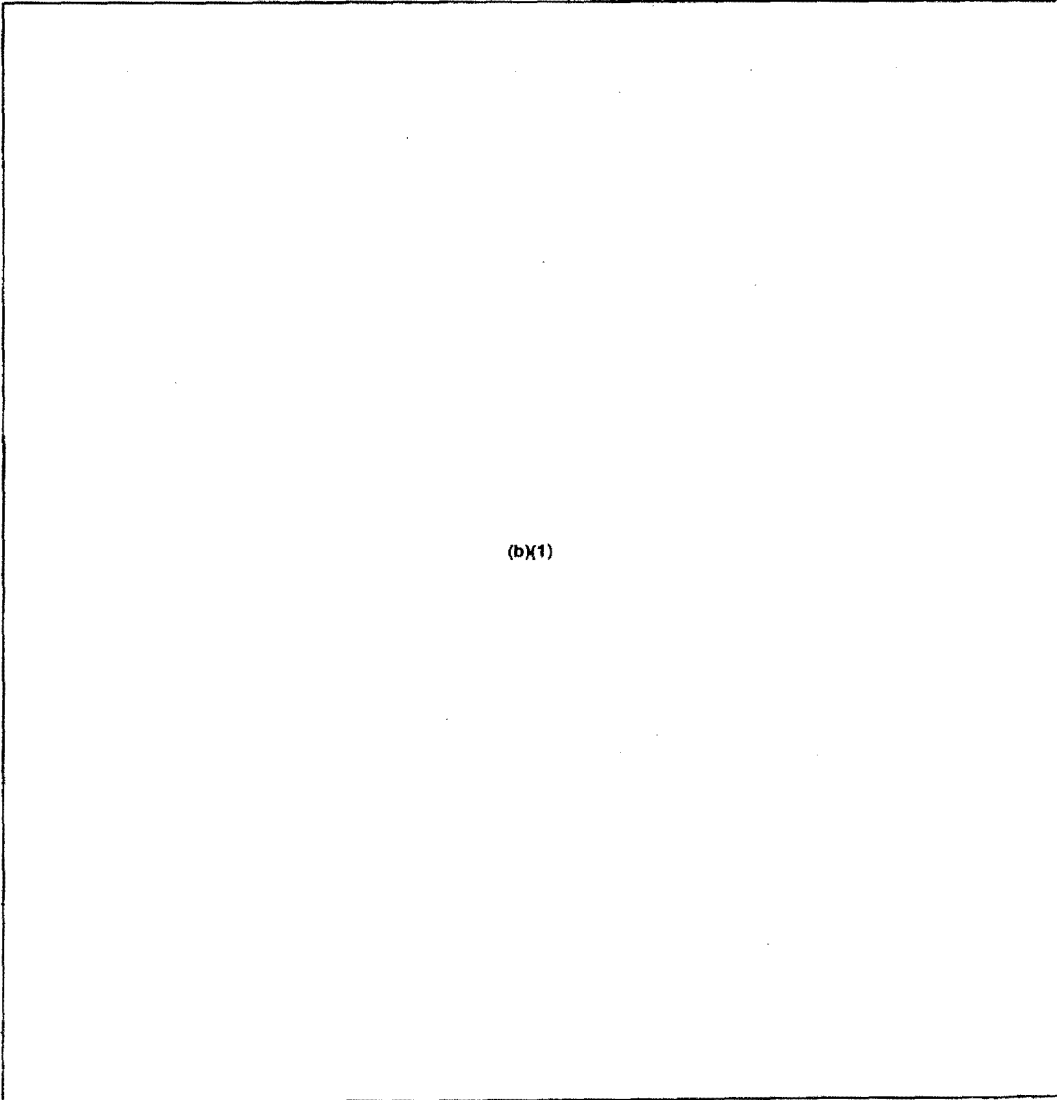
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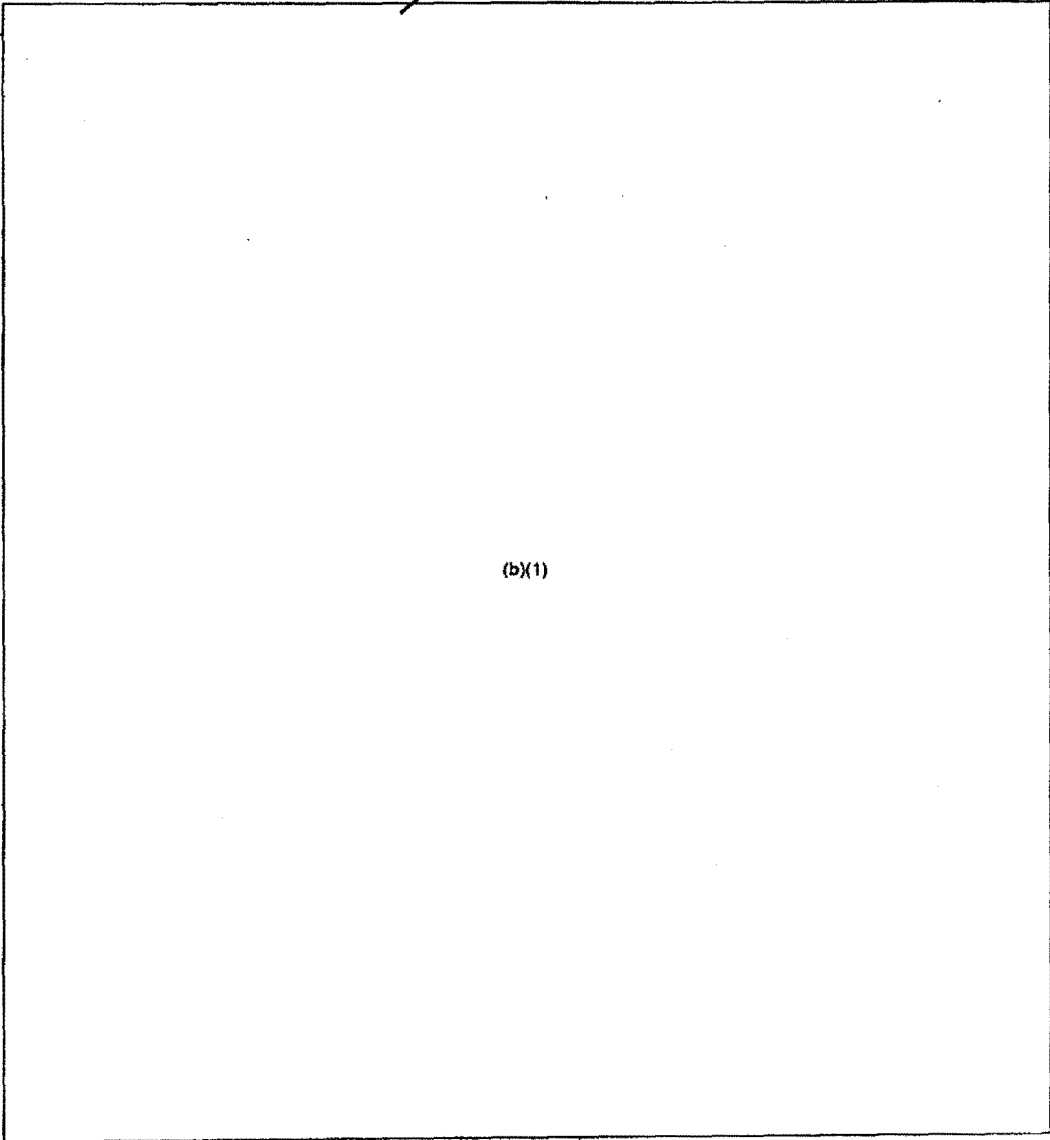
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21. ~~(C)~~ Toxin Laboratory Accident

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22. ~~(CONF)~~ Wind-Water Channel and Wind Tunnel for BW/CW Research

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H. NAVAL ASPECTS OF BW

e 23. ~~(C-NPD)~~ Protection

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S 24. ~~(C-NPD)~~ Offensive

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S 25. ~~(e)~~ Training

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I. CONCLUSIONS

S 26. ~~(S)~~ Technology and Research

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27. ~~(S)~~ Materiel and Personnel, Army

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28. ~~(C-NPD)~~ Naval Protection

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K. TRENDS AND FORECASTS

29. ~~(S)~~ Trends

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30. ~~(S)~~ Forecasts

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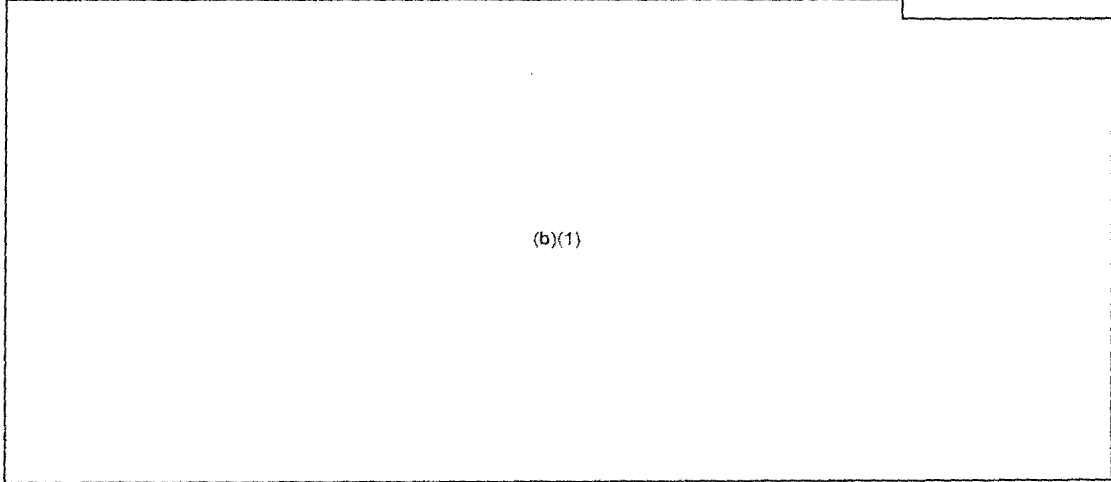
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Section V.

GREECE

A. INTRODUCTION

1. (U) Competence in Microbiology and Public Health

There has been very little research on non-nuclear aspects of CBR warfare; there is no base to support BW studies. Responsibility for military research lies with the medical corps of the Hellenic Army, but Army medical research includes only epidemiological studies, the examination of food and drugs for microbial contamination, and limited studies concerned with the production and control of biologicals. There is little veterinary research of any kind, although the Army Veterinary Research Laboratory investigates animal disease problems and assigned personnel collaborate closely with their counterparts at the Hellenic Pasteur Institute in Athens who are concerned with the epizootiology of animal diseases. The quality of medical care is low in Greece.¹ The Greeks are hard pressed to cope with indigenous problems affecting the nation's public health, and have shown little interest in initiating BW programs.

2. (U) Geographic and Political Factors

Greece can support only a modest R&D effort, and its scientific and technical capabilities lag far behind those of Western Europe. The quality of Greek research is suffering from the increasing isolation of Greek scientists from the international community of scientists due to, in part, Western boycotts of Greece and the difficulty that Greek scientists have in obtaining passports.

B. ASSESSMENT

3. ^u ~~(S-NFD)~~ Order of Battle

a. ~~(S-NFD)~~ Military Personnel and Organizations

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4. ~~(C-NEB)~~ Doctrine and Procedures

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5. ~~(S-NEB)~~ BW Material

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b. ~~(S)~~ Defensive

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Table V. Greek Producers of BW Defense Related Pharmaceuticals (U)

Company	Location	Products
Cooperation Pharmaceutique Industrielle, S. A. "Cooper"	Athens	Antibiotics
Foot-&-Mouth Disease Institute	Athens	Foot-and-Mouth Disease Vaccine
Hellenic Pasteur Institute	Athens	Combined diphtheria & tetanus toxoids; BCG, typhoid, rabies, & staphylococcus vaccines
State Laboratories	Athens	Smallpox, rabies, typhoid, paratyphoid, cholera & plague vaccines
Veterinary Microbiological Institute	Athens	Veterinary biologicals
Economides & Company, S. A. ("Chropi")	Piraeus	Biologicals
Microbiological Institute	Thessaloniki	Veterinary biologicals ⁷

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6. (U) Research and Development

Although the Greeks have an adequate administrative organization for military research and development, lack of qualified personnel, facilities, and financing has kept research at a low level. Such as it is, the research base consists of the Hellenic National Defense Research Center, the Greek Atomic Energy Commission, the Academy of Athens, and the Hellenic Research Foundation. Additional research is carried out in universities. Because of political difficulties and economic priorities, research is not well organized, and the Greeks, though a NATO member, rely on the USIS for technical information of all kinds. There is no indication in either the open or classified literature that biomedical research in progress would support a BW program.

7. ~~(S)~~ Conclusions

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C. TRENDS AND FORECASTS

8. ~~(S)~~ Trends

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9. ~~(S)~~ Forecasts

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Section VI.

ICELAND

1. (U) Introduction

Iceland's standards of medical care are among the world's best. Hospital and health care support facilities are entirely adequate for the population. In spite of the Civil Defense Law of 1962, little has been done to prepare for war disaster, and the population would have to rely on sea and mountain rescue services and the Red Cross for disaster relief. Medical training at the University of Iceland's Faculty of Medicine meets high standards.¹

2. (U) Assessment

a. The Institute of Pathology, a general medical oriented facility, does support viral studies in tissue culture systems.² Although laboratories are well-equipped, and investigators are deemed competent, there are no known R&D programs applicable to biological warfare.

b. No data are available concerning Iceland's policy, doctrine, training or Order of Battle for biological defense. Iceland is a signatory of the 1972 BW Disarmament Convention.

c. Iceland neither produces nor stores either offensive or defensive materiel for biological warfare. The country would have to rely upon imports to satisfy any military requirement.

3. (U) Conclusions

Iceland has no BW programs or capabilities. There are no indications that either will be developed.

4. (U) Trends and Forecasts

Iceland's military importance to NATO will continue to be only its geographic location. Icelanders will continue to receive good medical care but will not divert funds to military programs other than required by the Coast Guard. R&D will be limited to that needed for medical purposes and as part of teaching activities. No change is expected through the next 15 year period.

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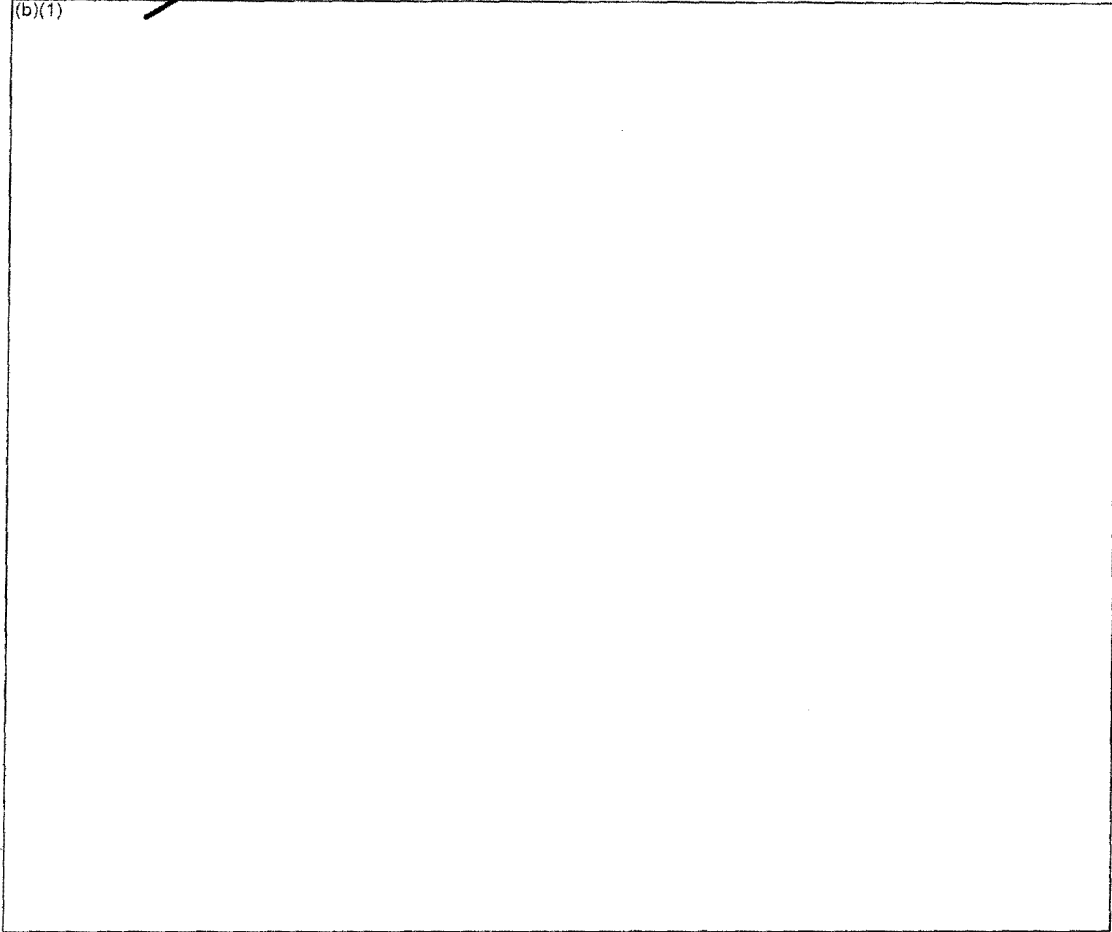
Section VII.

ITALY

A. INTRODUCTION

1. ~~(S-NFB)~~ Historical Background

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2: ~~(C)~~ ^(U) Competence in Microbiology and Public Health

a. (U) Italian scientific tradition predates the Renaissance and includes the beginnings of modern experimental science. Outstanding scientific achievements by Italians during the 16th through 18th centuries include the experimental research of Redi and Spallanzini who refuted the theory of spontaneous generation of life.²⁸ Italy has a large number of universities, institutes, academics, and professional societies that are concerned actively with the advancement of scientific research. The Ministry of Health and Sanitation operates the Higher Institute of Health in Rome where research is performed in biochemistry, biophysics, microbiology, parasitology, as well as on air and water pollution. Italian scientists and engineers are generally as capable as those in the United States but are often deficient in laboratory experience or specialized training. Despite this fact, they have made important contributions over several decades to many disciplines, including microbiology, genetics, and fermentation.²⁵ Italy's competency in microbiology and in allied sciences is adequate to sustain defensive biological warfare programs. If adequate funding was provided and the country's policy demanded it, an offensive program could also be managed with the talent presently available.

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3. (U) Geographical and Political Factors

a. Italy is located in southern Europe, in the Mediterranean basin. The long, peninsular mainland and the island of Sicily almost bisect the Mediterranean Sea. All of western and central Europe, including western USSR are within 1,000 nautical miles of Italy. The Strait of Otranto, about 40 nautical miles wide, separates Italy from Communist Albania, and the USSR is about 360 nautical miles from the northeastern border of Italy. Mainland Italy has an area of about 97,000 square miles, about 1 3/4 times that of Florida. No part of the country is more than 150 miles from surrounding seas.²⁵ Italy is vulnerable to biological warfare attack from the land, the air, and particularly, the sea.

b. Italy is constitutionally a republic governed by a cabinet responsible to both houses of parliament; the chief of state is a President chosen by the parliament. Institutions of local government date essentially from pre-Fascist days, with important powers wielded

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from Rome through a system of prefects. Regional governments, foreshadowed in the 1948 constitution, have not yet been introduced generally throughout the peninsula.²⁵ An unstable political atmosphere resulted in constraints on military spending which, in part, prohibited the development of a long-range BW program.²⁶

B. ASSESSMENT

4. ~~Order~~ Order of Battle

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5. ~~(S)~~ Doctrine and Procedures

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Italy is a signatory of the 1972 BW
Disarmament Convention.

6. ~~(S)~~ BW Materiel

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7. ~~(S)~~ (C-NPD) Production Facilities and Capabilities*

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Figure 10. Italian Model M-59 protective mask (U).

