CHEMICAL
Warfare

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OSS FORM 3061

Chemical Warfare

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DIRECTOR'S OFFICE

CROSS REFERENCE SHEET

Letter
Memo
Cable

re CIC 13-15 Book 6
CCS 1061/2

DATED:

FROM:

TO:

SUBJECT:

German intentions on use of gas warfare

ORIGINAL FILED IN: _____

FILE #: _____

OSS
Form 69 (Revised)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE December 30, 1944

FROM BERN, SWITZERLAND

TO OFFICE OF STRATEGIC SERVICES

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(FOR ACTION) DISTRIBUTION (FOR INFORMATION)

DIRECTOR

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IN 29736

U. S. GOVERNMENT PRINTING OFFICE 16—87988-2

RECEIVED IN CODE OR CIPHER

SECRET

#2867. AZUSA. From Berg to 106 and Dix.

SECRET

1. Flute is impressed with Regener's discovery at his Institute for Stratosphere Physics at Friedrichshafen of new modification of water that does not freeze except at minus 70° centigrade. Normal water crystallizes in a hexagonal system. Regener's is cubic system.

2. Aero-dynamics Institute at Goettingen employs 3500. Ackeret, wind tunnel expert here, pro-Nazi but Flute will pursue Aero-dynamics inquiries.

3. Swiss Colonel in Germany 2 months ago reported to Flute that he saw experiments by mine throwers propelling gas that creates fine fog that descends and burns clothing.

4. Am pursuing other channels of inquiry.

5. Please extend Flute regards to our Suits Schenectady through Tester CHMD. Suits gave me independent introduction.

Berg.

TOR: 12/30/44 10:45 PM

FILE COPY

SECRET

HEADQUARTERS
ARMY GROUND FORCES
OFFICE OF THE COMMANDING GENERAL
ARMY WAR COLLEGE
WASHINGTON, D. C.

21 February 1945

Major General William J. Donovan,
Office of Strategic Services,
Washington, D. C.

Dear General Donovan:

Thank you very much for sending me the list of training films available in your organization. I am sending this list to the appropriate section of my staff and they will contact your office at a later date to secure the films.

Best wishes.

Sincerely,

J. W. Stilwell

J. W. STILWELL,
General, U.S.A.

GSA FORM 6001a

Date 22 Feb 45

To: Mrs. O'Donnell

Marian:

A copy of the General's letter of 15 February to General Stilwell and a copy of General Stilwell's reply have been sent to Field Photographic.

JWA
JWA

Office of the Secretariat

(9119)

SECRET

16,244
Chemical Warfare
x Germany
x Motion Pictures

15 February 1945

General Joseph W. Stilwell
Commanding General
Army Ground Forces
Army War College
Washington, D. C.

My dear General Stilwell:

This agency has recently obtained in the Mediterranean Theater a number of German training films dealing with chemical warfare. In the belief that they may be of value to the Army Ground Forces or, more particularly, to the Chemical Warfare Service I am enclosing a list of the films together with a complete translation of German Training Film No. 413 entitled "The Importance of Artificial Smoke in Infantry Warfare".

If you are interested in these films and will advise as to whom we should make them available, we will be glad to arrange for their prompt delivery.