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8. ~~(S)~~ Stockpiling and Storage Facilities_u

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There is no more recent information available.^{1,2}

9. ~~(S-NP)~~ Research and Development_u

a. ~~(S)~~ General_u

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b. ~~(C-NFD)~~ Institutes and Facilities ~~u~~

(1. ~~(C-NFD)~~ Military ~~u~~

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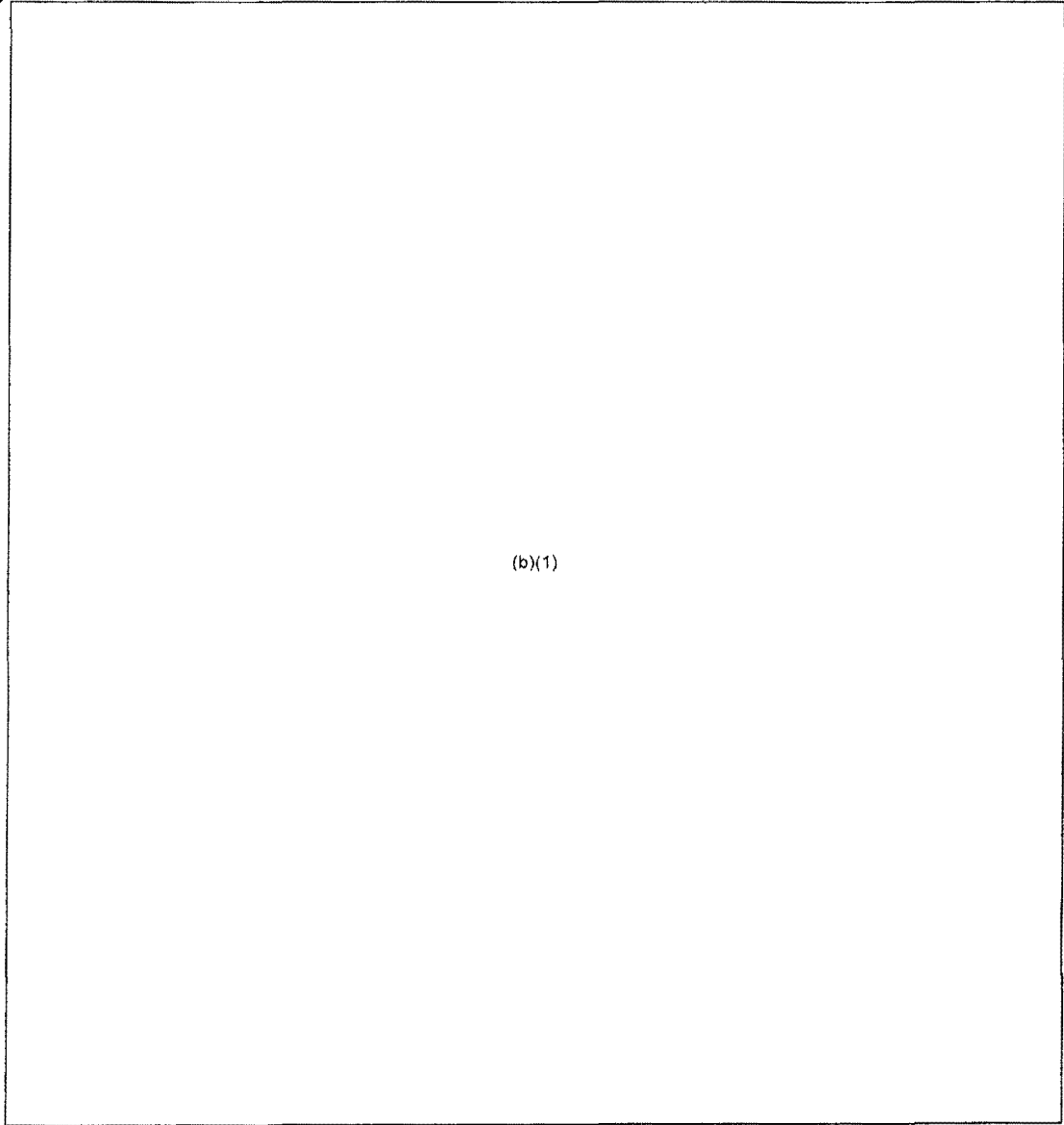
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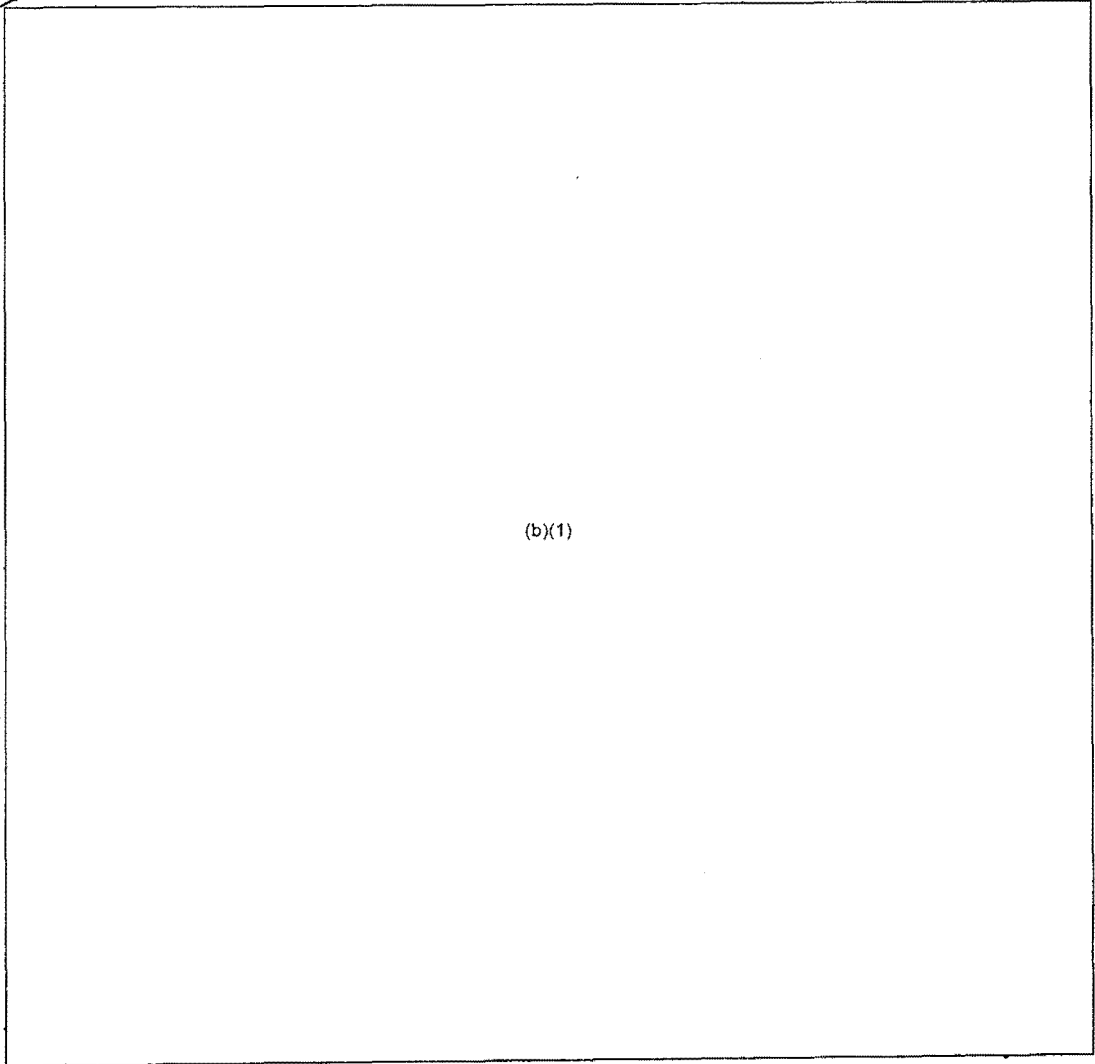
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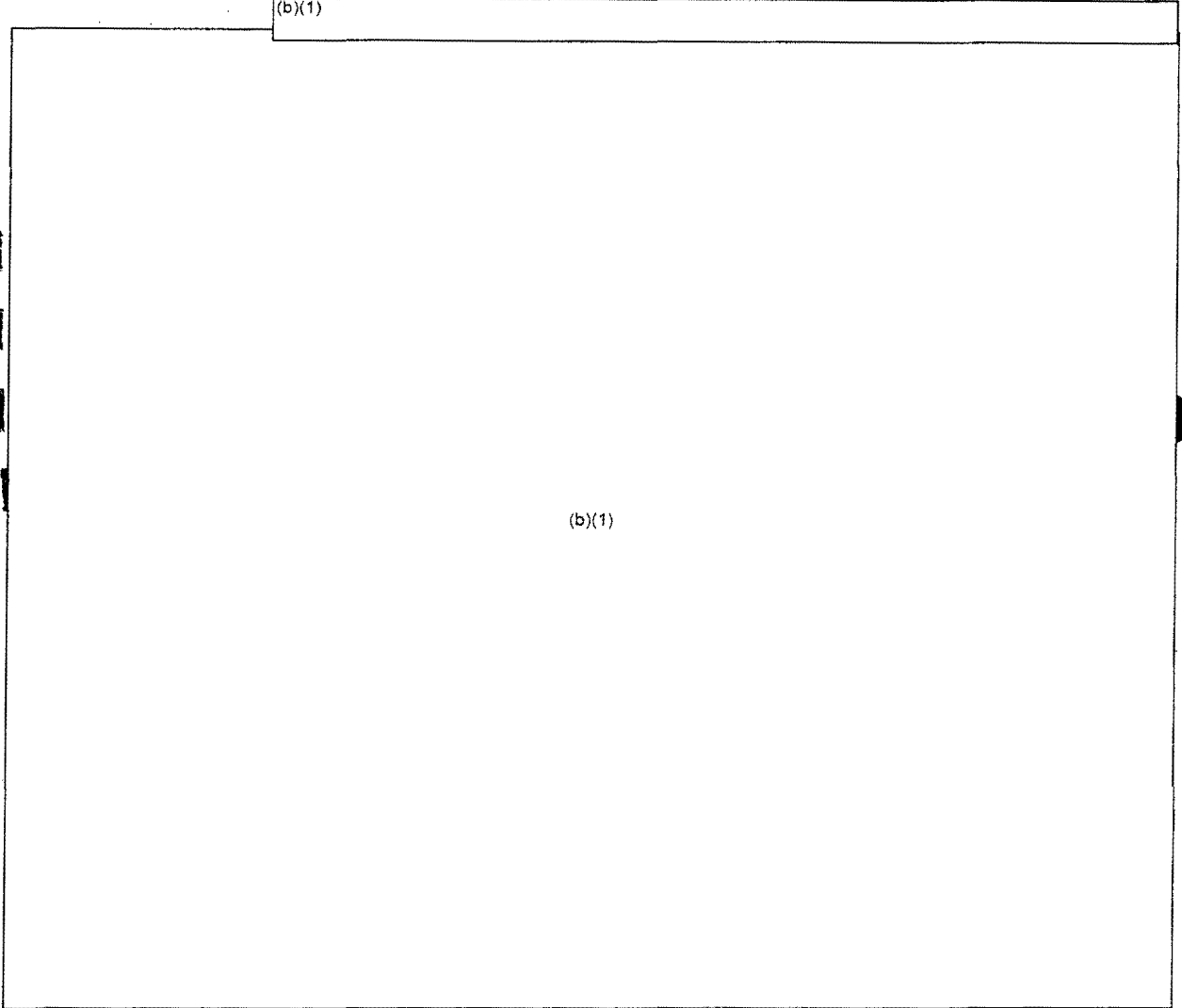
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(2) ~~CONFIDENTIAL~~ Selected civilian institutes. α
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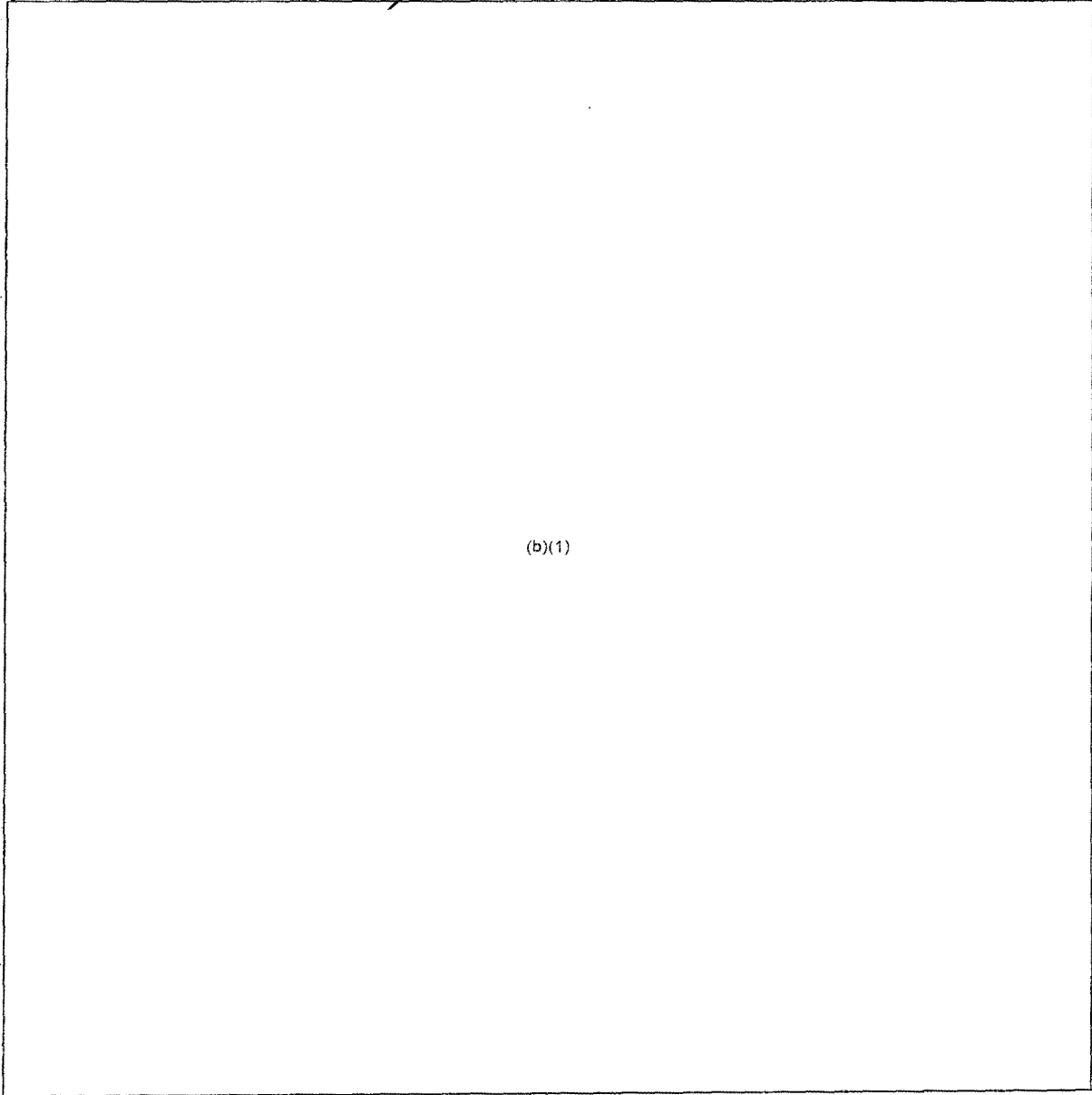
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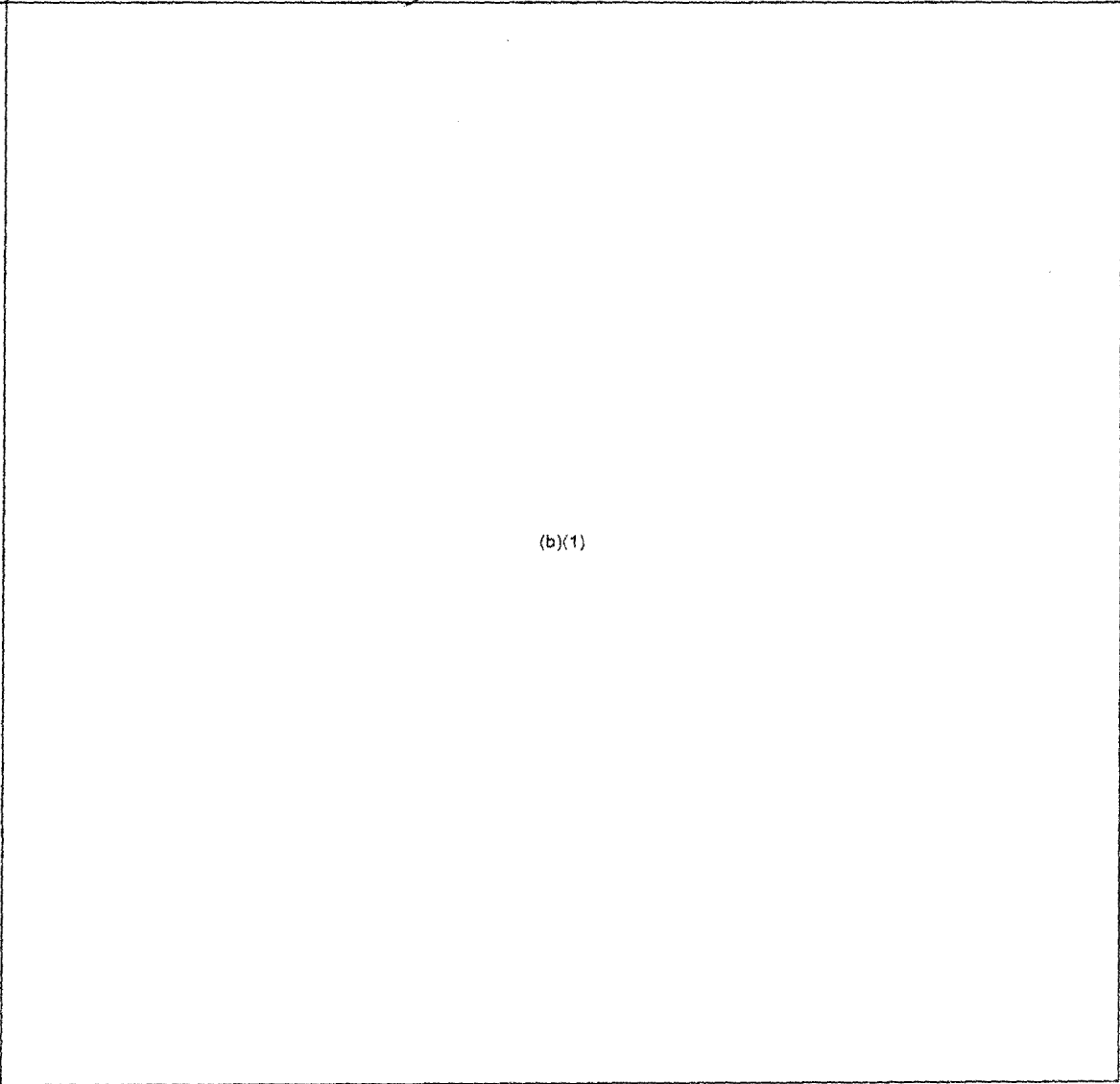
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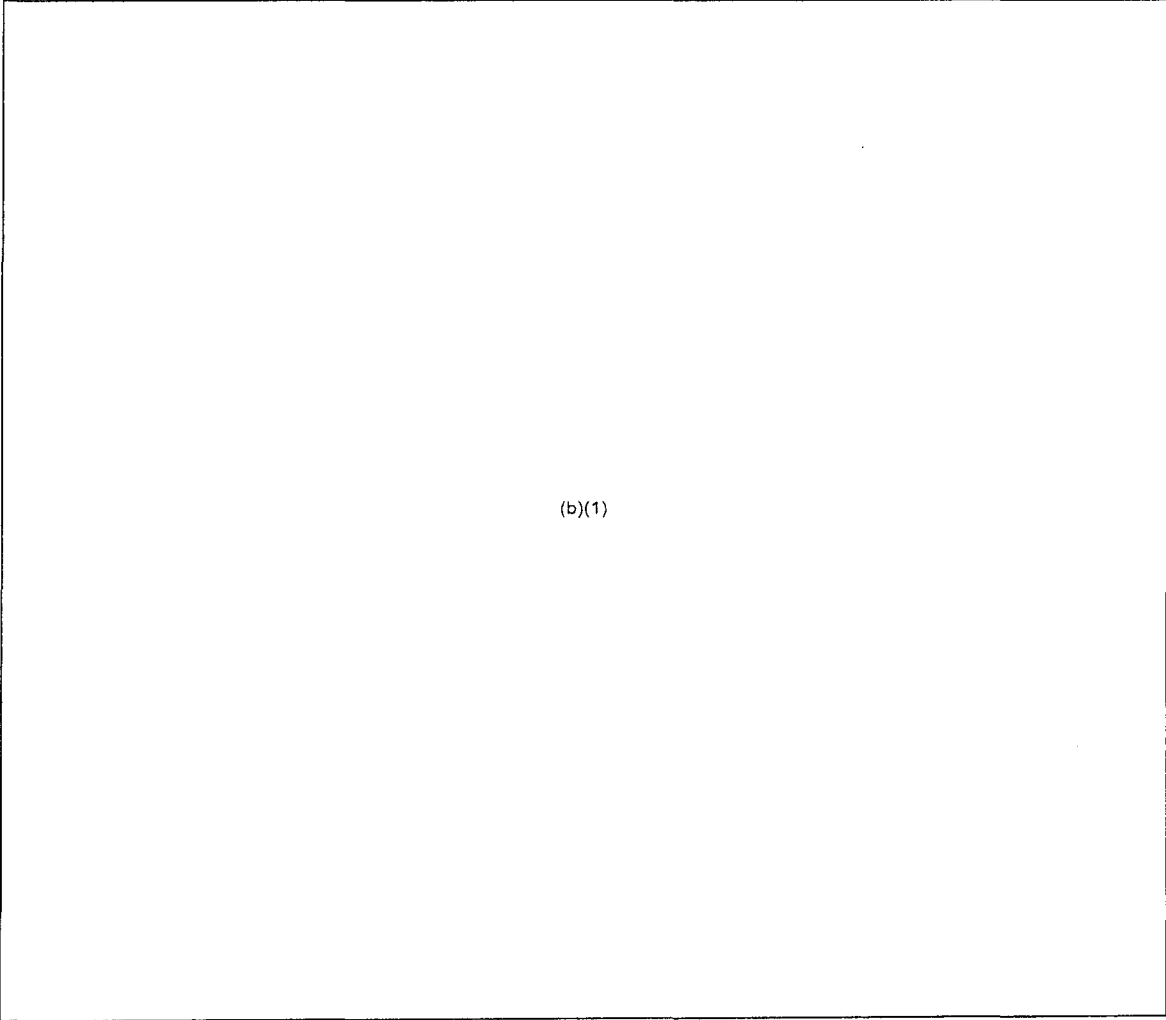
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C. TRENDS AND FORECASTS

12. *12* Trends

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Section VIII.

LUXEMBOURG

A. INTRODUCTION

1. (U) Competence in Microbiology and Public Health

a. The medical services and standards of public health and sanitation in Luxembourg compare favorably with those of other West European countries. There is no medical school in Luxembourg, and medical students are trained in other European or non-European countries. Medical facilities are generally controlled by the government.⁴

b. Most serious diseases occurring in Luxembourg are under control, and progress is being made in reducing the incidence of disease. The damp climate is responsible for the prevalence of respiratory infections with epidemics of influenza occurring periodically.

2. (U) Geographical and Political Factors

a. Luxembourg is centrally located in Western Europe, surrounded by Belgium, France, and the Federal Republic of Germany (FRG). It is the hub of several international transportation lines. The country has no natural barriers to afford protection, and the armed forces consist of a small, all volunteer army. A National Gendarmerie could, if required, assist the army in territorial defense. Luxembourg has sought security from its neighbors when a traditional policy of neutrality proved to be no safeguard through two world wars.

b. The boundaries of Luxembourg enclose an area of 1,000 square miles inhabited by nearly 350,000 persons. Compact and roughly triangular in shape, the country has a maximum north-south dimension of 55 miles and a maximum east-west dimension of about 35 miles. Of her boundaries, 92 miles adjoin Belgium, 45 miles with France, and 84 miles with the FRG. No fortifications exist on the Luxembourg side of the border. Because its geographical location has given Luxembourg a greater role in international affairs than her size warrants, neighboring countries are concerned lest other countries control this Grand Duchy.

c. Politically, Luxembourg abandoned its traditional posture of neutrality when it joined the UN in 1945. The Duchy has consistently sided with the West and given full support to the European collective security and integration programs. The political structure

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is based on a constitutional, 1868, monarchy, a popularly elected unicameral parliament responsive to the will of the electorate, and political parties representing diverse religious and socioeconomic elements of the population. The constitution guarantees a wide range of civil and religious rights, protected by legal and judicial processes. Ultimate political power resides in the parliament, known as the Chamber of Deputies. The head of the state is the Grand Duke or Grand Duchess in whose name executive power is exercised.

d. Luxembourg's defense policy is based on cooperation in mutual security programs and active participation in NATO commensurate with the size and resources of the nation. Responsibility for the formulation of defense policy is vested in the cabinet with the concurrence of the Chamber of Deputies. Military service in Luxembourg has, since 1967, been entirely voluntary. The Army would be powerless to resist any determined aggressor and is capable of maintaining internal security only. The force has no strength other than the quality of its manpower.

B. ASSESSMENT

3. ~~(S-NFD)~~ Order of Battle *u*

a. (U) Staff Structure. The Minister of Public Force is responsible to the Prime Minister who reports directly to the Commander in Chief, currently the Grand Duke. Subordinate to the Minister of Public Force is the Commandant who exercises authority over major components of the Army, as shown in Figure 11.

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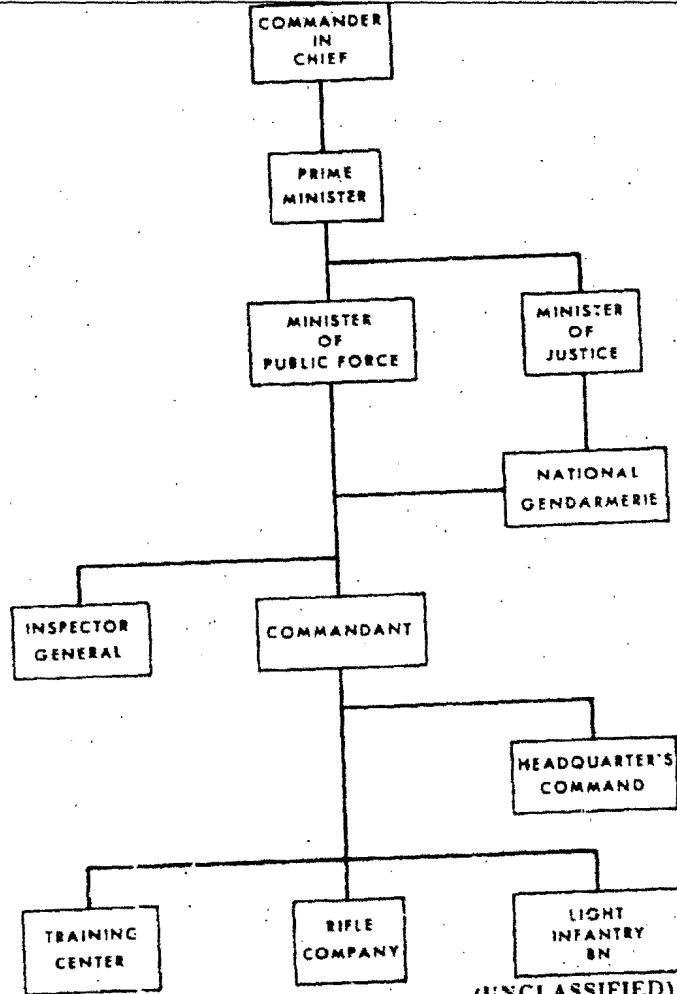
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Figure 11. Luxembourg Army Command Structure (U).

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5. ~~(C, NFD)~~ BW Materiel

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6. ~~(C, NFD)~~ Conclusion

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C. TRENDS AND FORECASTS

7. (U) Trends

The status of public health and medicine will continue to reflect conditions in other West European countries as a result of Luxembourg's integration into European affairs. Although Luxembourg will fully support NATO, it will not develop offensive military programs nor initiate research in BW related areas.

8. ~~(C)~~ Forecast

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Section IX.

THE NETHERLANDS

A. INTRODUCTION

1. ~~(C)~~ Historical Background and Competence in Microbiology and Public Health ^u
 - a. ~~(C)~~ Historical Background

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- b. ~~(U)~~ ~~(C)~~ Competence in Microbiology and Public Health

(1) (U) Science and technology have maintained a position of importance in the Netherlands for many generations. Dutch scientists are highly skilled in the fields of microbiology and the medical sciences, and the public health system in the Netherlands is

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equivalent to, and in some respects better, than that of the US. The Netherlands' technological goal has been to maintain a recognized position in international scientific affairs.

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2. (U) Geographical and Political Factors

a. The Netherlands is located on the North European Plain between the North Sea, West Germany, and Belgium. The land area is about 13,000 square miles or about one-fifth the size of the State of Maine. The terrain is predominantly low, flat plains with about one-third lying below sea level. Cross-country movement in much of the country would be severely hindered by the dense network of canals and drainage ditches. The maritime climate is dominated by prevailing onshore winds from the west or southwest, which result in high humidity and abundant cloudiness. Air operations are most favorable from May through September.

b. The Dutch are a moral, industrious, and self-contained people. National stability is manifested in a long established constitutional monarchy, a popularly elected parliament,

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and working coalition governments drawn from the major political groups. Government established agencies define the national scientific and technological (S&T) goals for which funds are provided by government and industry; however, the bulk of funds are contributed by private industry. Research is carried out in university institutes, semi-governmental cooperative facilities, and large research laboratories of Dutch-based international industries. The government's policy has been to provide maximum encouragement and support with a minimum of direction to S&T efforts. Its influence functions indirectly through the institutes, committees in which it participates with provincial and municipal governments, through quasi-governmental bodies, and with private industry. This places emphasis on cooperative decisions in cooperative institutions with joint channels of responsibility. The TNO is the country's largest semi-private cooperative through which the government exercises its influence. The strong scientific tradition coupled with the carefully organized program of participation by government, semi-private, and industrial research organizations has favorably affected the advancement of science in the Netherlands.⁴

B. ASSESSMENT

3. ^u~~(S-NFO)~~ Order of Battle
 - a. ~~(S-NFO)~~ Military Personnel and Organizations.
 - (1) ~~(S-NFO)~~ Responsible Organizations.

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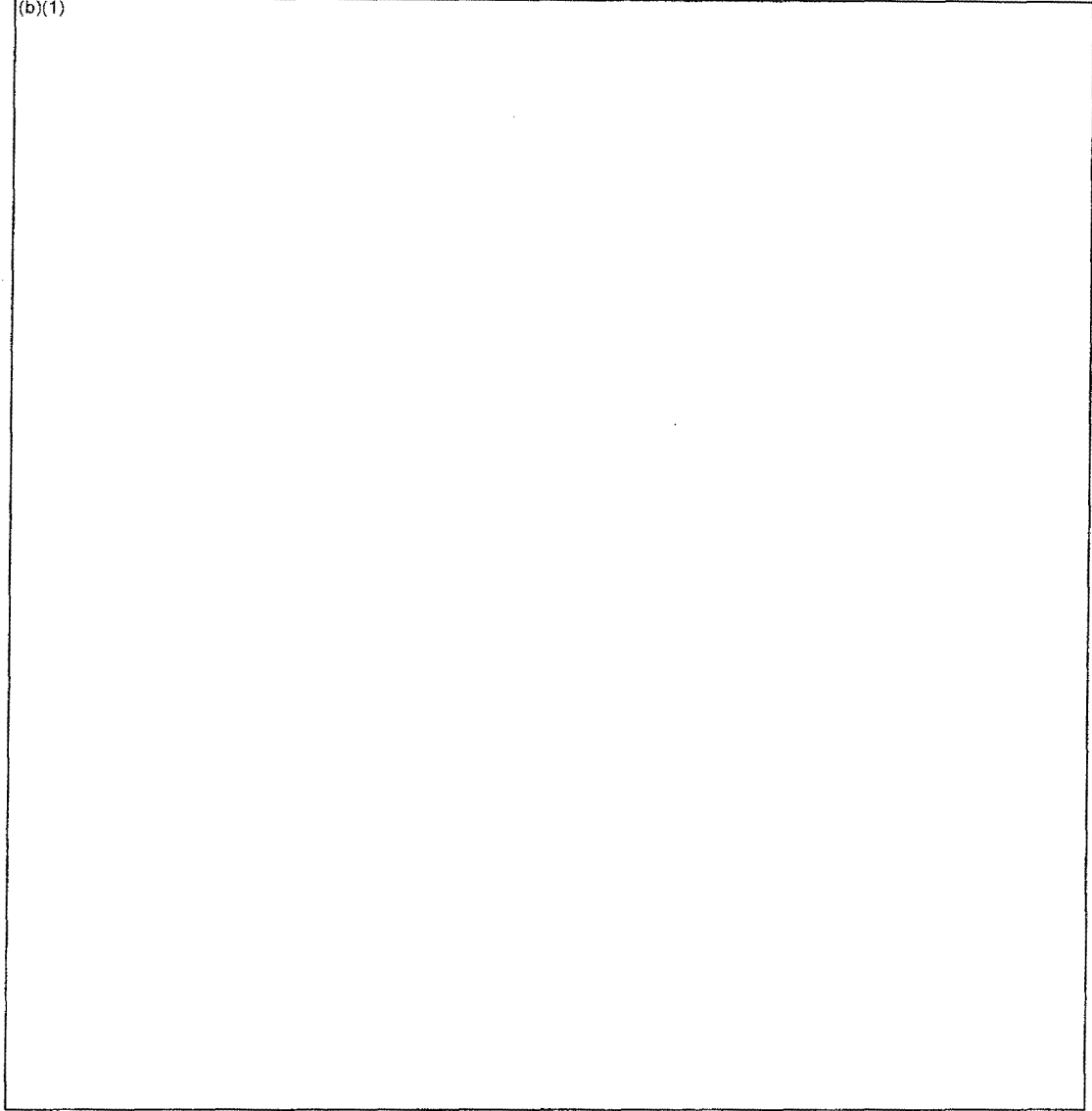
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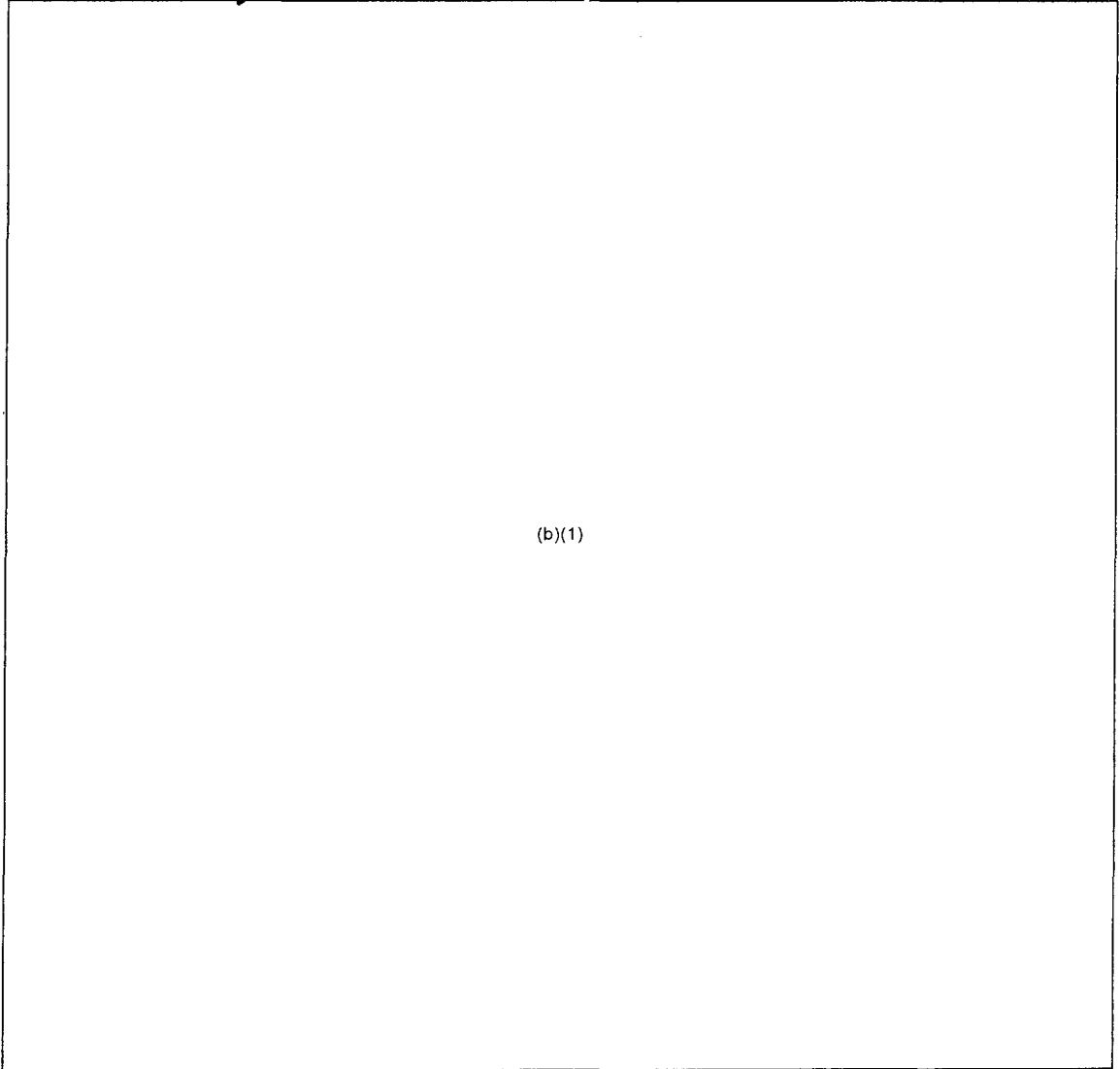
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(-4) ~~(S)~~(b)(1) CBR training schools



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4. ~~(C)~~ Doctrine and Procedures Governing the Use of BW Weapons

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6. ~~(C)~~ BW Materiel

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(4) (U) Although no standard collective protectors for field use are known to be available, the US M113 armored personnel carriers and the German Leopard tanks in the RNA are equipped with collective protection systems.^{6 7}

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Figure 12. Netherlands protective cape (U).

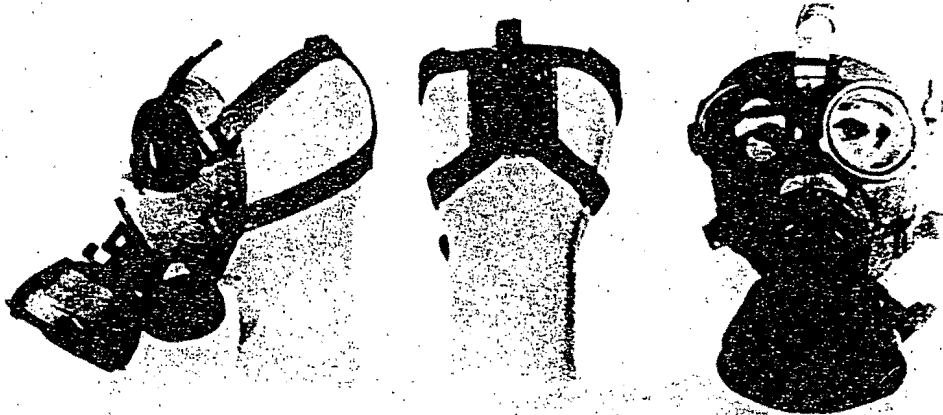
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Figure 13. Netherlands Model K protective mask (U).

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d. ~~(S)~~ (C/NFD) Production Sites.

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8. ~~(S)~~ (C) BW Research, Development, and Testing

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b. (U) The Central Organization for Applied Natural Scientific Research (TNO),
The Hague.

(1) (U) This organization, created by an Act of the Netherlands Parliament in 1932, is an impartial, non-profit, establishment with a mission to stimulate applied research throughout the scientific community. Organizations under the TNO are decentralized and consist of special organizations, each dealing with scientific research for a specific range of objectives. The government contributes about 70 percent of available funds with the remaining 30 percent accruing from contributions by industry and from third party research projects.

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Table VI. Major Dutch Pharmaceutical Producers (U)

Company	Location	Products
Amsterdamsche Chininefabriek N.V.	Amsterdam	Biologicals
Central Institute for Veterinary Research	Amsterdam	Biologicals for human and animal use
Nederlandsche Combinatie voor Chemische Industrie N.V.	Amsterdam	Antibiotics & Biologicals
Phillips-Duphar	Amsterdam	Antibiotics & Biologicals
Royal Tropical Institute	Amsterdam	Yellow Fever Vaccine
Koninklijke Nederlandsche Gist-en Spiritus Fabriek N.V.	Delft	Biologicals & Drugs
Merck, Sharp & Dohme	Haarlem	Biologicals & Drugs
Organon	Oss	Biologicals & Drugs
Central Serum Institute	Rotterdam	Biologicals (human and animals)
N.V. Chefarce Maatschappij (Chemische Fabriek Rotterdam)	Rotterdam	Biologicals & Drugs
Franken Donders N.V. United Aniline Works	Tilburg	Biologicals
Cooperative Apothekers Vereniging De Onderlinge Pharmaceutische	Utrecht	Biologicals & Drugs
National Institute for Public Health	Utrecht	Serums & Vaccines

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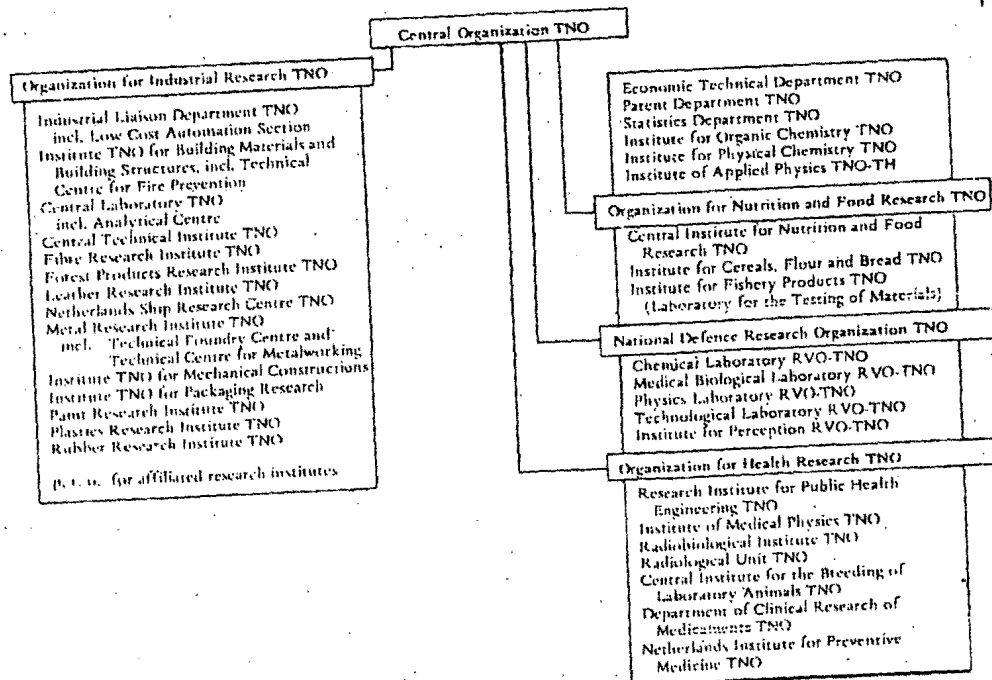
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(2) (U) The TNO staff numbers about 4000 and includes 700 with Ph.D. degrees, 600 with B.Sc. degrees, and 600 technicians. Organizations subordinate to TNO are: The Organization for Industrial Research, The Organization for Nutrition and Food Research; The National Defense Research Organization; and The Organization for Health Research (Figure 14). These research disciplines combine into one organization a variety of expertise which can be directed to research of a complex nature when desired. Through sponsored research and cooperative research with industrial firms, the TNO maintains excellent contacts and working relationships with the scientific community.³



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Figure 14. The Organization for Applied Scientific Research (TNO) (U).
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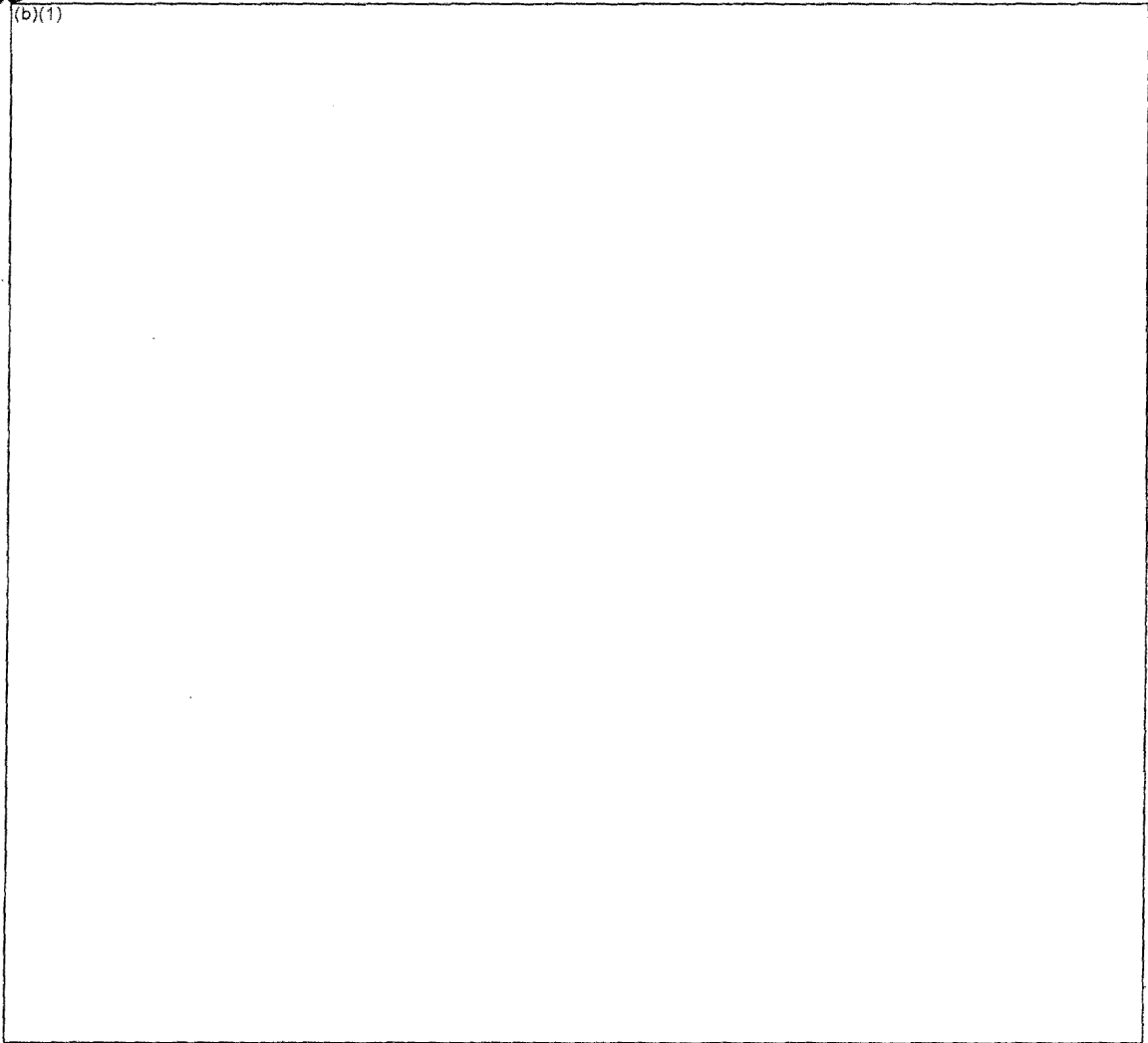
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(2) (U) The Technological Laboratory, Rijswijk. This laboratory is primarily concerned with explosives and rockets, but also develops NBC protective equipment.