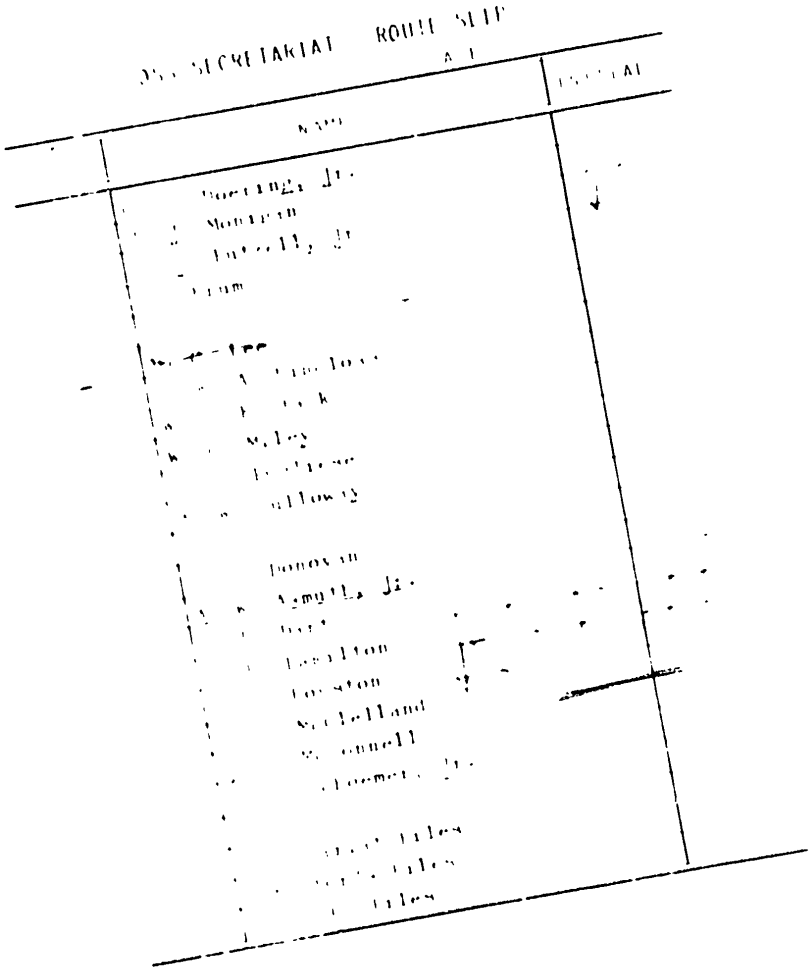
Sincerely,

William J. Donovan
Director

Enclosures

AWS:mr

SECRET



SECRET

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

6 February 1945

To Ned Pettey

TO: Lt. Col. O. C. Doering, Jr.

FROM: Lt. John W. English, Executive Officer
Field Photographic Branch

SUBJECT: Enclosures 1 and 2

Would you please take care of this & see that the film is delivered promptly and by such means as will be the most good - O.C.D.

Enclosure (1) is a list of German Training Films received from MEDTO which have been screened by you and Mr. Cheston. The titles are translated.

Enclosure (2) is a complete translation of German Training Film No. 413, "The Importance of Artificial Smoke In Infantry Warfare".

These films can be forwarded to the Army Ground Forces or the Chemical Warfare in accordance with the recommendation of Col. Dix and his associates.

John W. English
Lt., USNR

Enclosures (2)

SECRET

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

DATE: 20 December 1944

TO : Lt. Gen. W. J. Donovan

FROM : Col. H. W. Dix, Technical Section

SUBJECT: Ger an Explosive and Propellant Plants

Attached is a copy of an interview and an interview sheet for Dr. John H. Becker (#N 11Pol) for your information.

We are keeping the copies together here after you have read them.

STANDARD FORM NO. 64

15.4.95
Chem Warfare.
German

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lieut. Gen. W. J. Donovan DATE: 19 December 1944

FROM : Col. H. W. Dix

SUBJECT: German Explosive and Propellant Production

Attached is a copy of an interview with Mr. Antonin Basch (AR-1714) together with an interview sheet and a sketch.

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : Brig. Gen. W. J. Donovan

DATE: 27 November 1944

FROM : Col. H. W. Dix

SUBJECT. German Explosive and Propellant Production

Attached is a copy of an interview with Dr. Emil Czap. OSS N-11969, for your information

We are keeping the copies together here after you have read them.

returned
(Col Dix
11/28/44

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

DATE: 14 November 1944

TO : Brig. Gen. W. J. Donovan

FROM : Lt. Col. H. W. Dix

SUBJECT: German Explosives and Propellant Plants

Attached is another copy of letter to Col. Turner on the above subject with copies of the interview with Mr. Max Spitzer (M-215).

Attachments - Secret

Office Memorandum • UNITED STATES GOVERNMENT

TO : Brigadier General William J. Donovan DATE: October 11, 1944

FROM : Henry Field

SUBJECT: Final Report on the Use of Chemical Materials as Shark Repellents

Attached herewith is the OSS file copy of Naval Research Laboratory No. P-2373 dated September 23.

Two reels of 16 mm. sound Kodachrome film, made by the Navy, have been given to Mrs. Caldwell for the files.

I think you would be interested to see this film.

HF.

Attachment

Restricted

October 11, 1944

Brigadier General William J. Donovan

Henry Field

Final Report on the Use of Chemical Materials as Smoke Screens

Attached herewith is the OSS file copy of Naval Research Laboratory Report No. P-2377 dated September 22. Two reels of 16 mm. sound Kodachrome film, showing the Navy, have been given to Mrs. Caldwell for the file.

I think you ought to be interested to see this film.