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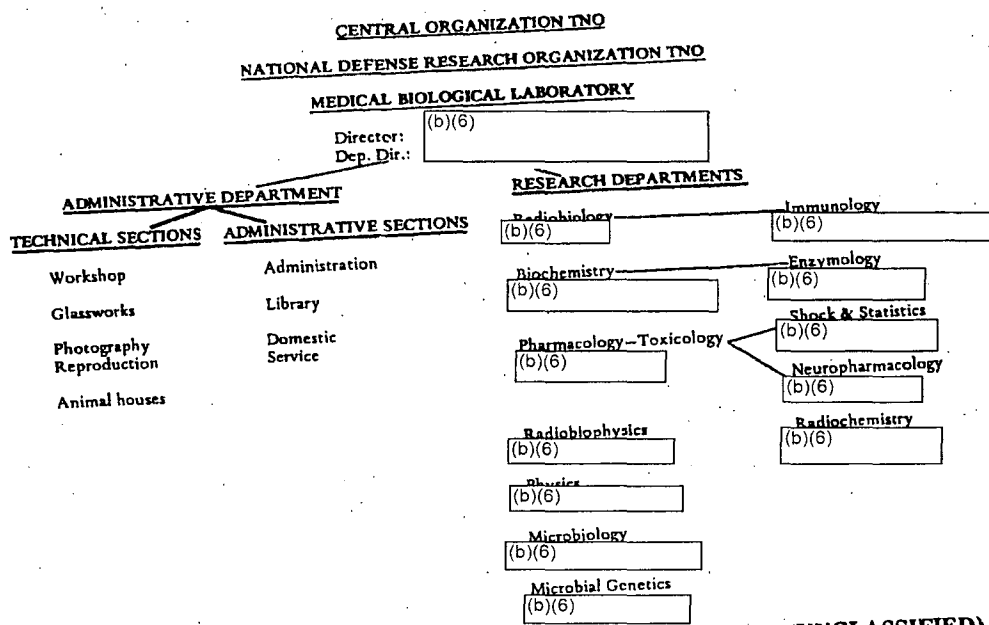
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(S) (U) The Physics Laboratory, The Hague. Primary research efforts concern communications and electronics.

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Figure 15. Organization of the Medical Biological Laboratory (U).

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l (5) ~~(C)~~ State University of Utrecht, Catharynsengel 59, Utrecht.

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d. ~~(U)~~ Other Institutes of Interest.

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(2) (U) Van Hemert of the Apparatenfabriek von Doorn, Utrechtseweg 364-De Bilt described problems associated with the growth of tissue cells and production of viruses in 1968. The inability to control environmental conditions was cited as a serious propagation weakness. This was particularly true for oxygen tension since high oxygen concentration inhibited cell division but favored viral propagation. Recently, this company circulated brochures which described fermentors of 5, 10, and 50 liter capacities which were completely instrumented and which included a steam-sterilizable oxygen electrode. Reportedly, the oxygen tension can be controlled under a variety of conditions by automatic regulation of oxygen, nitrogen, air, and carbon dioxide concentrations. The oxygen tension probe can be sterilized repeatedly at 120°C. The inclusion of these electrodes in a fully instrumented fermentor provides an excellent system for producing tissue culture cells for subsequent viral infection.⁵⁹

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(4) (U) The Phillips-Duphar Company is engaged in the development of special drugs, medical equipment, vaccines, and anti-viral compounds. Brucella vaccine is manufactured by fermentation, then inactivated by heating at 50-75°C.⁶⁰ Other vaccines are under development.

e. ~~(S)~~ Anti-Crop Research

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(2) (U) Research on plant viruses has included studies of the mechanism of infection, isolation and purification of plant viruses, characterization and synthesis of protein and nucleic acids isolated from plant viruses, and from insect vectors.⁶³ Interest has also been evident in controlling insects by infecting them with specific viruses.⁶⁴

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9. ~~(C-NEB)~~ Naval BW Capabilities

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10. ~~(S-NFD)~~ Conclusions

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C. TRENDS AND FORECASTS

11. ~~(S)~~ Trends

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12. ~~(S)~~ Forecasts

a. Short-Range (1972-1977).

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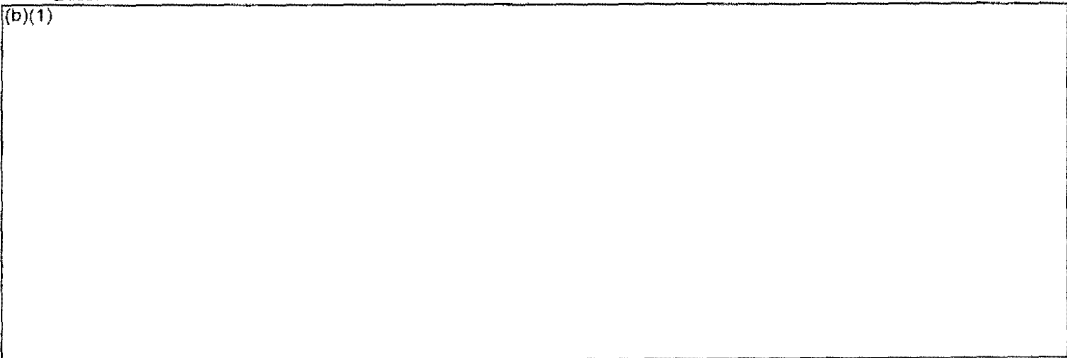
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Section X.

NORWAY

A. INTRODUCTION

1. (U) Historical Background

As a signator of the Geneva Protocol of 1925, Norway has renounced the use of chemical and biological agents and research to develop offensive weapon systems. Norway has also signed the 1972 BW Disarmament Convention.

2. ~~(S)~~ Competence in Microbiology and Public Health:

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B. ASSESSMENT

3. ~~(S)~~ Order of Battle

a. ~~(C)~~ Military Personnel and Organizations

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4. ~~(S)~~ Doctrine and Procedures

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5. ~~(S-NPT)~~ BW Materiel

a. (U) Offensive. No agents and/or other offensive materiel has been acquired. It is deemed unlikely that Norway will develop such a capability. In the event of an all-out war, and if the Norwegian Ministry of Defense deemed it militarily advantageous to use a biological weapon, they would at this time have to obtain the weapon system from another NATO country. However, unilateral national decisions made by the United States have stripped NATO countries of offensive biological warfare capability.

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6. ~~(S/NFD)~~ Production Facilities and Capabilities

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Table VII. Principal Norwegian Producers of BW Defense-Related
Antibiotics and Biologicals (U)

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7. ~~(S/NFD)~~ Stockpiling and Storage Facilities

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8. ~~(S/NFD)~~ BW Research and Development

a. (U) Prior to World War II, the scope of research in Norway was very limited, and the economic resources too small to facilitate a strong development of research activities. Since 1945 there has been an expansion of research capacity. A significant feature of Norway's post-war development was the establishment of three research councils: The Royal Norwegian Council for Scientific and Industrial Research (NTNF), founded in 1946; The Norwegian Research Council for Science and the Humanities, founded in 1949; and The Agricultural Research Council of Norway (NLVF), also founded in 1949. Large proportions of funds have been devoted to planning or encouraging scientific and scholarly activity at the state colleges and universities. The work of the research councils has also been of great

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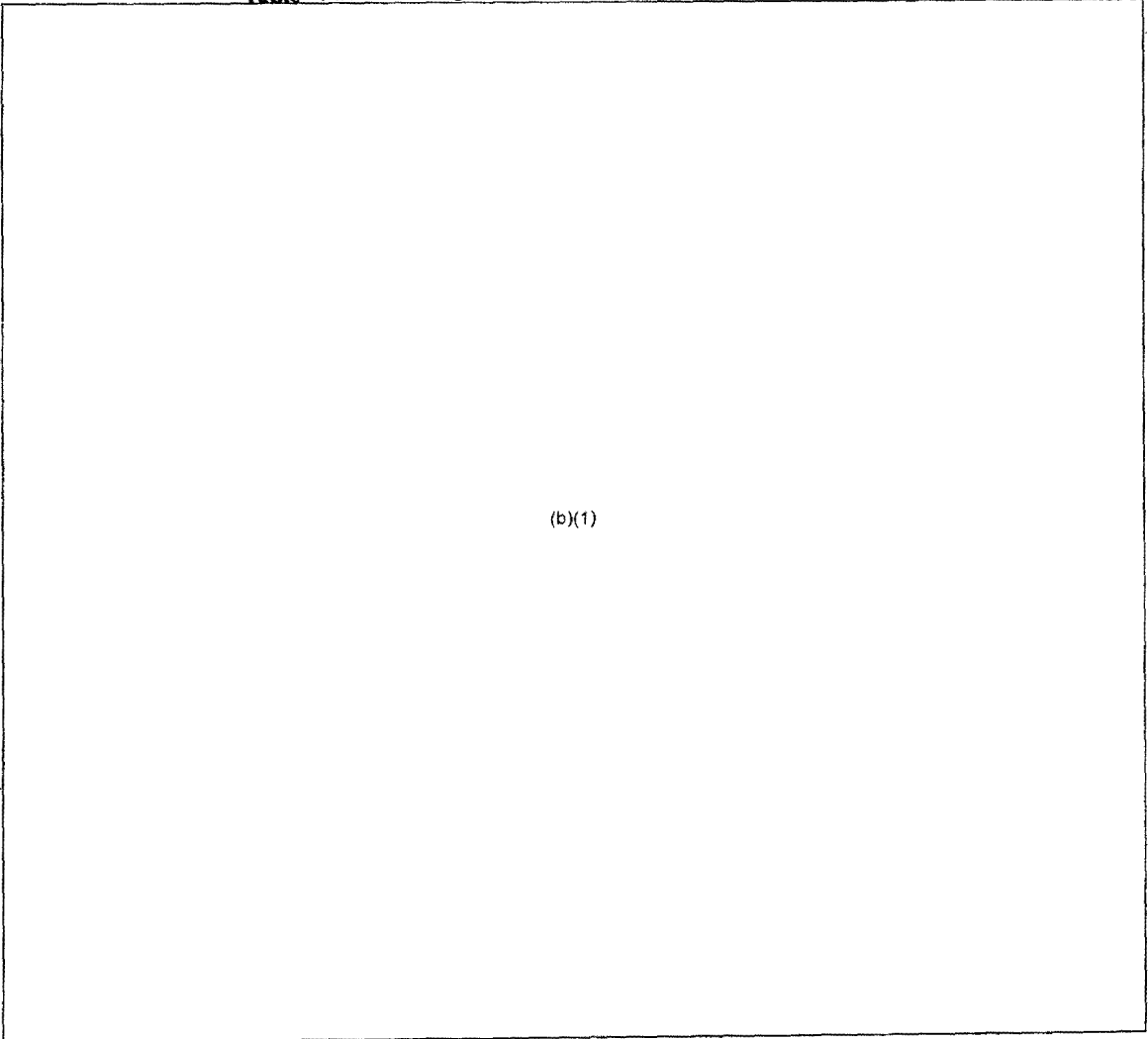
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Table VIII. Norwegian Military Medical Depots (U)



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significance in strengthening and expanding research activities outside the universities and state colleges.

b. (U) The Norwegian Science Advisory Council was established by Royal Decree in 1965, and is responsible to the Prime Minister. Its fifteen members are appointed by the Government for a period of 4 years. The main task of the Council is to provide advice on matters related to scientific and technological research in all fields to the Government and in particular to the Ministerial Science Committee, which is an interdepartmental body of the Government established to coordinate science activities at government level. The Research Councils play a very important part in policy making. For example, apart from grants to atomic energy research, earmarked by Parliament, the Councils have a free hand in the distribution of funds, regardless of whether they are derived from the State, from the State-owned football pool, or from other sources. The Councils have the right to grant funds to governmental institutions and higher institutions of learning run entirely by the State, and can accordingly influence the activities of the institutions. The Councils also influence science policy by direct representation on the boards of the various institutes, through direct influence on their own institutes, and finally through active work for the recruitment of scientific personnel.

c. (U) Norwegian research institutes include universities and colleges (all of which are controlled and administered by the Government), Government institutes connected with various Ministries, institutes connected with the Royal Norwegian Council for Scientific and Industrial Research, and finally private non-profit institutes connected with research associations.

d. (U) Despite considerable expansion over the past years, the universities have been unable to satisfy the demand for scientists and engineers. At least 40-50% of Norway's graduate engineers take their degrees abroad. This is also true in medicine and dentistry. Several of the important universities are cited here. The University of Oslo, which was established in 1811, enrolled 13,000 students in 1966. Of this number, 2,800 were studying mathematics and the natural sciences, while 750 were matriculated in the department of medicine. The Industrial Research Center, Blindera, together with the Research Center at Trondheim can be regarded as main institutes for industrial research in Norway. The University of Bergen is also a major center of learning, as is The Technical University of Norway at Trondheim where emphasis is placed on architecture, mining, and metallurgy, civil, chemical, mechanical and electrical engineering, and on the general sciences. Two other universities of lesser importance are the Agricultural College of Norway and the Veterinary College of Norway.

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c. (U) The Norwegian Defense Research Establishment (NDRE) at Kjeller was established in 1946 under the Ministry of Defense and was built up around a nucleus of scientists experienced in wartime defense research. Personnel at NDRE conduct fundamental and applied research in fields important to the defense of Norway. They particularly evaluate progress in military science and technology. For example, they conduct research on Norwegian geophysical peculiarities which could be of importance for both the national and NATO defense, and facilitate national production of weapons and materiel by encouraging the development of weapons and equipment particularly suitable for use in the Norwegian environment. The NDRE acts in an advisory capacity to the Ministry of Defense, the Defense Staff, and the three services in all matters of fundamental importance covered by its field of activity. Within the NDRE there are divisions of physics, chemistry, electronics, underwater warfare, explosives, and toxicology. A Defense Research Board of 10 members formulates the general research policy of the Establishment and approves major new research projects within the framework of funds and personnel made available by the Ministry of Defense. The staff at NDRE numbers about 400, of which nearly 130 are scientists and graduate engineers. For 1966, it had a budget of 20,000,000 NK (\$3,000,000). The Establishment receives its financial support for some of its projects from other national organizations and from sources in the United States: the Mutual Weapons Development Program (MWDP) has been one of the principal contributors.⁵

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C. TRENDS AND FORECASTS

10. ~~(S)~~ Trends

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11. ~~(S)~~ Forecasts

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Section XI.

PORTUGAL

A. INTRODUCTION

1. (U) Competence in Microbiology and Public Health

a. The Ministry of Corporations, Social Welfare, Health and Public Assistance is the responsible agency for matters concerning the health of the country. In addition, there are regional health offices in Lisbon, Porto, and Coimbra. Supporting these regional offices are 22 political district health offices.

b. Common animal diseases indigenous to Portugal are brucellosis, anthrax, rabies, and African swine fever.

- There are few highly qualified scientists available to conduct necessary research.

2. ~~(C)~~ Political Factors &

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B. ASSESSMENT

3. ~~(C)~~ Order of Battle &

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5. ~~(C)~~ BW Materiel

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6. ~~(C)~~ Production and Stockpiling

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7. ~~(S-NFD)~~ Research and Development

a. (U) Institutes and Facilities.

(1) (U) Research programs in biology and medicine are chiefly concerned with problems related to public health and preventive medicine. This quality of work is considered to be relatively unsophisticated. Portugal is a signatory of the 1972 BW Disarmament Convention

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(2) (U) Investigators in the Plant Genetics and Rice Breeding Section of the Plant Breeding Department at The National Agronomy Station in Oeiras have been developing disease resistant strains of rice, wheat, barley, and rye. The development of strains yielding more grain per acre has also been given some priority. These investigations have been at least partially successful.^{6/12} This work was under the direction of Engineer C. G. de Melo e Mota, Chief of the Genetic Department, and Engineer M. A. da Cunha Vianna e Silva, Chief of the Rice Breeding Section, Department of Plant Pathology. Dr. Manuel Bravo Lima, the only plant nematologist in the country, also works at the National Agronomy Station.

(3) (U) The Institute of Tropical Medicine supports programs related not only to diseases and public health problems indigenous to Portugal, but also those affecting the overseas provinces in Africa, Portuguese Timor, and Macao.⁸

(4) (U) At best, the biological research in Portugal is considered to be of a low level.

b. (U) Biological Agent Development.

(1) (U) There are no known facilities or institutes specifically directed toward the development of biological warfare agents.

(2) (U) The only work in biological genetics has been referenced previously, and is concerned solely with the improvement of crop resistance to disease and with enhancing higher yields of specific crops.⁶

c. ~~(S/NFD)~~ Methods of Dissemination. μ

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d. ~~(S)~~ Detection and Identification.

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(2) (U) As a NATO member, Portugal does have access through NATO sponsored scientific meetings to information relating to the latest developments for the detection and identification of biological warfare agents.

e. (U) Vaccines, Sera, and Chemotherapeutic Agents.

(1) (U) Although small quantities of various vaccines, sera, and other therapeutic and prophylactic biologicals are produced in Portugal, such supplies must be augmented from sources outside the country.

(2) (U) There is no known research being carried out in Portugal to develop procedures for aerogenic immunization.

8. ~~(S)~~ Naval Aspects of Biological Warfare

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9. ~~(S, A, T, D)~~ Conclusions

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C. TRENDS AND FORECASTS

10. ~~(C)~~ Trends

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11. ~~(C)~~ Forecasts

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Section XII.

TURKEY

A. INTRODUCTION

1. (U) Historical Development

a. Since the establishment of the Republic, the government has established modern disease control practices, health services, and facilities. Preventive campaigns have eliminated severe epidemics which once took heavy tolls in rural areas, and education and public works have raised the standard of rural hygiene, although facilities and personnel were few in number. By 1968, the cities and larger towns had access to good health care. However, as in the country, total medical resources are spread rather thin.

b. Inadequate public sanitation and a harsh climate are two of the principal factors affecting the health level in Turkey. However, public attitudes, especially in rural areas, contribute to lower standards of sanitation.¹

2. (U) Public Health Competence

a. Since World War II, there have been many advancements in health facilities due largely to the efforts of the Ministry of Health and Social Welfare and its planning and operating agency, the General Directorate of Health. A Director of Health Services has been assigned to each province; otherwise, the Directorate's functions are highly centralized. It plans preventive programs, supervises existing facilities, establishes standards and fees for the medical profession, conducts sanitation inspections, and promotes research and education. It supervises the School of Hygiene where health officers and physicians are given special training, and the Refik Saydam Institute of Hygiene, a laboratory that engages in research, diagnosis, and manufacture of vaccines and sera.¹

b. The limiting factor in Turkish public health competence is lack of both trained personnel and adequate facilities. Research standards are also limited by these same inadequacies, which in turn, affects training in secondary schools. Competent scientists and mathematicians are in short supply despite a government drive to improve and foster scientific education and employment. However, low pay and lack of facilities will continue to frustrate this goal for some time to come.

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Turkey has no rapid warning and detection devices. Decontamination equipment is scarce. Turkey possesses no known BW weapons system.

4. ~~(S/NFI)~~ Doctrine and Procedures

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5. ~~(S/NFI)~~ BW Materiel

a. (U) Offensive Materiel. Turkey is not known to possess either biological agents or munitions or to be engaged in research to develop offensive materiel of any kind. Guidance from the US has been requested in establishing CBR programs, but the emphasis was to be on defense aspects.³

b. ~~(S/NFI)~~ Defensive Materiel.

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6. ~~(S/NFI)~~ Production Facilities and Capabilities

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b. ~~(C)~~ Capabilities.

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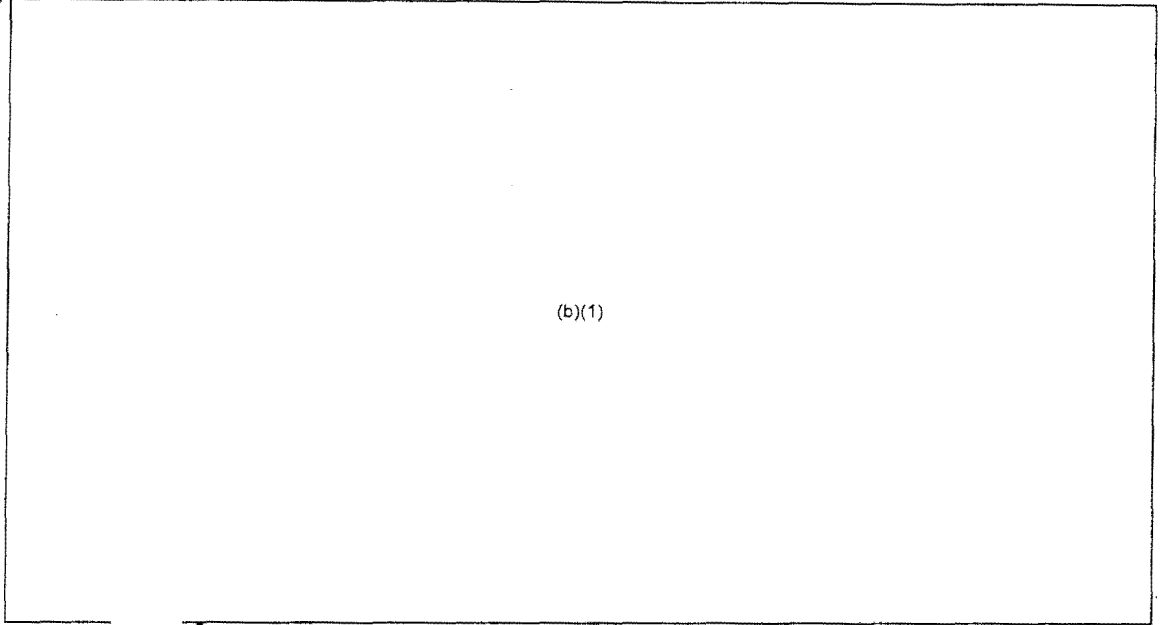
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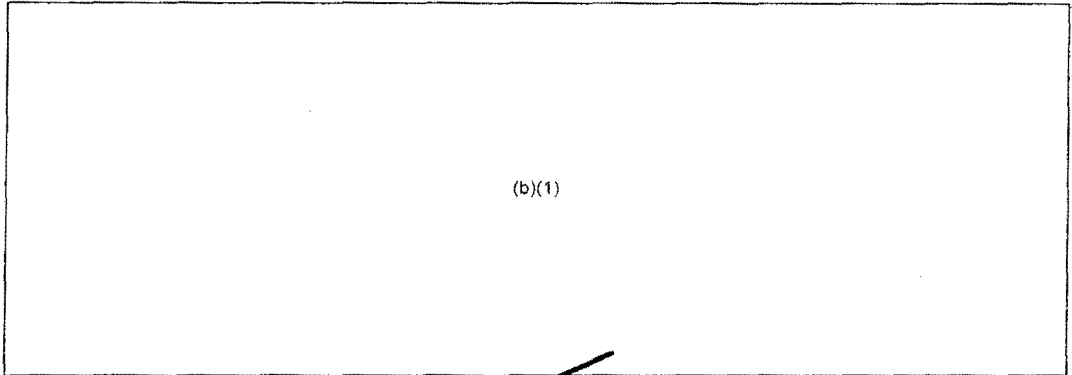
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7. ~~(S)~~ Stockpiles and Storage

a. (U) No stockpiling or storage is known to exist. It is unlikely that in the event of need more than a token amount of defensive equipment would be available. In view of the prevailing low technological level, it is unlikely that storage of BW materiel would be either safe or reliable.



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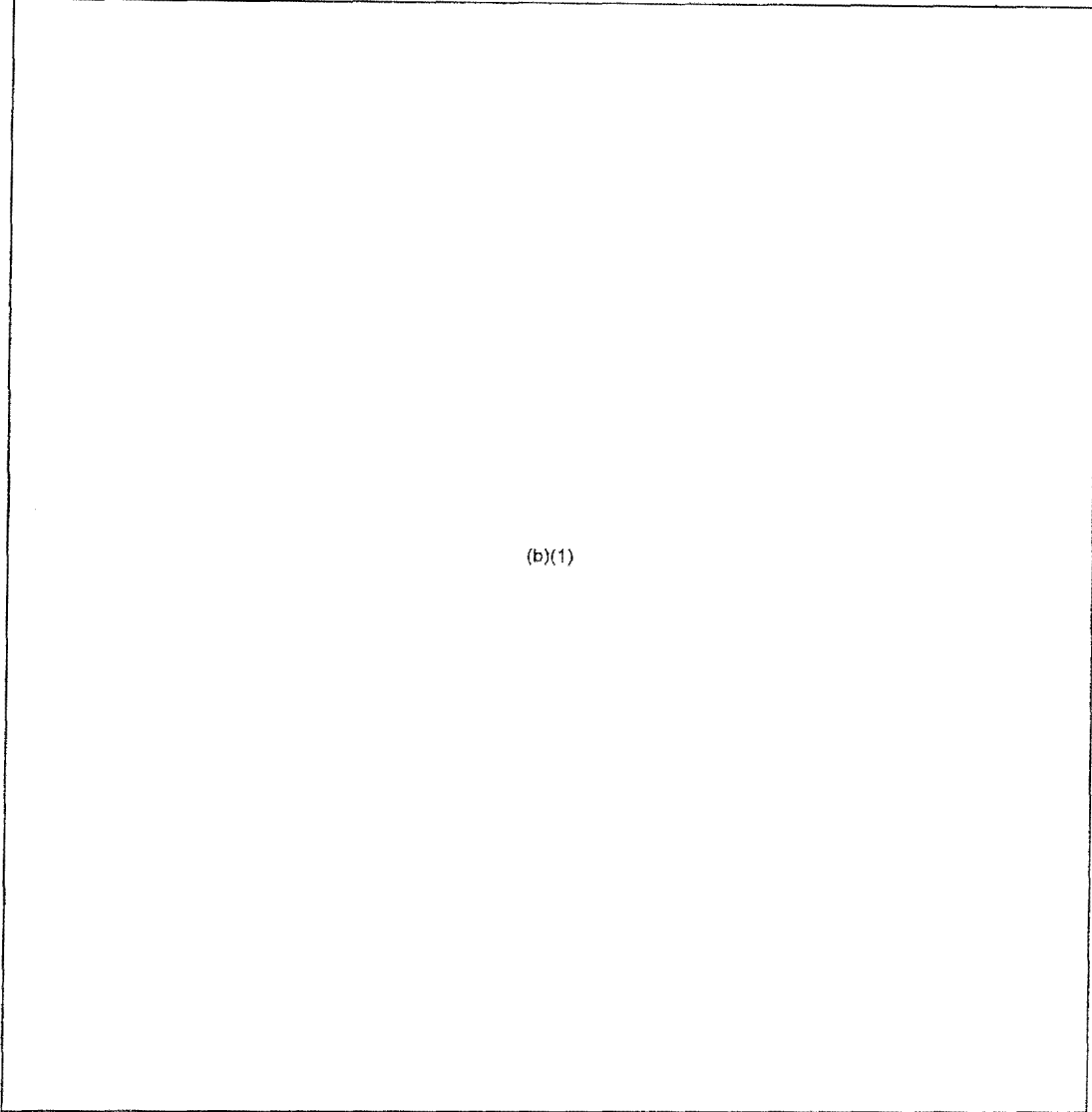
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9. (U) Naval Aspects of BW

No information is currently available which relates to specific or special offensive or defensive capabilities of the Turkish Navy. No citadel type construction or modification has been reported.

10. ~~EX~~ Conclusions ~~U~~

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Section XIII.

UNITED KINGDOM

A. INTRODUCTION

1. (U) Historical Background

British strategy for the defense of the United Kingdom and its oversea interests was for centuries based largely on control of the seas and the maintenance of alliances with strong and friendly European powers. In the post World War II period, however, the relative decline of the United Kingdom as a world power, the diminution of its colonial empire, and the vulnerability of the home base to nuclear attack have contributed substantially toward the development of a national posture of defense.

2. (U) Public Health

The United Kingdom has a wide ranging public health program. Established in 1948, this program, known as the National Health Service (NHS), makes comprehensive health services available—for the most part without charge—to everyone in the United Kingdom in accordance with medical need and without regard to nationality, residence, or insurance qualification. Available under this program are such services as hospitalization, medical and dental care, provisions of medicines and drugs, maternity and infant care, home nursing and vaccination. Providing these services by participating in the program are the vast majority of general practitioners, specialists, dentists, pharmacists and hospitals in the United Kingdom. About 97 percent of the population make use of the NHS.^a

3. ~~(S)~~ Political Factors

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B. ASSESSMENT

4. (U)
~~(S)~~ Order of Battle
NFD

- a. (U) Military Personnel and Organizations

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- (2) (U) CBR units.

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(b) (U) The Royal Navy has a NBC Protection Officer aboard each combat ship, but this is not believed to be a full-time assignment. The responsibilities of the NBC Protection Officer include: Advising the ships command as to implication of present or impending biological, chemical, or radiation hazards, and recommending appropriate countermeasures; keeping records of "total dose" absorbed by the ship's company; monitoring, and subsequently initiating decontamination and cleaning procedures to deal

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with NBC agents; training teams to accomplish these tasks; and, distributing and maintaining CBR protective devices, decontamination equipment, detection and measuring devices.³

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(4) ~~(C, M, D)~~ CBR training schools.

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(5) ^U~~(S)~~ Civil defense.

(a) (U) The Civil Defense Corps (CDC) is organized in local divisions recruited and trained by CDC agencies—usually the county and county borough authorities. Each division contains five sections. The Headquarters section is responsible for CD operations, communications, and reconnaissance. The Rescue section undertakes rescue of people who are trapped in damaged buildings and gives them first aid. The Ambulance and First Aid section administers first aid, organizes stretcher bearers, and transports casualties to Forward Medical Aid Units and hospitals. The Wardens are the general guardians within a district, helping to guide and control the public, reporting damage and radioactive fall-out, organizing self-help measures, etc. The Welfare sections look after the homeless, help with billeting, establish rest centers, implement emergency cooking and feeding procedures, and provide for public information centers.

(b) (U) There are three scientific advisors for the director of each CD district. These scientific advisors take extensive course work both within the CD organization and at appropriate universities to update their knowledge of CBR warfare, its effects, and countermeasures. In addition, volunteer CD workers must undergo during their first two years with the organization at least 50 hours of training, part of which is devoted to CBR. Refresher courses and exercises are continually held.

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b. ^U~~(S)~~ Military Equipment.

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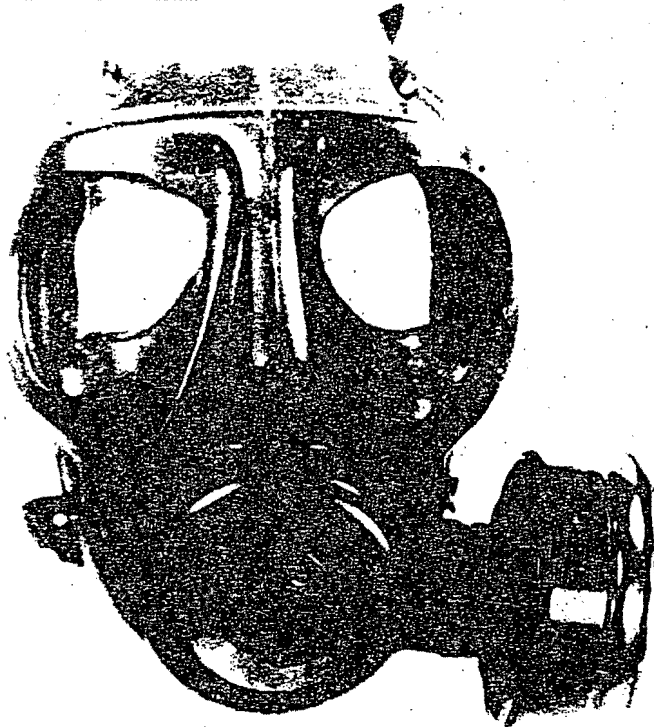
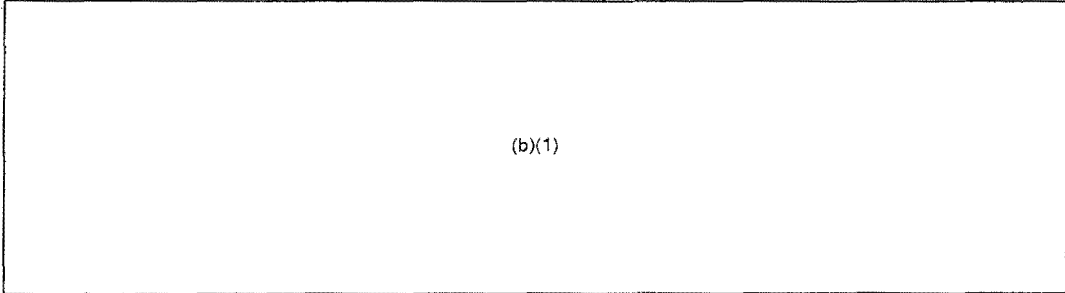
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5. ~~127~~ Doctrine and Procedures



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Figure 16. British Model S-6 protective mask (U).

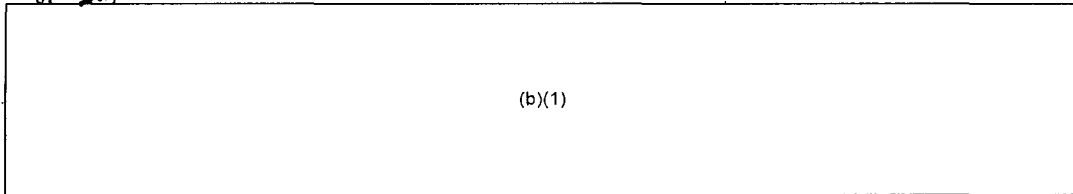
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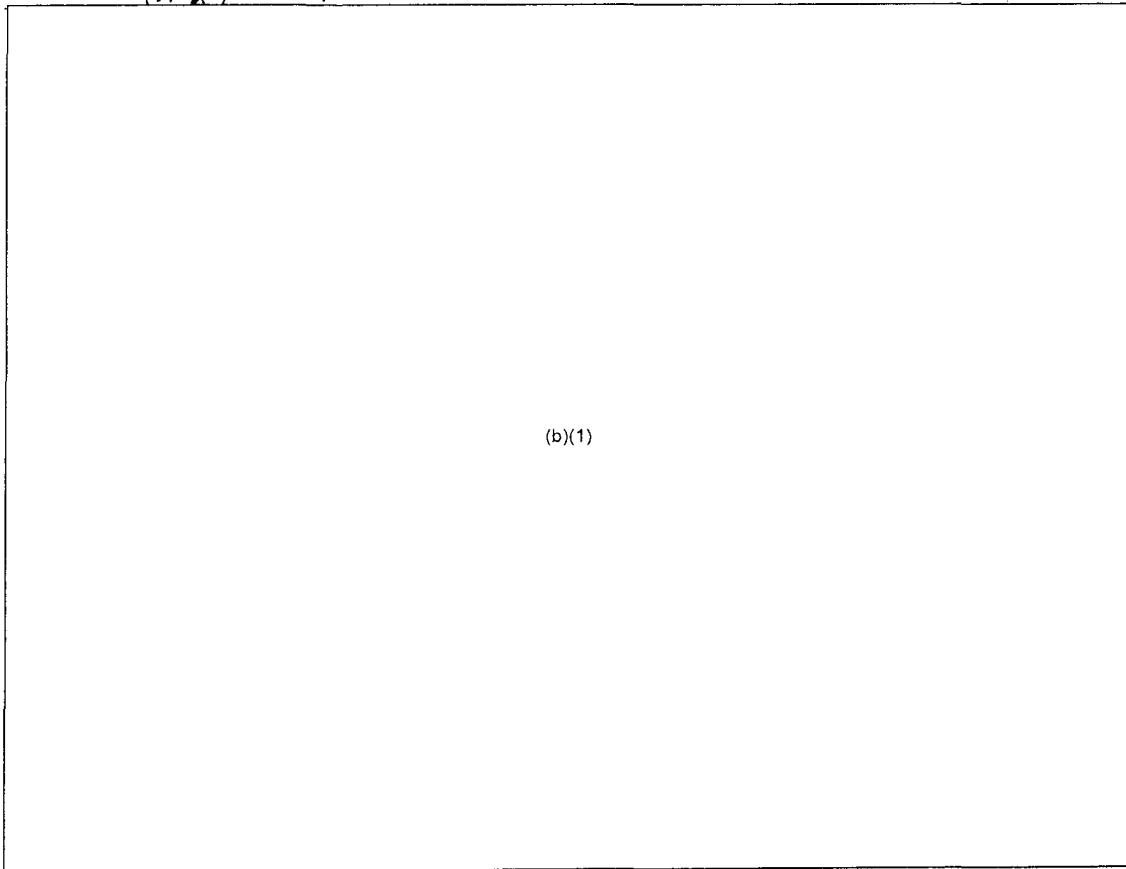
6. ~~(S)~~ BW Materiel



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b. ~~(S)~~ Defensive. ~~(S)~~

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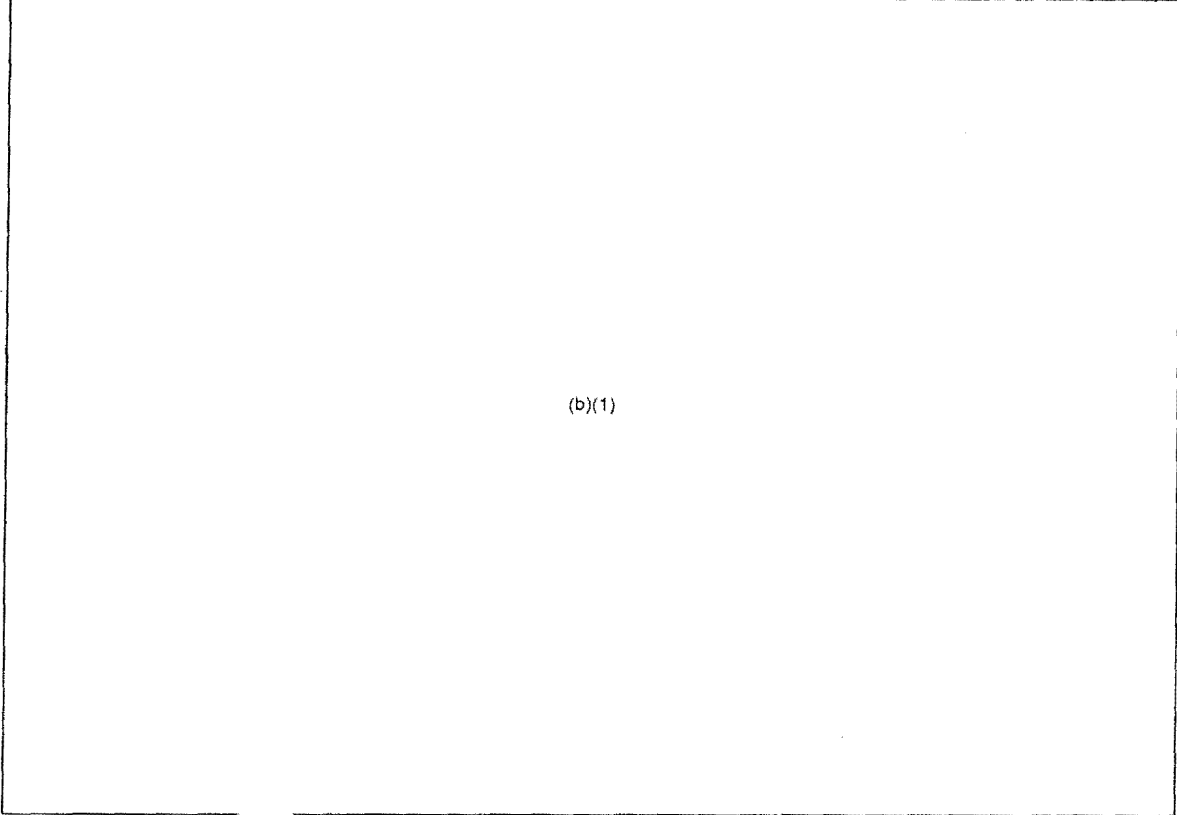
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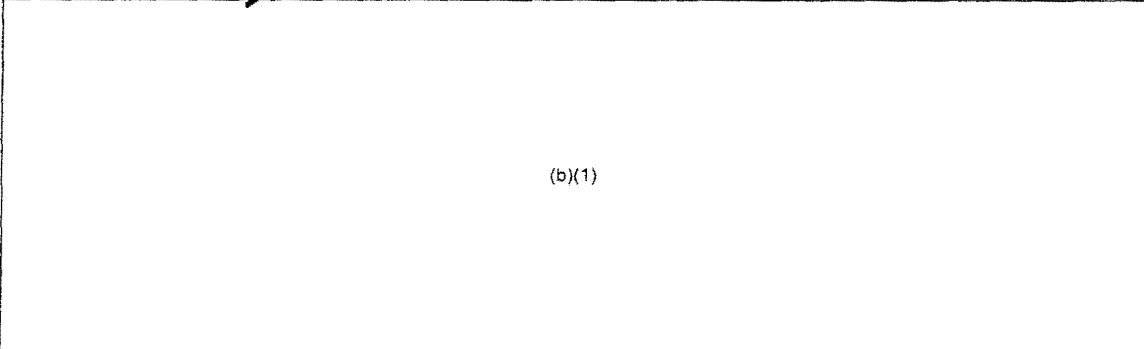
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(2) ~~(S)~~ Civilian



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7. ~~(S)~~ Production Facilities and Capabilities

~~(S)~~ Biologicals.