Attachment

STANDARD FORM NO. 64

Office Memorandum · UNITED STATES GOVERNMENT

TO : Brigadier General William J. Donovan DATE: October 11, 1944

FROM : Henry Field

SUBJECT: Final Report on the Use of Chemical Materials as Shark Repellents

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Attachment

October 11, 1944

Brigadier General William J. Donovan

Henry Field

Final Report on the Use of Chemical Materials as Shark Repellents

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Restricted

Brigadier General William J. Donovan October 11, 1944

Henry Field

Final Report on the Use of Chemical Materials as Shark Repellents

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Attachment

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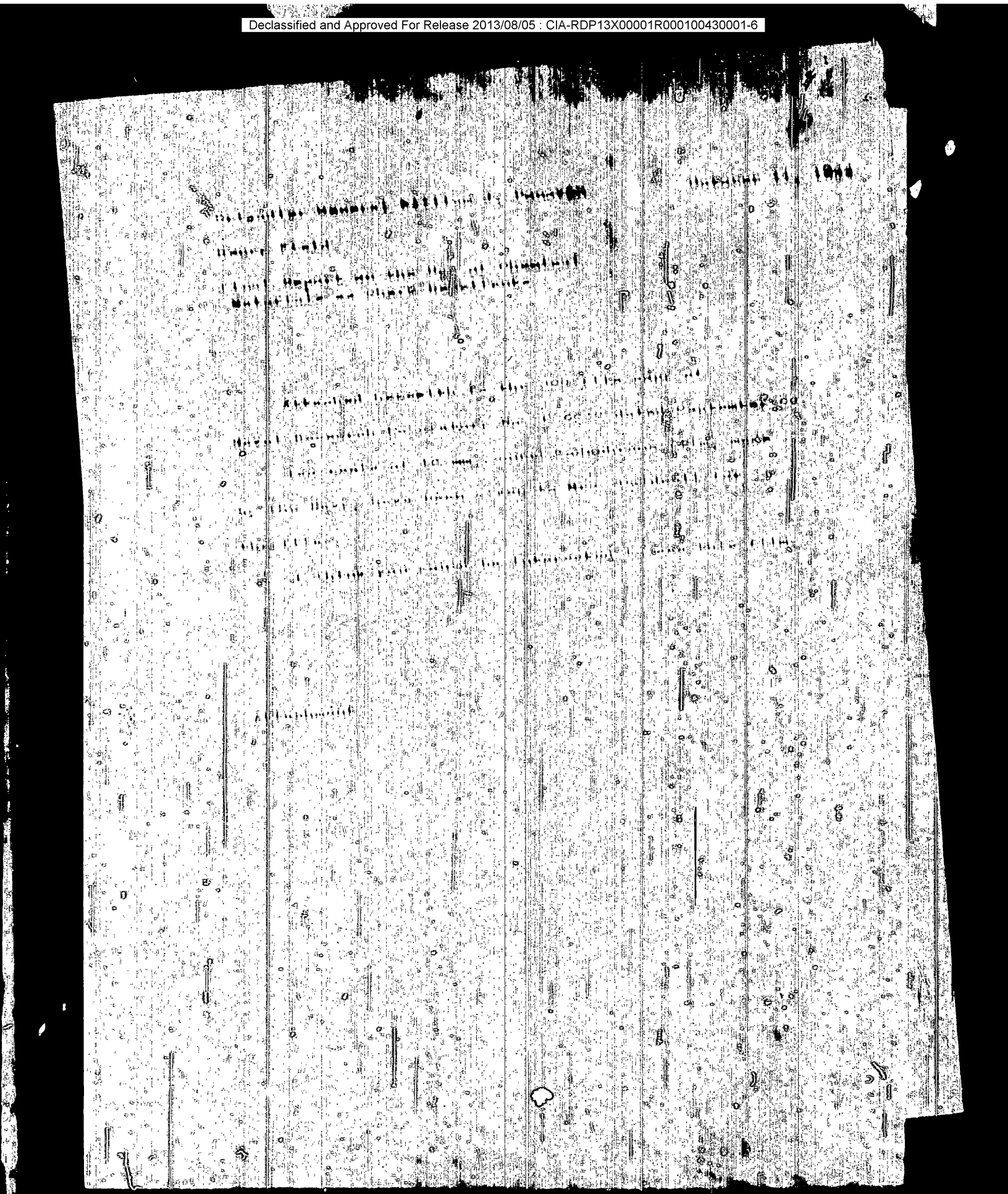

Declassified and Approved For Release 2013/08/05 : CIA-RDP13X00001R000100430001-6

RESTRICTED

23 September 1944

MRL Report No. P-2373

NAVY DEPARTMENT

Final Report
on
The Use of Chemical Materials as Shark Repellents

NAVAL RESEARCH LABORATORY
ANACOSTIA STATION
WASHINGTON, D.C.

Number of Pages: Text - 14 Plates - 10

Authorization: BuShips ltr. C-10/P-(4)(336) dated 9 December 1943.

Date of Tests: 9 April 1943 to 1 July 1944.