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(2) (U) A virus production facility has recently been formed at MRE and will soon be able to produce viruses on a substantial scale if the requirement exists. Production of chick embryo cells, used in the culture of certain types of viruses, is now semi-automated and highly efficient.^A

b. ~~(S)~~ Equipment

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c. (U) Pharmaceuticals. The pharmaceutical industry in the United Kingdom is large and comprises several hundred independent firms. Approximately 72 companies are major producers. In 1965 the industry produced goods valued at \$600 million, and employed a labor force of approximately 72,000. Large quantities of drugs and other pharmaceuticals are exported. There is no known production of pharmaceuticals and biologicals specifically designed for defense against BW, however, some types of material being produced do have BW defense application.²

8. ~~(S)~~ Stockpiling and Storage Facilities.

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9. ~~(S, NF, D)~~ Research and Development

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a. ~~(S)~~ Research Facilities.

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(3) (U) In addition to in-house research, MRE administers several extramural contracts. Currently these have been let to:

(a) (U) University of Birmingham. Studies here are concerned with the Semliki Forest Virus, vaccinia extra-viral antigens, and improvements in immunochemical technique.

(b) (U) London School of Hygiene and Tropical Medicine. Work emphasizes the effects of measles virus, yellow fever virus, and human adenovirus (type 5) on cultures of nervous tissue.

(c) (U) Queen Elizabeth College, University of London. Program is designed to investigate bacterial leaching of uranium and copper from their oxide and sulfide ores.

(d) (U) University of Bristol. Because equipment suitable for microscopy and the micromanipulation of *Staphylococcus* is not yet available, preliminary studies have been carried out on the comparatively large cells of a sewage organism. Improved instrumentation is being developed to permit near-ultraviolet illumination, with versatile phase-contrast facilities and photographic recording of observations.

(e) (U) University of Oxford. Investigations emphasize aspects of biochemical research.

(f) (U) Oxford Polytechnic. Hydroxyapatite columns have been used for the chromatographic separation of strains of Semliki Forest virus.

(4) (U) There has been considerable collaboration with the Medical Research Council (MRC), the Public Health Laboratory Service, and the Ministry of Health that is of an applied nature. These investigations include evaluations of disinfectants, studies of bacterial permeability through surgical wrapping paper and bags, analyses of bacterial infections which spread in hospitals, and characterizations of air filters and filter materials.^{1/8}

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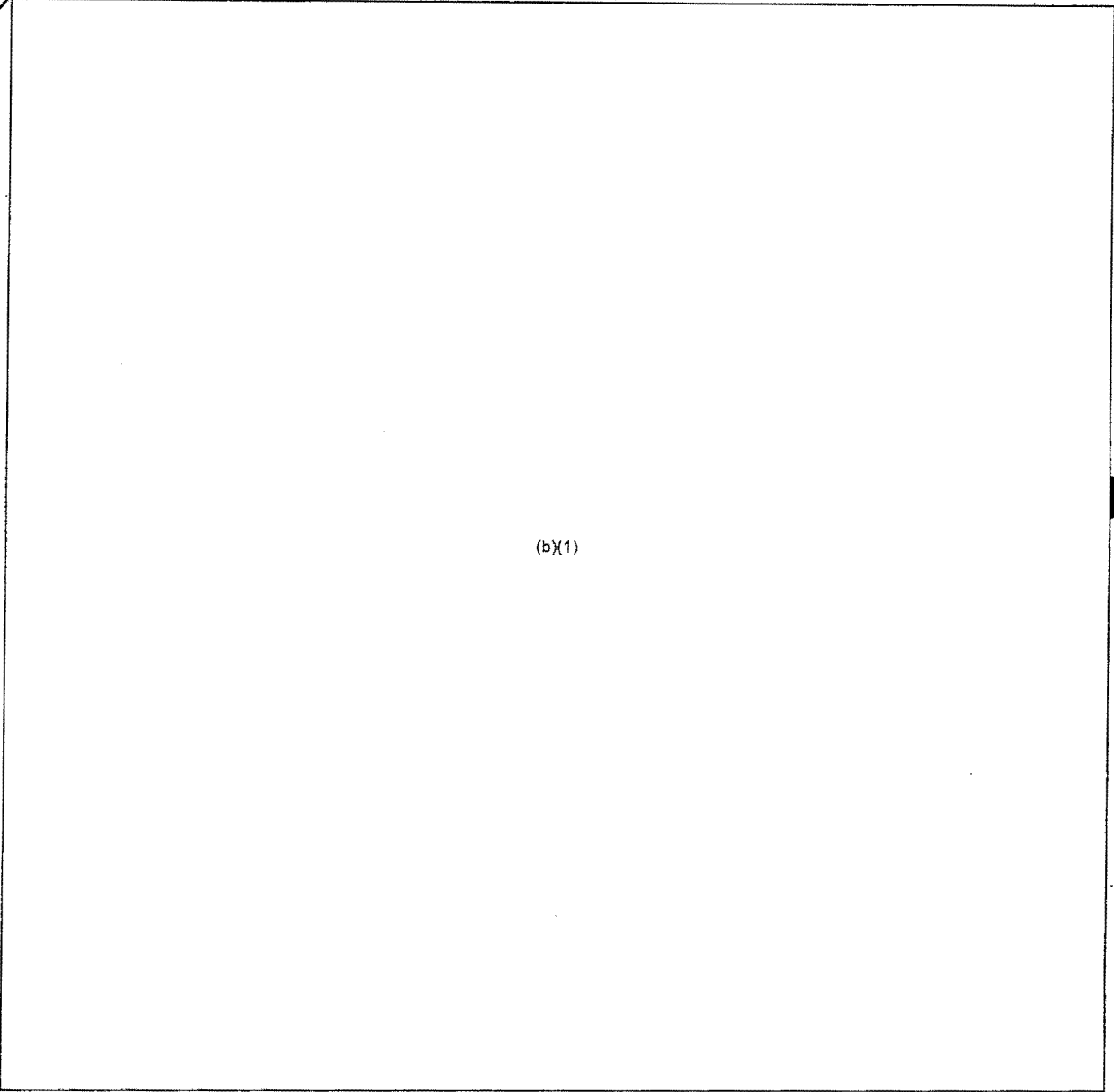
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c. ~~(S)~~ Detection and Identification.

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10. ~~(S)~~ Naval Aspects of BW

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11. ~~(b)~~ Conclusions

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11. ~~(S)~~ Conclusions

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C. TRENDS AND FORECASTS

12. ~~(C)~~ Trends

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13. ~~(C)~~ Forecasts

e a. Short-Range (1972-1977).

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e b. Mid-Range (1977-1982).

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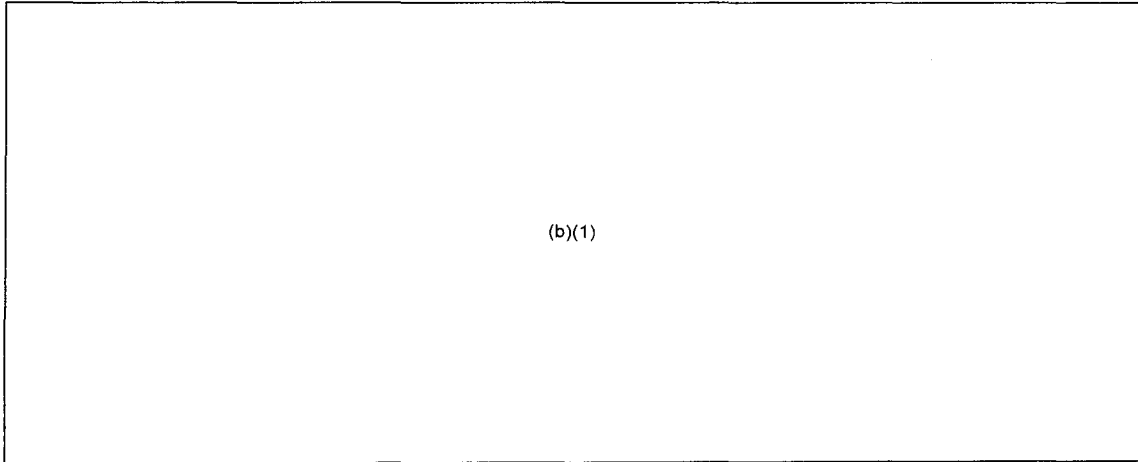
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Section XIV.

WEST GERMANY

A. INTRODUCTION

1. ~~(S-NFD)~~ Historical Background

a. (U) West Germany's activities in the field of biological warfare are restricted by the Brussels Treaty of 1948 which forbids the production of toxic CW munitions, and the London and Paris agreements of 1954 which prohibit research and development leading to the manufacture of weapons of mass destruction. These later agreements were further enforced by the Federal Republic of Germany Ministry of Defense (MOD) in accordance with the Brussels Declaration of 1955, in which the MOD stated that it had not exceeded and would continue to abide by these restrictions. In 1972 West Germany signed the BW Disarmament Convention.

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h. (U) The Federal Republic of Germany was founded in 1949 by uniting the three western zones of occupation of the former German Third Reich. At the end of World War II, the structure of scientific research throughout Germany had been completely shattered. It has been estimated that more than 60% of all research establishments which predated 1939 had been destroyed, and that scientific research was at a virtual standstill. Universities and other academic and scientific institutions had also suffered so severely that only 6 of 30 institutes of higher learning were able to open when hostilities ceased.

i. (U) One of the first important steps towards reorganization was taken by the British in 1946 when they brought several important German scientists to Göttingen and provided housing, laboratory accommodations, and equipment. From this small nucleus grew one of West Germany's most significant non-industrial and independent organizations for the promotion of research, The Max Planck Society for the Advancement of Science. This group was officially recognized in both the American and British zones in February, 1948, and by the French in October, 1949.

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2. (U) Research Base

a. The Federal Republic of Germany (FRG) is comprised of eight States and the free cities of Hamburg and Bremen. This is an important factor in understanding educational and scientific policy. The FRG is a polycentric country, and the science policy is primarily the responsibility of the States, not of the FRG. There is no federal authority for science and research. Consequently, each state provides the main support for scientific research in all academic institutions, and each state has its own educational practices. However, to achieve some unity, there is the Permanent Conference of Ministers for Cultural Affairs, a body politic made up of representatives from the offices of each State Ministry for Cultural Affairs. In 1951, the German Research Association was formed which has become the central organization within the Federal Republic dealing with all fields of scientific research.

b. Today the FRG has one of the best scientific and technological bases to support research in almost any field, including both offensive or defensive aspects of biological warfare if it so desires. In all likelihood, it has the largest group of scientifically trained personnel in all of Europe, and it is perhaps second only to the United States in having a large corps of young, enthusiastic, energetic, and dedicated scientific personnel. It is interesting to note that while prior to World War II young German men found their greatest rewards in military service, today in West Germany this age group is finding its greatest financial and personal satisfaction in research, industry, and business administration. It is of the utmost importance that the intelligence community of the United States keep abreast of all phases of research and development within the FRG.

B. ORDER OF BATTLE

3. ~~(S)~~ Military Personnel and Organizations Responsible for BW

a. ~~(S)~~ Responsible Organizations within MOD.

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Military Technology

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(2) (U) The BWB is responsible for the procurement and testing of all equipment and materiel for the armed forces. One of its twelve subunits, the Engineer and Field-equipment Division, *Pionier und Truppengerate* (PT), is responsible for the procurement, testing, and quality control of CBR equipment. Of the two testing facilities maintained by the BWB, the Testing Laboratory No. 53 at Munsterlager deals with the technical evaluation of CBR defense gear.

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b. ~~(C)~~ CBR Units.

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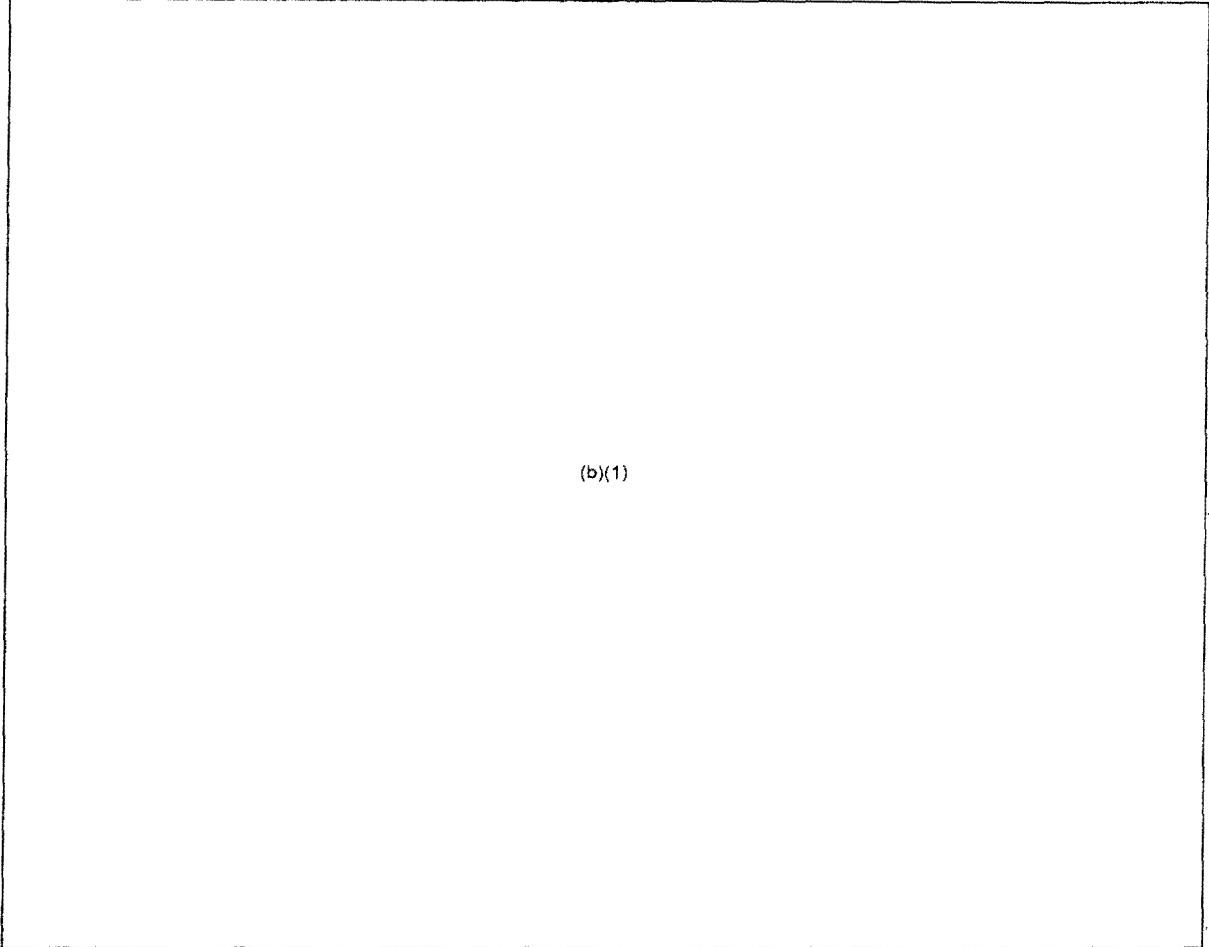
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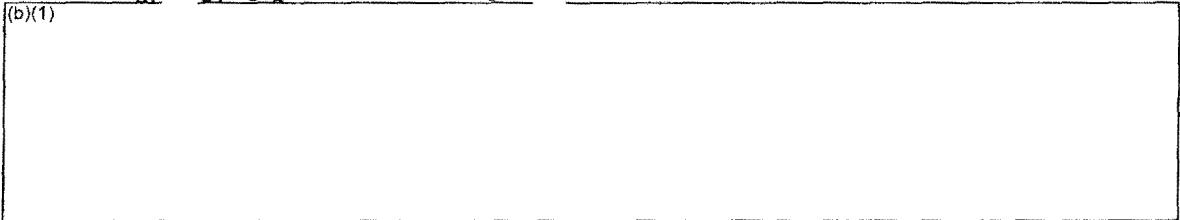
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d. ~~10~~ ~~SI~~ Organization and Strengths

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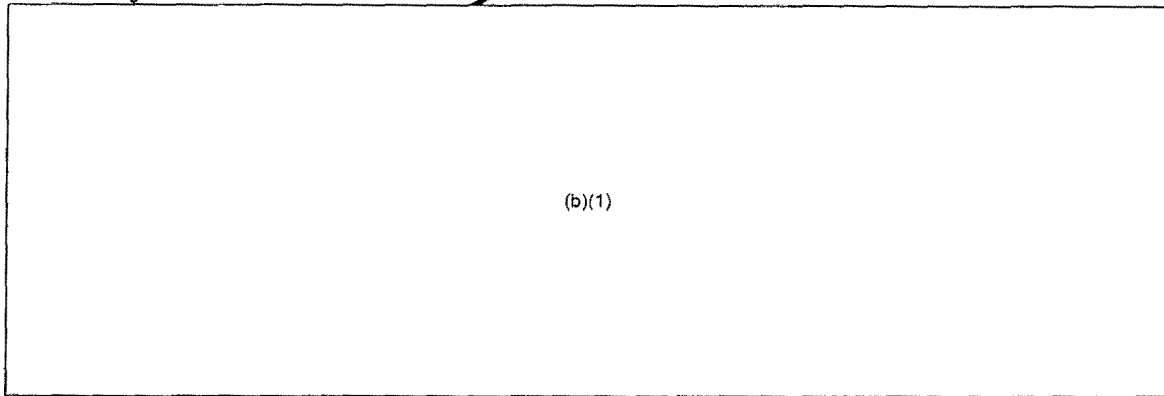
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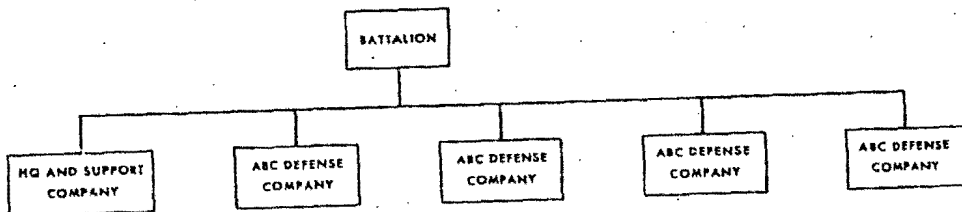
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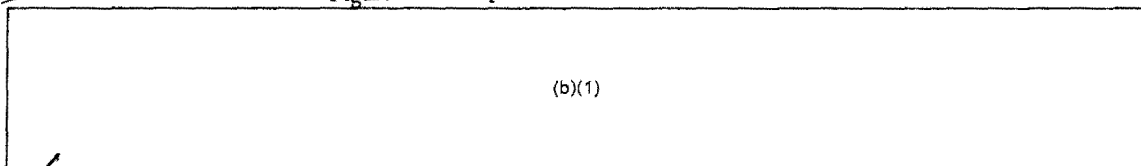


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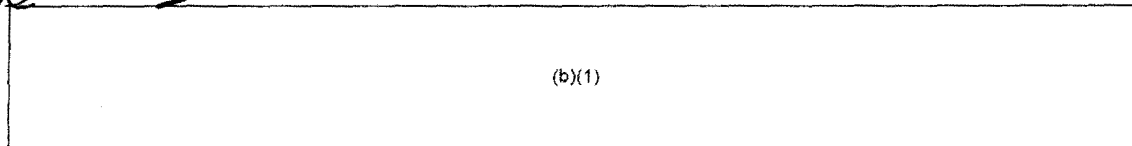


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Figure 17. Corps ABC Defense Battalion (U).

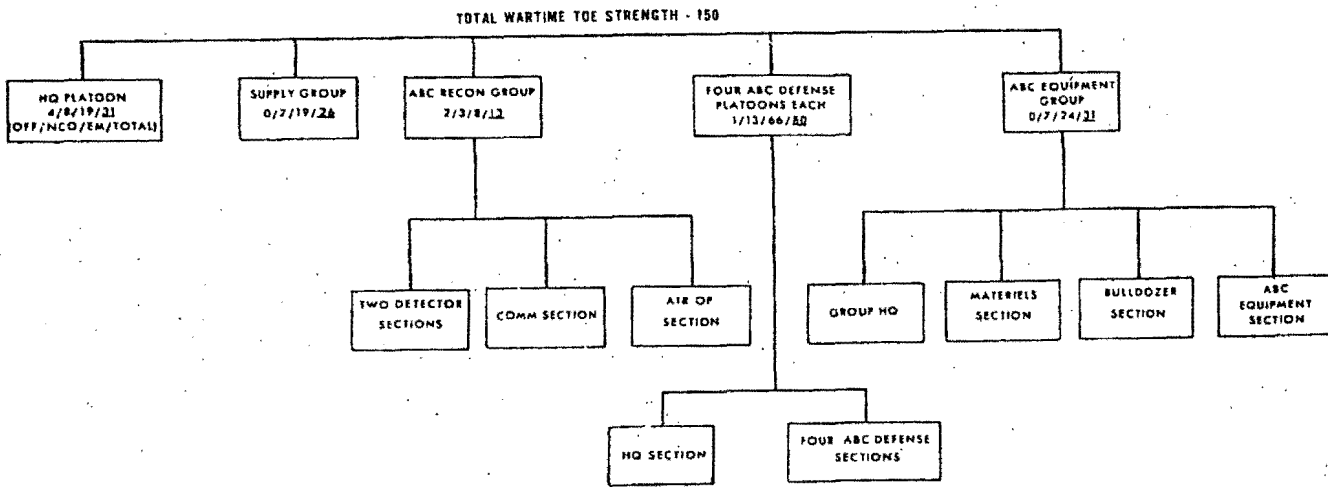


~~F. C. NT~~ CBR Training Schools.



(2) (U) The CBR school in Sonthofen is an all-service school, although the Army is most strongly represented. An ambitious program of instruction is carried out.