Prepared by:

J. M. Fogelberg, Lieut., USNR

Reviewed by:

R. L. Tuve, Chief of Special Research Section

P. Borgstrom, Supt., Chemistry Division

Approved by:

A. H. Van Keuren, Rear Admiral, USN, Director

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TABLE OF CONTENTS

ABSTRACT

This is a final report on the development and testing of a material designed for the protection of personnel from attack by sharks. Earlier laboratory development is summarized and the results of field testing are presented in their entirety. The effectiveness of several substances in protecting baits has been demonstrated by field tests under conditions varying from that of the slowest line fishing to conditions represented by large numbers of sharks feeding voraciously at the surface. The properties of a repellent material containing 80 percent [illegible] water-soluble dye and 20 percent copper acetate and its effectiveness as determined by field tests are described. Two types of [illegible] of the repellent material designed for individual use are described.

Reference is made to a motion picture film portraying the development and testing of the repellent material and the use of the [illegible]

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The assistance of other members of the Laboratory staff not mentioned in the body of this report is respectfully acknowledged. Stewart Springer formerly of this Laboratory and at present associated with the Reed-Martin Laboratories, Fort Myers, Florida, and Lieut.(jg) C.R. Wallace USNR, were actively connected with the field testing program. Mr. F. E. Brinnick, associate chemist, was instrumental in carrying out much of the laboratory development of the repellent unit.

INTRODUCTION

1. **Authorization.** The research on this problem at the laboratory was authorized by a directive originating with the Chief of the Bureau of Ships to the Director of the Naval Research Laboratory, C-ID/P(Q)(347) dated 9 April 1943. Further authorization was contained in letters from the Chief of the Bureau of Ships to the Director of the Naval Research Laboratory, ID/P-(4)(336) dated 9 December 1943, and ID/P-(4)(336)(61050) dated 22 March 1944.

2. **Statement of Problem.** Studies on the development and testing of a shark repellent material had been under way for almost a year by other investigators at the time the laboratory was authorized to begin work on the problem. A substance, copper acetate, had been selected by these investigators, and its effectiveness as a shark repellent evaluated. The main problem at that time appeared to be the development of a suitable container or device that would permit the repellent material to be used efficiently and economically and that could be worn on life jackets or clothing without inconvenience.

3. The problem changed in character as work progressed. Further testing of the repellent qualities of copper acetate was indicated, and when it became evident that under certain conditions the material lost much of its effectiveness the search for other materials as shark repellents was actively pursued. The search for new shark repellent materials was coordinated with an extensive program of field testing and development of a practical unit for survival use.

4. **Previous Work Bearing on the Problem.** A Naval Research Laboratory Report No. P-2210 dated 25 February 1944 and entitled "First Partial Report on the Use of Chemical Materials as Shark Repellents" summarized the work of other investigators on the problem and described the work of the Laboratory on the subject up to that time.

5. Work on the project by previous investigators was initiated by a directive issued June 1942 by the Chief of the Bureau of Aeronautics, in compliance with which a contract was made with Marine Studios, Inc. by the Committee on Medical Research of the Office of Scientific Research and Development. The results of the work by these investigators indicated that certain chemical materials possessed shark repellent properties and that copper acetate in particular showed strong repellent properties both in tank tests at the Woods Hole Oceanographic Institute and in field tests in the Gulf of Guayaquil on the coast of Ecuador.

6. The work of this laboratory was begun in April 1943 as a cooperative effort with the Committee on Medical Research and was later carried out independently when that group terminated work on the project in August 1943. The work of the laboratory as described in Report No. P-2210 comprised both laboratory experimentation and field testing.

7. The laboratory experimentation as previously reported may be summarized briefly as the formulation of copper acetate into a convenient cake form, a search for other chemical materials with shark repellent properties, and the combination of the several materials into a practical shark repellent unit. The cylindrical cake form of copper acetate was designed as a convenient practical form of the material to be used for individual protection. The uniform and consistent rate of solution of the material in this form also made possible more accurately controlled field tests.

8. When it was found that under certain conditions copper acetate was less effective as a repellent than the original tests had indicated, a search was begun for other chemical materials which might be added to it to enhance its effectiveness under varied conditions. The field of dark dyestuffs was investigated, since it appeared that the visual sense of the shark was important in the circumstances where copper acetate suffered its loss of effectiveness. None of the existing dyestuffs fulfilled all of the requirements of high tinctorial strength, solubility in sea water and compatability with copper acetate. Through the cooperation of the Calco Chemical Division of the American Cyanamid Company, a modified nigrosine type dye was developed with all of the requisite properties. It possessed a very high tinctorial strength, was readily soluble in sea water and when combined with copper acetate in sufficient proportions, maintained a pH which enabled the copper salt to dissolve uniformly in sea water.

9. While the shark repellent properties of the dye, Calco WBSR, were being proved by field tests, the laboratory experimentation was concentrated on the improvement of a unit to be used for individual protection. The flat compressed cake as originally developed for copper acetate possessed the desirable characteristics of a nearly uniform rate of solution throughout most of its life, but none of the binding agents was completely satisfactory in giving the desired strength. When the difficulty of the precipitation of the copper by sea water was eliminated by the inclusion of Calco WBSR in the formula, it was possible to enclose the cake in a porous bag. The porous bag gave protection to the cake of repellent yet it permitted the dissolved material to pass through readily. By forming the cake within the porous bag, air spaces were eliminated and the resulting density of the unit was sufficient to cause it to sink in sea water. A water soluble wax, Carbowax 4000, was used as a binding agent. This wax has a melting point of about 55°C so that the repellent mixture could be pressed while the wax was molten, thereby forming a uniform dense cake when the wax solidified.

10. The porous bag containing the repellent cake was enclosed in a waterproof envelope made of a vinyl-copolymer coated fabric. The envelope was closed by heat sealing and provided with an easy-opening flap permitting quick release of the inner bag when need for the repellent arose. The inner bag was made fast to the outer envelope by a length of cotton tape so that it would hang suspended below the wearer in the water.

11. The field tests that were reported included line tests by which the effectiveness of copper acetate and of dark dyes was evaluated. Also included in the field tests were studies of the diffusion pattern formed by the repellent material as it dissolved in sea water, both from a unit as used in bait tests and also from a unit as would be used by a floating survivor. Studies of the rates of solution of the repellent unit were made as the design was improved in order to insure an adequate rate for protection and maximum life of the unit.

12. <u>Theoretical and Practical Considerations.</u> Although the system of line fishing tests described in the earlier report gives actual numerical data on the effectiveness of a repellent substance in protecting baits, the results of such tests are more an evaluation of the relative merits of the various substances tested than a measure of their usefulness in actual human survival. Field tests of this nature are none the less important. A program of field testing based on bait tests makes possible the comparison of various repellent substances, and by varying the conditions under which the tests are carried out the over-all effectiveness of a substance can be determined. Other advantages of bait tests over

observations of the results in actual survival use are the speed with which the desired data can be obtained, the ability to get sufficient data to be statistically significant, and the practicability of having qualified observers at the scene of the test to properly interpret the results. The objective adopted was to obtain the most effective repellent substance that could be developed within a reasonable period and to produce the most practical unit that could be designed on the basis of existing knowledge. If substantiated reports of actual use of the repellent in human survival indicate some modification of the formulation or the design, such modifications should be carefully considered.

13. The portion of the work on the problem dealing with laboratory experimentation has been largely covered in an earlier report, and only that part not previously reported will be given in detail here. A part of the field testing was presented in the earlier report, but the methods used and the results of all field testing done by this Laboratory are included in this report in order to give to each phase of the tests its proper significance.

METHODS USED.

14. Laboratory Experimentation. This work was made up largely of the development of the repellent materials, studies of solubility and tinctorial strength of the materials, the production of a satisfactory unit for individual protection, and further studies of the unit for rates of diffusion, length of life and general serviceability.

15. The use of copper acetate as a shark repellent material was proposed and first tested by the committee on Medical Research before the Laboratory began work on the problem. The development of the dyestuff, Calco WMSR, was done by Calco Chemical Company in response to a request by the Laboratory for a dark dye with a high tinctorial value, readily soluble in sea water, and compatible with copper acetate. Studies of tinctorial strength were made with a Cenco-Sanford-Sheard Photelometer calibrated against neutral density filters. Transmission data were obtained for solutions in distilled water and sea water with and without copper acetate added. Transmission measurements were also used later to follow the rate of diffusion of the repellent material from the individual units. The sea water was prepared synthetically, from C.P. chemicals according to the following formula:

Magnesium Chloride ($MgCl_2 \cdot 6H_2O$)	11.0 Gm/liter
Calcium Chloride ($CaCl_2 \cdot 2H_2O$)	1.6 " "
Anhydrous Sodium Sulfate (Na_2SO_4)	4.0 " "
Sodium Chloride ($NaCl$)	25.0 " "

16. The compatability of the dye with copper acetate was studied by means of pH measurements as well as by transmission data. The pH of sea water is sufficiently high to precipitate copper from dilute solutions of copper acetate so that one of the requisites of the dye was that it maintain the pH of sea water solutions of the mixture at a point where the copper would not be precipitated. Measurements were made with a Coleman pH meter at various concentrations of the dye alone and of the dye-copper acetate mixture.