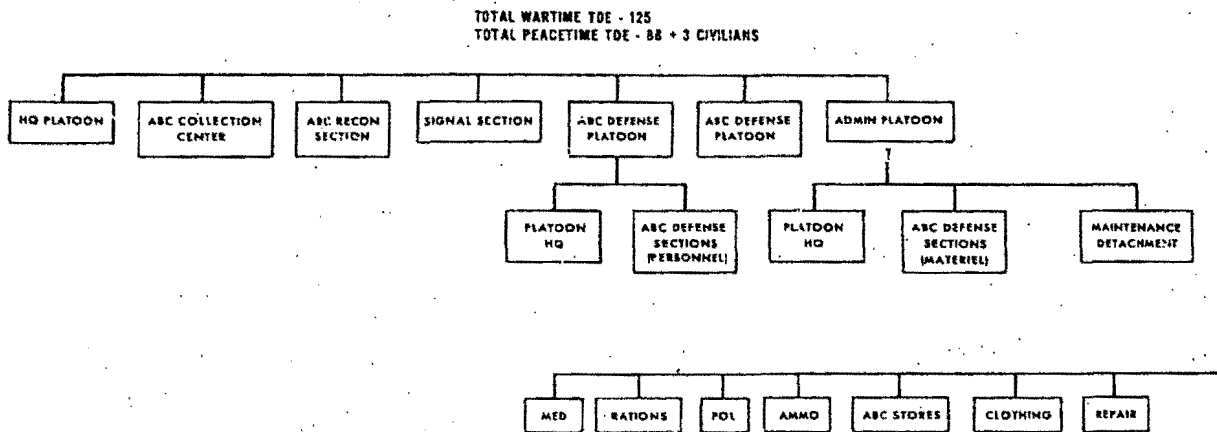
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Figure 18. Divisional ABC Defense Company (U).

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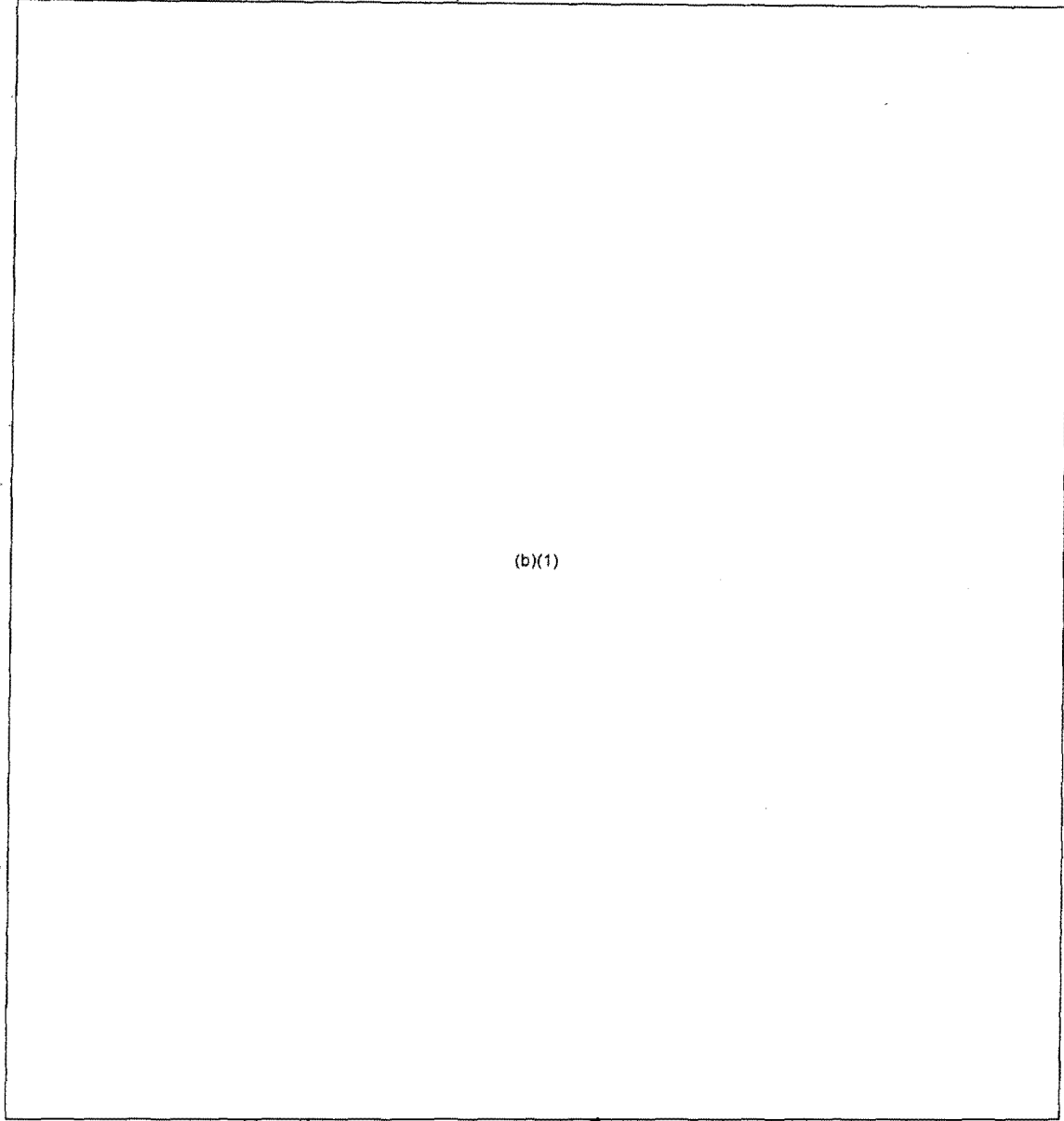
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Figure 19. ABC Defense Company—Armored Infantry, Infantry Brigade and Armored Brigade (U).

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4. (U) Civil Defense

The Federal Republic of Germany is aware of its responsibility to take all possible measures to safeguard the civilian population against CBR attacks. Defense measures are taken within the framework of Civil Defense in close cooperation with the armed forces. In 1965 the Bundestag passed Civil Defense laws covering various aspects of civil response to natural disaster and war. One of the requirements is that each citizen is to protect himself against the effects of radioactive fallout, and biological and chemical weapons.⁹ There is no current information on the implementation of these laws.

C. DOCTRINE AND POLICY GOVERNING THE USE OF BW WEAPONS

5. ~~(S)~~ Doctrine

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6. ~~(S-NED)~~ Policy

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D. DOCTRINE AND PROCEDURES FOR DEFENSE AGAINST BW

7. ~~(S)~~ Military

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8. ~~(C)~~ Civilian

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E. BW MATERIEL (OFFENSIVE)

9. ~~(C)~~ Weapon Systems

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10. ~~(C)~~ Offensive Equipment

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F. BW MATERIEL (DEFENSIVE)

11. ~~(C)~~ Military --

a. Protective Masks.

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Figure 20. West German Model M-65 protective mask (U).

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d. Decontamination.

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12. ~~(S)~~ Civilian

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G. PRODUCTION FACILITIES AND STOCKPILING

13. ~~(C/NPD)~~ General

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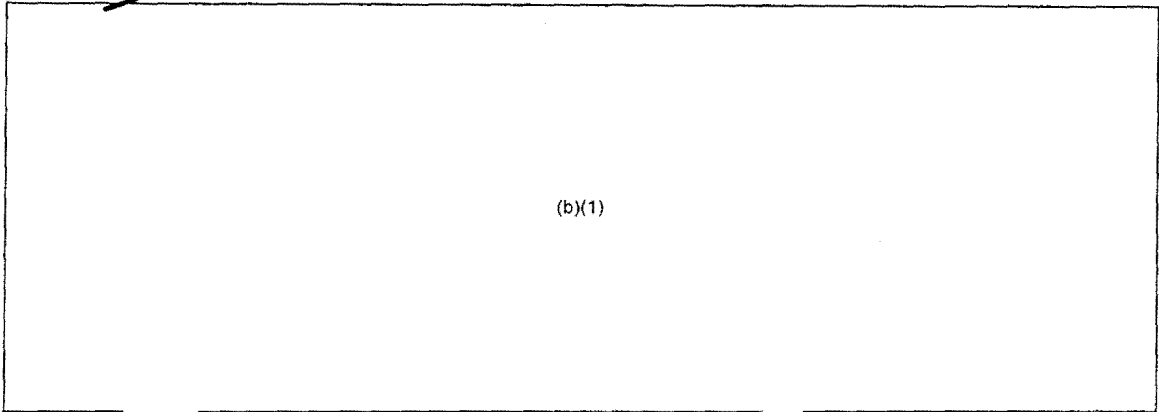
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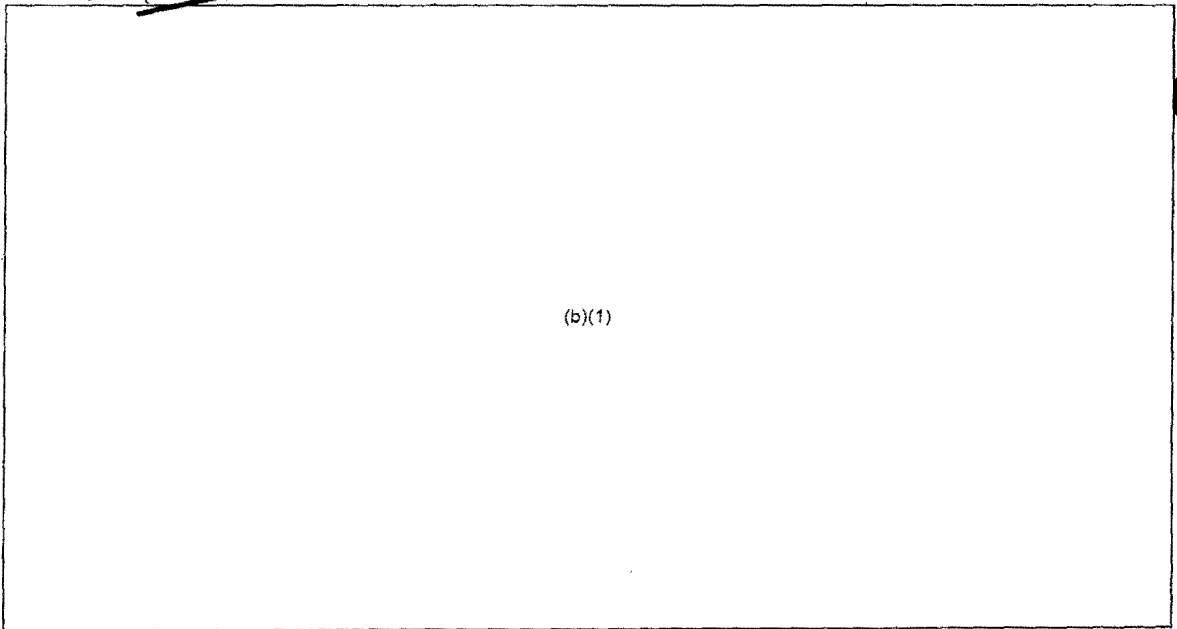
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14. ~~(C-NFD)~~ Production Sites



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15. ~~(S-NFD)~~ Defensive Equipment Produced and Stockpiled



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Table IX. West German Military Medical Depots (U)

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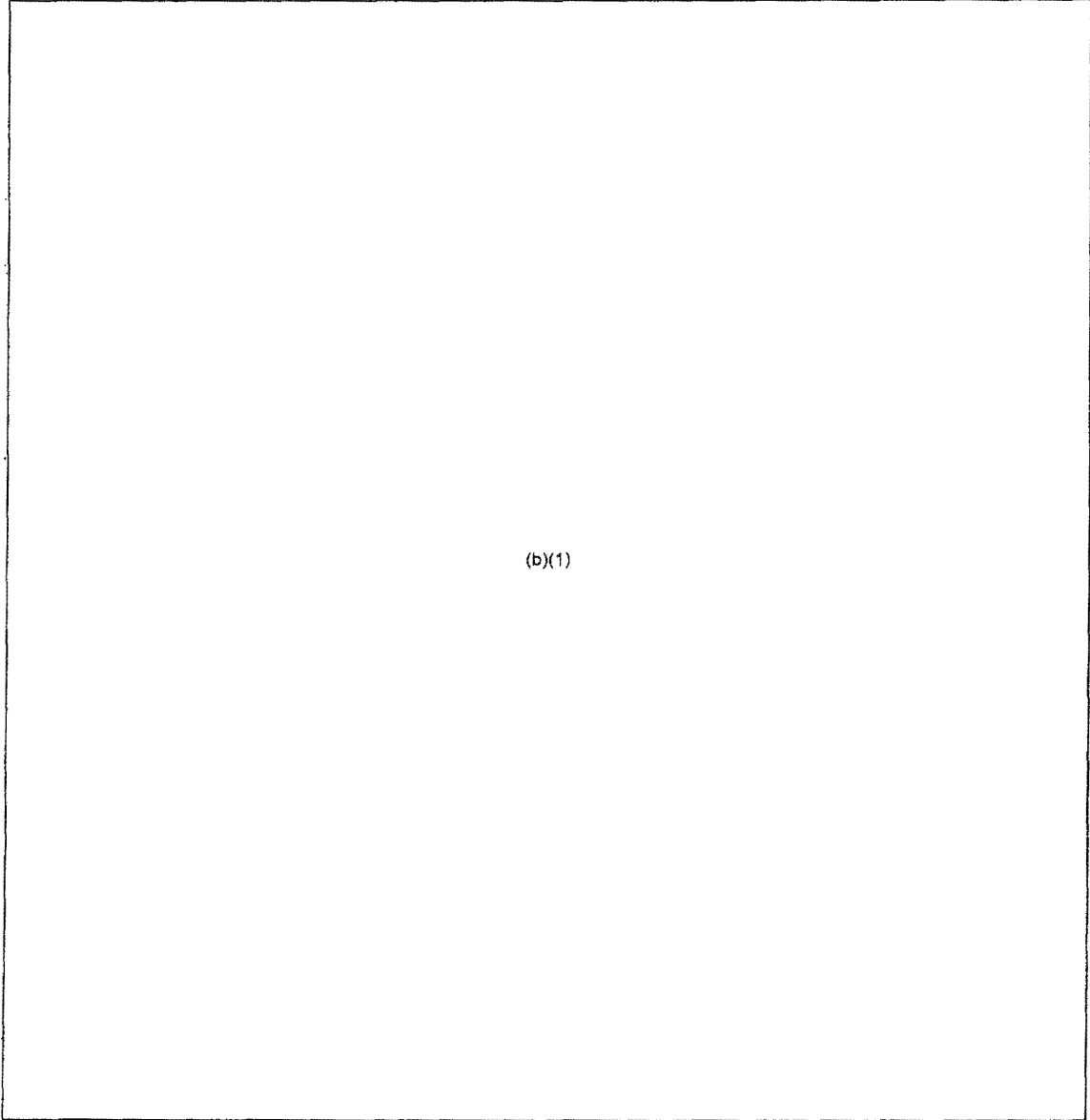
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Table X. Major West German Pharmaceutical Producers (U)

Company	Location	Products
Asta Works Chemical Factory, Inc.	Brackwede	biologicals
E. Merck Chemical Factory, Inc.	Darmstadt	drugs
Cassella Mainkur Dye Works, Inc.	Frankfurt	antibiotics
Hoechst Dye Works, Inc.	Frankfurt	antibiotics
Dauelsberg Penicillin Company	Göttingen	antibiotics
Pfizer, Inc.	Karlsruhe	drugs
Bayer Dye Works, Inc.	Leverkusen	antibiotics
C. F. Boehringer and Sons Co.	Mannheim	antibiotics biologicals
Behring Works, Inc.	Marburg	antibiotics biologicals
CIBA, Inc.	Wehr	drugs

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H. BW RESEARCH AND DEVELOPMENT

16. (U) Civilian Research Institutes and Facilities

a. General Science Policy. Scientific investigators in the Federal Republic of Germany enjoy today a high degree of freedom, due primarily to the cultural autonomy of the States. There is no government pressure to compel, either directly or indirectly, scientists, research workers, or teachers to adopt certain methods or views. The Donor's Association for Promoting Arts and Sciences in Germany, The Max Planck Society, and the German Research Association are completely autonomous and independent of any government department.

b. Academic Institutions. Universities of historic significance include:

- (1) Ruprecht Karl University of Heidelberg (founded in 1386);
- (2) The University of Cologne (1388);
- (3) Gottingen University (1757);
- (4) The University of Wurzburg (1402);
- (5) University of Munster (1780);
- (6) University of Freiburg (15th century);
- (7) Justus Liebig University, Giessen (1607);
- (8) University of Tubingen (1472);
- (9) University of Marberg (1527).

c. Scientific Societies. The FRG has many scientific societies which have earned international recognition. Some of these are:

- (1) Association of West German Academies of Sciences and Arts;
- (2) The Gottingen Academy of Sciences;

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- (3) The Bavarian Academy of Sciences and Arts in Munich;
- (4) The Heidelberg Academy of Sciences and Arts;
- (5) The Academy of Sciences and Arts of Mainz.

d. The Max Planck Society.

(1) One of the outstanding scientific organizations in Germany, and indeed in all Europe, is the Max Planck Society for the Advancement of Science. The fundamental principle of the Max Planck Society is to maintain institutes, especially those concerned with the natural sciences and medicine, where scientists can carry out research without being involved in teaching or administrative duties. Students are normally excluded from institutes of the Society. Its founders provided considerable initial capital and made regular annual donations to ensure its freedom from governmental control. The Society is led by its President, who is Chairman of the Board of Management, a Senate, and a General Assembly of Members. The membership of the Society is divided into scientific and supporting members, and the Society is administered as a registered society by private law. The General Assembly elects the members of the Senate who hold office for a period of six years. The Senate is responsible for all important decisions affecting the life of the Society. It makes all the appointments, has the power to dissolve or establish an institute, and draws up budgets both for each separate institute and for the Society as a whole. In addition, the Senate elects the President and members of the Board of Management, who all serve for a period of six years.

(2) The following is a partial listing of Max Planck Institutes that are directly concerned with biological research or related disciplines:

- (a) Institute for Experimental Medicine—Göttingen;
- (b) Institute for Virus Research—Tübingen;
- (c) Institute of Biology—Tübingen;
- (d) Institute of Biophysics—Tübingen;
- (e) Institute of Inorganic Chemistry and Allied Fields—Frankfurt/Main;
- (f) Institute of Plant Genetics—Heidelberg;

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- (g) Institute of Medical Research—Heidelberg;
- (h) Institute of Molecular Genetics—Berlin;
- (i) Institute of Cell Physiology—Berlin.

c. German Research Association. Another non-government scientific society that functions on a national scale is the German Research Association. There is hardly any field of scientific endeavor in the Federal Republic with which the German Research Association is not concerned. Special attention is given to problems relating to the national economy and to questions of public health and welfare. The principal functions of the German Research Association are: To provide financial aid for research projects; to advise governmental and administrative authorities on matters of scientific policy; to encourage cooperation between scientific workers and, when possible, to coordinate their research activities; and to establish and maintain relationships between the Federal Republic and other countries in all branches of scientific research.

17. (U) Government-sponsored Research Facilities

The Federal Government, the State Governments, and to a lesser extent the local authorities sponsor and maintain a very large number of research institutes. Coordinating the efforts of these various institutes is the Science Council which in turn is divided into the Scientific and Administrative Commissions. The Council as a whole is responsible to the Federal Government through the Ministry for Scientific Research, and to the State Governments through their Education Ministries. Although the Scientific Commission is completely independent of any government control, the Administrative Commission is responsible through its members to both Federal and State Governments as appropriate. The Council receives its funds from the Federal Ministry of Scientific Research. This Ministry, established in 1962, supports research in all branches of science and the arts. About three-quarters of its annual budget is earmarked for applied research. The remainder is devoted to the programs of the General Promotion of Science. The Ministry for Scientific Research not only supports institutes within the Federal Republic of Germany, but also a number of institutes outside the country. In addition, it supports promising young Germans who wish to study and conduct research outside the FRG.

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18. (U) The Fraunhofer Society for the Promotion of Applied Research

a. This society has its headquarters in Munich. Though a private, non-profit institution, it receives the majority of its funds from the FRG. It has been reported that this Society is an agency of the MOD.²¹ Its principal aim is the promotion of research in all branches of applied science and technology. In 1964 research funds available to the Society amounted to 31,000,000 DM (\$10 million). Although this is the most current figure available, it is assumed that the sum has substantially increased in the intervening years. The Fraunhofer Society has eight research institutes of its own and administers the work of three others. These support research programs in a wide range of disciplines, at such diverse facilities as:

- (1) Institute for Applied Microscopy, Photography, and Cinematography—Mannheim;
- (2) Institute for Public Health and Bacteriological Techniques—Munich;
- (3) Institute for Technical Physics—Stuttgart;
- (4) Institute for Electrical Materials—Freiburg;
- (5) Institute for Aerobiology—Grafshausen;
- (6) Institute for the Chemistry of Propellants;
- (7) Documentation Center for Building Information;
- (8) Spectrochemistry and Radiochemistry Information Center.

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In 1955, the Fraunhofer Society was given the responsibility for maintaining the Patents Service for German Research. Accordingly, it provides advice and assistance to research workers and inventors with regard to the patenting and marketing of discoveries and inventions.

b. In addition to all the facilities listed in preceding paragraphs, industrial firms of the FRG maintain large research staff and/or sponsor research institutes or foundations. A number of these would include the:

- (1) Volkswagen Foundation;
- (2) Farbenfabriken Bayer, AG;
- (3) Badische Anilin und Soda Fabrik AG-BASF;

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(4) Farbwerke Hoechst AG;

(5) Metallgesellschaft AG;

(6) Zeiss of Oberkochen annually spends about 14% of its income in research and development. About 12% of the employees are engaged in research and another 8% are employed on testing and inspection.¹

20 ~~(S)~~ Institute for Acrobiology, Grafschaft

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(4) (U) Today the Institute has been opened to qualified and reputable academic personnel who are invited to work at the Institute for extended periods of time.

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Many of the potential CW antidotes currently under test at the Institute are obtained from university and commercial laboratories, and scientists at the Institute are now encouraged to publish their test results in the open literature.

(5) (U) During the reorganization, Dr. Karl Bisa was relieved as Director of the Institute. He took this opportunity to retire from government service and is no longer connected with the Institute in any capacity.