17. Individual units of the repellent materials for use in bait tests were made up by mixing the repellent with suitable binding and solubilising agents and then forming into a dense cake by pressing in a steel die with a laboratory

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model hydraulic press. The design and development of the units for actual survival use was somewhat different and will be treated at a later point in this report.

18. Field Tests. The repellent value of a substance was determined by its ability to protect a suitable bait under a variety of conditions. The use of live animals or freshly killed animals was considered by the original investigators for the Committee on Medical Research but was judged impractical. These investigators used a method of determining the ability of a substance to protect bait fish to evaluate its effectiveness as a shark repellent. This method with some modifications was used for the first part of the Naval Research Laboratory field tests. Two shark lines were used simultaneously, identical except for the presence of a repellent on one line; the other line acted as a control. The baits on the hooks were suspended at the desired depths by means of floats. The lines were fished from the stern of an anchored boat and were kept separated a distance of 25 to 50 feet by means of outriggers and small paravanes.

19. Plate 1, Figures 1 and 2, are underwater photographs showing the relationship of the paravane, float, repellent and bait. Figure 1 is a picture of the line with a repellent unit attached while the line in Figure 2 has a dummy repellent cake of bakelite attached and acts as a control. The repellent was attached at the lead sinker so that its depth did not change. The depth of the bait depended somewhat on the rate of the current, consequently, it did not at all times remain in the repellent as it diffused downcurrent from the repellent cake.

20. The edges of the flat cylindrical repellent cake were protected to enable the repellent to dissolve from the unprotected face at a uniform rate. A rate of solution of 30 grams per hour was chosen as a standard for the line fishing tests. This rate would vary with the temperature of the water, rate of current flow and roughness of the surface water, but under average conditions a 100 gram cake would last slightly more than 3 hours.

21. In another type of test, instead of fishing a control and a repellent line simultaneously, two control lines were fished for a definite period, then two repellent lines, and finally two control lines again. In this way the rate at which the shark could be expected to be caught was established by the control periods and the effectiveness of the repellent was determined by comparing that rate with the rate at which they were caught when the repellent was used.

22. The repellent was also tested against large groups of sharks feeding on the surface. This mass feeding condition exists where a large amount of food such as fish or garbage is thrown repeatedly into an area inhabited by sharks. The sharks become accustomed to taking the discarded material and feed voraciously on the surface whenever the food is thrown over. Field tests were conducted in the vicinity of Mayport, Florida, where, during the months of May and June, large numbers of sharks follow the shrimp boats to feed on the trash fish that is taken in the shrimp trawl and discarded. The purpose of the tests was to determine the effectiveness of the repellent material in stopping the sharks from feeding on the trash fish which they ordinarily took so voraciously. The first tests of this nature were conducted from a boat other than a shrimper. A quantity of bait fish was taken aboard and the boat brought alongside a shrimp boat that was discarding trash fish. By throwing over bait from the experimental boat just as the discarding of trash fish from the shrimper was discontinued the

sharks could be induced to follow the experimental boat, and take the bait as it was thrown over. A sea water solution of the repellent material was then sprayed on the surface of the water and bait fish thrown into the treated area. The effectiveness of the repellent was judged by the extent to which it was able to stop the feeding on the surface.

23. This method of testing was only partly successful. It was difficult to keep the sharks in the vicinity of the experimental boat because the sharks had evidently become so highly conditioned that they could readily differentiate between the experimental boat and the shrimp boats from which they ordinarily received their food. For this reason it was difficult to determine whether the repellent material drove the sharks from the vicinity of the experimental boat or whether they left of their own volition. Another difficulty met with in this type of test was that the action took place in such a short space of time that it was difficult to obtain any quantitative numerical data to substantiate the observed results.

24. The first difficulty was overcome by carrying out tests from boats actually engaged in shrimping operations. In this case the presence of the shrimp trawl, the sound of the motors and other factors were exactly those to which the sharks were conditioned and as long as bait fish was thrown over, there was no difficulty in keeping the sharks in the vicinity of the boat. The difficulty of obtaining numerical data was overcome by the use of motion picture photography. By this means the activity of the sharks on the surface at the stern of the shrimper, the manner in which the repellent material was used and the effect of the repellent on the shark activity could be shown. The Photographic Science Laboratory of the Bureau of Aeronautics collaborated with this Laboratory in the production of a 16 mm. Kodachrome film which is not only a photographic record of the field tests but also tells briefly the entire story of the development of a shark repellent for survival use.

25. Plate 2, Figures 1 and 2, are photographs showing the activity of the sharks at the stern of a shrimp boat as trash fish is being thrown over. The lines to the trawl are visible. Plate 3, Figs. 1 and 2, are additional shots of sharks feeding on the surface.

26. The sharks dealt with in the mass feeding tests were mostly of the common black tip variety, Carcharinus Limbatus, a species not generally considered dangerous to man. These sharks were of an average size of five to seven feet. It may be considered pertinent, however, that at the same time that the tests were being conducted in the vicinity of Mayport, Florida, a young girl was bitten, apparently by a shark, while bathing on the beach in 3 to 4 feet of water. Plates 4, Figs. 1 and 2, are photographs of the wound, a typical shark-bite, which were taken at the dispensary of the Mayport Naval Frontier Base where the girl was brought for emergency treatment.

DATA AND RESULTS OBTAINED.

27. Laboratory Data. The tinctorial strength of many dyes was measured photometrically but only those data on the dyestuff, Calco WBSR, and its combination with copper acetate are included here. Transmission vs. concentration curves are given in Plate 5. The curves are for the pure dyestuff, Calco WBSR, in synthetic sea water and for an 80/20 mixture of the dye and copper acetate. The curves were obtained with a Cenco-Sanford-Sheard Photelometer with tungsten

light. For further identification of the repellent mixture the transmission characteristics were measured using a Wratten #89 filter. At a concentration of 40 p.p.m. the repellent mixture showed a transmission for white light of 36% while at the wave length given by the Wratten #89 filter the transmission for the same solution was 50%.

28. A spectral transmission curve for the mixture containing 76% dye, 19% copper acetate and 5% Carbowax 4000 was prepared by the Calco Chemical Division of American Cyanamid Company. This curve is reproduced in Plate 6. The concentration used was 40 p.p.m. in distilled water.

29. Hydrogen ion concentration measurements were made by means of a Coleman glass electrode pH meter. The results of measurements on synthetic sea water solutions of the dye, WBSR, and of the 80/20 mixture of the dye and copper acetate are given in the following table.

Conc. P.P.M.	pH Soln. of Calco WBSR	pH Soln. of 80% WBSR - 20% $Cu(Ac)_2$
50	6.2	6.6
100	- -	6.5
250	- -	6.0
500	5.4	5.6
1000	5.3	5.2
5000	5.2	5.0
10000	5.1	5.0
25000	5.0	4.9
50000	4.9	4.8
100000	- -	4.8

30. Results of Line Fishing Tests. Line tests were conducted in the vicinity of St. Augustine, Florida; Biloxi, Mississippi; and the Florida Keys. Series I, II, and III are tests of the repellent value of copper acetate. Series IV and V are tests of the dye, WBSR. In all cases, the rate of solution was approximately 30 grams of repellent per hour.

Series I

Tests conducted at: North River, St. Augustine, Florida, July 1943 between hours of 1930 and 0500.

Rigs: Two similar rigs used, one of which was protected with repellent cake. Floats used so that baits hung from 5 to 15 feet below the surface and repellent cake was attached 30 to 48 inches from bait.

Bait: Fresh shrimp.

Repellent: Copper acetate.

Type of Sharks: Small hammerhead and shovelnose.

Results: Number of sharks caught on control line - 25
Number of sharks caught on repellent line- 7
Percent effectiveness - - - - - - - - - - 72

Series II*

Tests conducted at: Chandeleur Island, Louisiana, off Biloxi, Mississippi, 30 July 1943 to 2 August 1943 between hours of 0730 and 2000.

Rigs: Two similar rigs used, one with repellent cake. Floats used to suspend baits about 3 feet below surface. Repellent cake attached 30 inches from bait.

Bait: Fresh white trout and ground mullet.

Repellent: Copper acetate.

Type of sharks: Black tip and one sharp nose, other types including hammerhead, lemon shark and tiger shark, known to be in vicinity.

Condition of sharks: The sharks were stirred up and brought to the surface by dragging a shrimp trawl and by chumming. The tests have been divided into two parts arbitrarily on the basis of rate of fishing. During the period of great shark activity the sharks often struck the bait a few seconds after it struck the water and it is possible that some of the sharks attacked the bait without encountering any of the repellent.

Results:

	Control**	Repellent	Percent Effectiveness
Period of great shark activity	67	37	45
Period of lesser activity	46	11	76
Combined periods	113	48	58

Series III

Tests conducted at: Florida Keys off Bahia Honda Channel, 12 October and 11 December 1943 during hours of 1000 and 2000.

Rigs: Two similar rigs used, one with repellent cake attached 36 inches from bait. Floats used to keep baits about 12 feet below surface.

**Numbers include both catches and strikes.
*The test represented by Series II was conducted by the Committee on Medical Research with the cooperation of a representative of the Naval Research Laboratory.