(6) (U) Dr. Oldiges (Biologist) has been Acting Director since Dr. Bisa's departure. Prior to this appointment, he had been on the staff of the Institute doing research related to toxic antidotes and their effect upon mice, guinea pigs, and rabbits. He has continued his interest in this area.⁸⁸

b. ~~(C)~~ Research Program of the Institute

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c. ~~(C)~~ Facilities.

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(4) (U) Other buildings house additional chemical laboratories, all of which contain modern, sophisticated equipment; for example, a 1 MEV neutron generator built by the Philips Corporation of Holland.

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d. (U) Scientists at the Institute and Their Areas of Research. A brief review of the current research conducted at the Institute is presented below.⁸⁸

(1) (U) (b)(6) (Biologist), Acting Head of the Institute, is responsible for the following projects: Pharmacological investigations with antidotes against acylphosphate intoxications; experiments to measure the dose responses in animals treated

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with antidotes against organophosphoric esters; and physiological testing of animals treated with various antidotes.

(2) (U) (b)(6) (Biologist) is investigating the permeability of organophosphorous compounds through the skin of pigs. It is his opinion that pig skin most nearly matches that of the human skin.

(3) (U) (b)(6) (Biologist) is conducting pharmacological investigations on isolated mouse ileum.

(4) (U) (b)(6) (Chemist), husband of (b)(6) is doing *in vitro* research on the inhibition and reactivation of enzymes.

(5) (U) (b)(6) (Electrical Engineer) continues his work related to the measurement of aerosolized latex particles using the principle of light scattering. He has also fabricated and studied the effectiveness of a rotary filter for air filtration. Preliminary tests showed that axial rotation of filter discs provided a separation efficiency against micron size particles equal to that obtained using 11 times the thickness of such filters held in stationary frames. Results also indicated that with design modifications and with greater rotational speeds, the filter could probably reach an efficiency achieved only by stationary filters twenty times more thick in construction. These filters may have excellent application in NBC protective systems.⁹²

(6) (U) (b)(6) (Chemist) is conducting studies related to: the preparation of toxic solutions for the other divisions; he is also involved in synthesis and analytical work, i.e., measurement of acetyl cholinesterase activity in reticulo-endothelial tissues of laboratory animals poisoned with parathion (E605); and he is attempting to characterize chemical reactions between toxic phosphoric acid esters and selected antidotes.

(7) (U) (b)(6) (Biologist) is investigating the biological effects of fast neutrons. He is studying mortality rates of mice after neutron irradiation, and damage caused to the hematopoietic system (bone marrow, spleen, and lymphatic system). He is also studying the relative biological activity of fast neutrons when these effects are compared to those caused by gamma rays.

(8) (U) (b)(6) (Chemist)⁸⁹ is doing research on the reactivation of diethylphosphoryl-acetylcholinesterase by pyridinium oximes. The results of kinetic studies indicate a complex is formed between phosphoryl-enzyme and the reactivator as a preliminary step in the reactivation process. Based on this assumption, the

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concentration-dependence of the observed rate-constants were used to interpret the affinities and reactivities of 30 different pyridinium-oximes. The pKa values of mono- and bisoximes were determined by means of potentiometric titration. (b)(6) has also prepared possible intermediates in the reactivation chain and has tested some of these compounds in pharmacological tests.

(9) (U) (b)(6) (Physicist) is doing research in dosimetry of fast neutrons, 1-6 MEV. He has also prepared an Einzel lens system to enhance the focal properties of the 1 MEV accelerator. He has conducted radiation experiments using white mice, and has devised a quartz target to determine the focal properties of the accelerator.

(10) (U) (b)(6) (Zoologist) joined the staff in October of 1968. His research interests include microspectrography using ultraviolet light, microdensitometry, isolation of DNA and RNA, and the influence of acylphosphates on phosphates.

(11) (U) (b)(6) (Physicist) is conducting research using differential centrifugation to establish particle size distribution in aerosols. He has been able to separate latex particles of various sizes in a centrifugal field of force. The centrifuges used were designed by Prof. Stober (see below).

(12) (U) (b)(6) (Physicist) is a US citizen who has been with the Institute for about one and a half years. He has a two-year contract with the Fraunhofer Society to conduct research on the detection of aerosolized particulates. He is attempting to measure particles by their rate of deceleration in a vacuum.

(13) (U) (b)(6) (Veterinarian) is engaged in research related to general toxicology, veterinary pharmacology, concentration of pesticides, such as E605, in animal tissue, the storage of toxic organophosphorous compounds in the animal body, and the absorption of organophosphorous compounds through the skin.

(14) (U) (b)(6) (Chemist) came to the Institute in November 1969 through the efforts of Prof. Stober. His main area of research deals with studying Ribonuclease T₁ using Proton Magnetic Resonance (PMR). The chemical shifts of the C-2 protons of the histidine residues of ribonuclease T₁ have been studied as a function of pH in the presence of deuterium oxide. His results are interpreted in terms of interactions between the histidine residues and the carboxylate anions of acidic amino acid residues. In addition, he has studied the chemical shift of the C-2 imidazole protons of the histidine residues contained in pancreatic ribonuclease. Upon protonation of the imidazole ring, the C-2 proton magnetic resonance signal shifts about 1.0 ppm to a lower level. Thus, titration

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curves and approximate pka values of the histidine residues can be developed. From an analysis of the titration curves of histidine 119 and histidine 12, the existence of an enzyme species has been derived in which both imidazoles are connected by a hydrogen bond.

(15) (U) Neutron magnetic resonance (NMR) studies have been carried out with a Varian Associates HA 100 NMR spectrometer having an internal lock system. A Varian C 1024 Computer of average transients was used. Also available to (b)(6) is a recently installed proton spectrometer linked to a computer manufactured by FABRI-TEK and BRUKER.⁸⁹

(16) (U) (b)(6) continues his studies to measure residual concentrations of parathion in the brains of treated mice. He has been doing this work since 1968. He appears to be interested only in total brain concentration and has made no attempt to find areas of the brain (i.e., thymus, cerebrum, cerebellum, medulla, cortex, etc.) where maximum concentration might accumulate.

(17) (U) (b)(6) (physicist) specializes in radiobiology. He has taken a position with the Institute of Aerobiology as Chief of the Physics Branch. It is mainly through his efforts that young, new investigators have joined the staff. He has also been responsible for obtaining the necessary funds to procure expensive and highly sophisticated equipment. In addition to his position at the Institute for Aerobiology, Prof. Stober is a member of the faculty at the University of Munster, Munster, West Germany, and concomitantly holds a position at the University of Rochester, Rochester, N. Y., USA, in the Department of Radiobiology. Prior to accepting his present positions, (b)(6) spent two years teaching in the Physics Department at the University of California, Berkeley. (b)(6) speaks flawless English.

e. (C) Research Applications. &

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21 ~~(C)~~ Institut Fur Electrowerkstoffe, Freiburg

a. (U) An effort has been under way at the Institut fur Elektrowerkstoffe, Freiburg, Germany, to detect airborne particulate matter. The prototype instrument that has been fabricated for this purpose uses a high-volume air sampler (100-1,000 liters of air/minute), a pre-impinger to screen out all particles above 3-5 microns, a lightscanning system, a particle-size discriminator, and a manual visual readout. The only novel feature of the system appears to be the light source. This component has been built into the system so that there is a guaranteed light source with no flickering or wavering of the illumination (i.e., there is a constant level of light emission). This feature involves very exotic automatic controls, but the Germans appear to feel that the uniform light feature is very important to the overall success of the detector.

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21. (U) The Borstel Institute

- a. An example of the type of research facility operated on a state level is the Borstel Institute. One of a number of institutes under the jurisdiction of the *Forschungsgesellschaft*, it is located about 40 km north of Hamburg. The entrance to this institute is about a mile east of the main highway running between Hamburg and Kiel.
- b. At present, the main laboratory facilities are located in very old single story brick buildings. The laboratories are very well equipped, and safety cabinets are available in which all culture transfers, dilutions, etc., are made prior to animal inoculations.
- c. The major research conducted at the Borstel Institute concerns studies with *Pasturella pestis* which are directed towards the development of new cultural techniques, the study of variant strains of this pathogen, and the production of new and more effective vaccines. The comparative biochemistry of different strains of *P. Pestis* is also studied.
- d. During the past two years, a very modern lecture hall has been built. Under construction in the summer of 1970 was a five-story laboratory building, possibly planned to replace the existing laboratories, or perhaps to supplement them. In addition, individual homes and apartments were also under construction. This is being done both to keep present employees and also to attract others. Many of the present employees commute between the Institute and Hamburg or Kiel and the turnover of employees at Borstel has been quite high.

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c. There is no evidence that personnel at the Borstel Institute are currently engaged in any type of offensive BW research, nor is there any indication that they receive funds or guidance from the military. However, the Institute is a state operated facility although it does receive some operational funds from the Federal Republic of Germany. Such a laboratory could readily be concerted to participate in offensive programs if such were to be undertaken.

22. ~~(C)~~ Military Research Institutes and Facilities

(b)(1)

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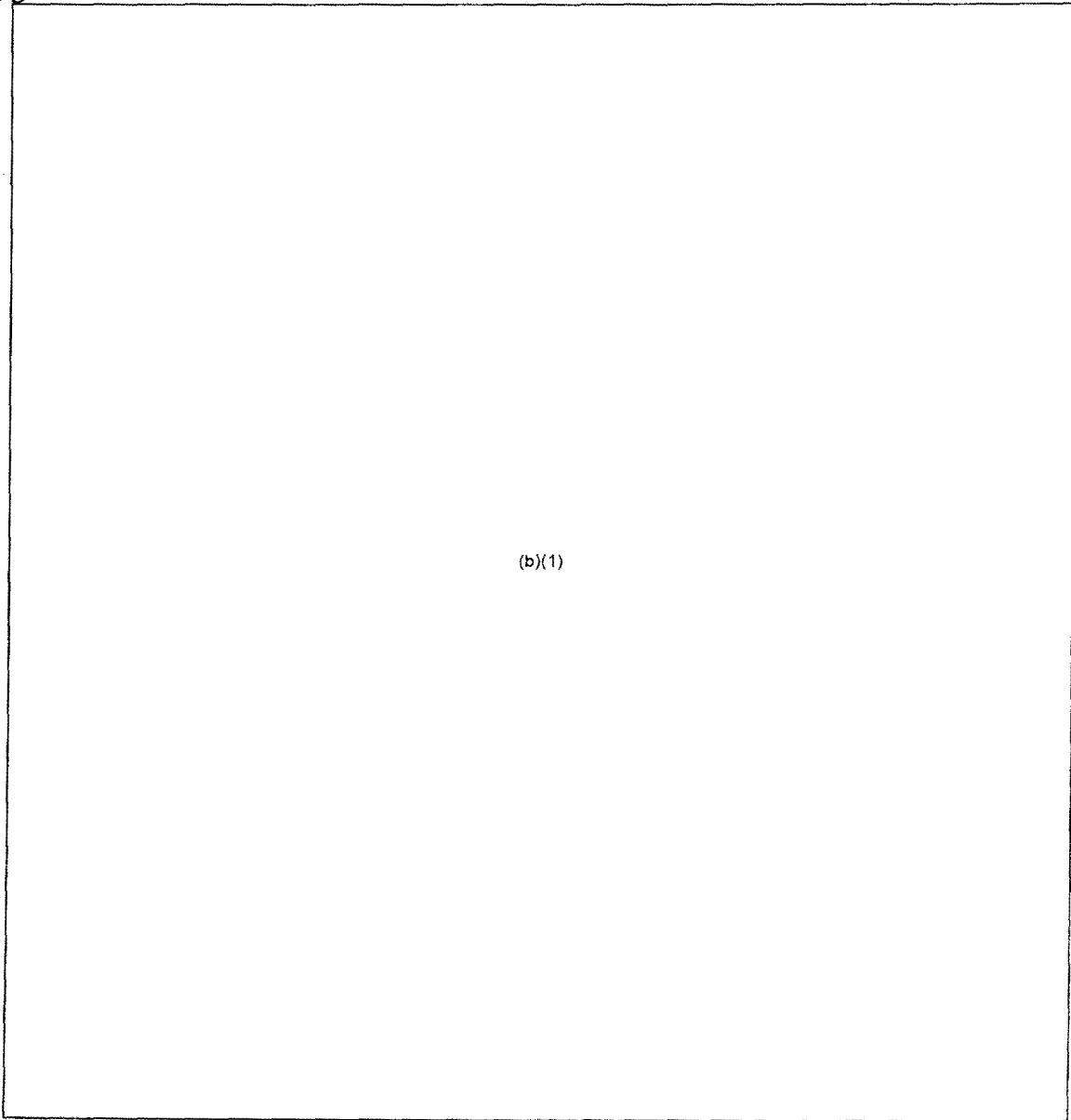
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h. (U) A self-contained, pressurized, protective suit has been developed at E-Stelle 53. It is currently under test and evaluation. It is constructed of two pieces of material which is basically nylon impregnated with a plastic. The exact plastic used is not known. The most unique feature of this suit is that it affords protection to the wearer by maintaining a positive pressure head within the suit. This positive pressure is derived from a small (6'x12') battery-operated blower, fitted with absolute filters. Operation time with the batteries presently available is three hours. The blower package weighs approximately ten pounds and is worn at waist level on the back of the suit. This affords the wearer complete freedom of movement and action.

I. NAVAL BW CAPABILITY

24. General

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25. ~~25~~ CBR Protective System on the Destroyer BAYERN

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25.1. ~~(S/NFD)~~ Washdown System on the Frigate LUBECK

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26. ~~(S-NED)~~ Naval Research

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J. CONCLUSIONS

27. ~~(C-ND)~~ Summation

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28. ~~(C-NFD)~~ Projection

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K. TRENDS AND FORECASTS

29. ~~(C)~~ Trends

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30. ~~(C)~~ Forecasts

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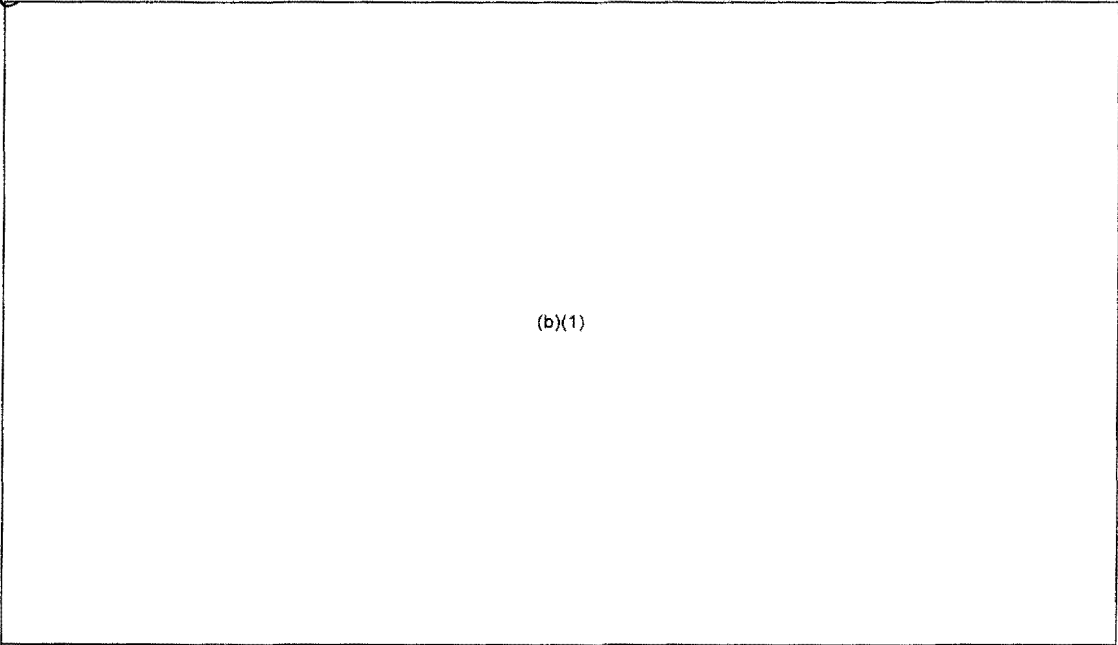
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LIST OF ABBREVIATIONS

A/ARMA Assistant Army Attache¹
ABC atomic, biological, chemical
AMA Danish Army Ammunition Arsenal
AMX *Atelier de Moulineaux*, the name of the company producing
the French light tank or char.
AMZ CBR Warning and Coordinating Center, *ABC Meldezentrale*
(West Germany)
ANP *L'appareil Normal de Protection*
ATC Army Technical Center (Italy)
BCG *Bacillus calmette - guerien*
BG *Bacillus subtilis var niger (B. globigii)*
BHK baby hamster kidney cells
BW biological warfare
BWB Federal Office for Military Technology and Procurement,
Bundesamt fur Wehrtechnik und Beschaffung (West Germany)
B weapon biological weapon
CB chemical, biological
CBR chemical, biological, radiological
CCAS Committee for Coordination of Scientific Activities, *Comite de*
Coordination des Activites Scientifiques, (Belgium)
CD Civil Defense
CDC Civil Defense Corps (United Kingdom)
CDE Chemical Defense Establishment (United Kingdom)
CEB Center of Studies, *Le Bouchet, Centre d'Etudes des Bouchet*
(France)
CFNBCS Canadian Forces Nuclear Biological, and Chemical School
CIAS Interservice Special Weapons Command, *Commandement*
interarmees des Armes Speciales (France)
CIC Communications information center
CIETAS Interservice Special Weapons Tactical Study Group, *Cemite*
Interarmee d'Etudes tactiques des Armes Speciales (France)
CIEECB Interservice Chemical and Biological Experimental and Study
Commission, *Commission interarmee Experimentation et Etudes*
Chimique et Biologique (France)
CRD Defense Research Center, *Centre de Recherche pour la Defense*
(Belgium)

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CW chemical warfare
C weapon chemical weapon
DCBRL Defense Chemical, Biological and Radiation Laboratories, now is the DREO (Canada)
DM Deutsch mark
DMA Ministerial Delegate for Armament, *Delegation Ministerielle pour l'Armement* (France)
DNA deoxyribonucleic acid
DP Powder Directorate, *Direction des poudres* (France)
DRB Defense Research Board (Canada)
DREO Defense Research Establishment Ottawa (Canada)
DRES Defense Research Establishment Suffield (Canada)
DRME Directorate of Research and Experimental Methods, *Direction des Recherches et Moyens D'Essais* (France)
DSK Dauer - Schutzluft - Klimasystem (West Germany)
DTAT Technical Directorate for Ground Armaments, *Direction Technique des Armements Terrestres* (France)
EETB Bourges Technical Test Center, *Etablissement d'Experiences Techniques de Bourges* (France)
EM enlisted man/men
EMA Headquarters Armed Forces, *Etat-Major des Armees* (France)
EMC encephalomyocarditis
E-Stelle Testing Station, *Erprobungsstelle*
FAO Food and Agricultural Organization of the United Nations
FAST fluorescent antibody staining technique
FFI *Forsvarets forsknings institutt*, now is NDRE (Norway)
FINABEL An alliance of France, Italy, the Netherlands, and Belgium, plus West Germany
FMD foot-and-mouth disease
FRG Federal Republic of Germany
GAC Chemical Arms Group, *Groupeement Armes Chimique* (France)
G-3 operations and training section of a general staff
HMCS Her Majesty's Canadian Ship
INSAN 1-3 Inspectorate of Sanitation and Health Matters, *Inspektion des Sanitats- und Gesundheitswesens* West Germany
km kilometer
kw kilowatt
LAC large area coverage

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LIDAR light detection and ranging
m meter
MeV million electron volts
Mk mark - designation of a model
Mle model
mm millimeter
MOD Ministry of Defense
MOS military occupational specialty
MRC Medical Research Council (United Kingdom)
MRE Microbiological Research Establishment (United Kingdom)
MWDDEA Mutual Weapons Defense Development Exchange Agreements
MWDP Mutual Weapons Development Program
NATO North Atlantic Treaty Organization
NBC nuclear, biological, chemical
NCO noncommissioned officer
NDRE Norwegian Defense Research Establishment
NGSF Royal Netherlands Fermentation Industry
NHS National Health Service (Denmark, United Kingdom)
NLVF Agricultural Research Council of Norway
NMR neutron magnetic resonance
NTNF Royal Norwegian Council for Scientific and Industrial Research
OAF open air factor
PMR proton magnetic resonance
PT Engineer and Field Equipment Division, *Pionier* and
Truppengerate (West Germany)
R&D research and development
RH relative humidity
RNA Royal Netherlands Army, ribonucleic acid
RVO National Defense Research Organization,
Rijksverdedigingsorganisatie (Netherlands)
RVO-TNO See RVO
SEBC *Section d'Etudes Biologiques et Chimiques*; part of CEB (France)
SFV Semliki Forest virus
SGB subgroup of CIEECB
SGC subgroup of CIEECB
SID Defense Intelligence Service (Italy)
S&T scientific and technical

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STA Army Technical Section, *Section Technique de l'Armee* (France)
STITEUR Army Scientific and Technical Intelligence Team, Europe
(United States)
TEP troop decontamination center, *Truppen Engiftungs Platz* (West
Germany)
TOE Table of Organization and Equipment
TNO Central Organization for Applied Natural Scientific Research,
Toegepast Natuurwetenschappelijk Onderzoek (Netherlands)
T-II-2 The "Referat" (2) dealing with CBR matters within the
Defense Research Section (II) of the Military Technology
Division (West Germany)
T-III-7 The "Referat" (7) dealing with CBR matters within the
Defense Technology Division (III) of the Military Technology
Division (West Germany)
UN United Nations
UNESCO United Nations Educational, Scientific, and Cultural
Organization
UNICEF United Nations Children's Fund
UK United Kingdom
US United States
USIS United States Information Service
USSR Union of Soviet Socialist Republics
WHO World Health Organization
ZWO Organization for Pure Scientific Research (Netherlands)

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
biological warfare aerosol studies decontamination biomedical research facilities dissemination of agents protective citadel order of battle protective equipment CBR units public health agent prophylaxis						

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