RESTRICTED

Bait: Fresh mullet.

Repellent: Copper acetate.

Type of Sharks: Black tip, sharp nose and black nose. One large nurse shark caught on non-experimental rig.

Condition of Sharks: Efforts made to attract sharks to vicinity by occasional chumming with chopped mullet and bottom fishing for either fish. Exploratory catches made to show presence of sharks in vicinity.

Results:

	Catches	Strikes	Totals
Exploratory catches	5	0	5
Control line	14	2	16
Repellent line	1	0	1
Percent effectiveness	93	100	94

Series IV

Tests conducted at: Florida Keys within a radius of 25 miles of Marathon, Florida during all hours including hours with twilight and moonlight conditions.

Rigs: Two similar rigs used, one with repellent cake and the other with dummy baked file cake. Repellent cake attached to anchor from bait. Floats used to keep baits 6 to 10 feet below surface.

Bait: Fresh mullet.

Repellent: Pyrotuff Cake MK8.

Type of Sharks: Black tip, shovelnose, black nose and sharp nose.

Condition of Sharks: Occasional chumming with chopped mullet. Simultaneous fishing for bottom fish. Exploratory catches made to show presence of sharks in vicinity.

Results:

	Catches	Strikes	Combined
Exploratory catches	112	4	116
Control line	80	24	104
Repellent line	6	0	6
Percent effectiveness	96	100	97

Series V

Tests Conducted at: Florida Keys near Marathon, Florida 1 January 1944.

Rigs: Two similar strings without repellent during first period, two with repellents during second period and two without repellent again during 3rd period. Baits 5 feet below surface.

Bait: Fresh mullet.

Repellent: Dyestuff Calco WBSR.

Type of Sharks: Black tip, black nose and sharp nose.

Condition of Sharks: Chumming with chopped mullet at a relatively constant rate throughout test.

Results:

1st fishing period - 100 minutes, no repellent
- Sharks caught - - - - - - - - - - 12
- Strikes - - - - - - - - - - - - 9
- Greatest interval between actions - - - - - - - - - - - - 13 minutes

2nd fishing period - 100 minutes, repellent used.
- Sharks caught - - - - - - - - - - 0
- Strikes - - - - - - - - - - - - 0
- Greatest interval between actions - - - - - - - - - - - - -100 minutes.

3rd fishing period - 58 minutes, no repellent.
- Sharks caught - - - - - - - - - - 4
- Strikes - - - - - - - - - - - - 2
- Greatest interval between actions - - - - - - - - - - - - - 21 minutes.

31. Results of Mass Feeding Tests. The first tests of a repellent material against large numbers of sharks on the surface were conducted by the investigators for the Committee on Medical Research in the vicinity of St. Augustine during May 1943. In these tests it was demonstrated that copper acetate lost most of its effectiveness as a repellent under the conditions of mass feeding. Tests with dark water-soluble dye were conducted near Mayport, Florida in June, 1943, near Biloxi, Mississippi in August 1943 and again at Mayport and Fernandina, Florida in September 1943. In none of these instances, however, was the activity of the sharks sufficiently great to make the results of the tests conclusive. They did indicate in a qualitative way that the dark dyes possessed repellent qualities against the mob action displayed by surface feeding sharks.

32. A more extensive series of tests was planned in order to evaluate the effectiveness of the Calco WBSR, copper acetate mixture under mass feeding conditions after the repellent qualities of the dye had been established by line tests. These mass feeding tests were carried out in the vicinity of Mayport, Florida between 27 May and 3 June 1944.

Series I

This series of tests was conducted from an experimental fishing boat that had been engaged in work for the United States Bureau of Fisheries. The boat was equipped for menhaden fishing and had a crow's nest 40 feet above the waterline from which the cameraman was able to work.

The difficulties met with in attempting to get successful tests from the experimental fisheries boat have already been mentioned. Sharks were induced to feed on bait fish thrown on the surface from the experimental boat, and a sea water solution of repellent was sprayed among them. A definite lessening of activity of the sharks could be noted when the repellent was used, but in control runs when no repellent was used there was also a gradual lessening of activity, making an exact evaluation of the effectiveness of the repellent difficult. When it became obvious that it would be impossible to maintain any semblance of uniform activity of sharks in the vicinity of the experimental fisheries boat, operations were transferred to a shrimp boat actually engaged in trawling for shrimp.

Series II

These tests were conducted from a shrimp boat where there was little difficulty in obtaining the desired shark activity on the surface and as long as trash fish was thrown overboard there appeared to be no lessening of activity of the sharks. When a shovelful of trash fish was thrown over, the sharks would strike it almost immediately within a few feet of the boat and churn the water as large numbers of the sharks competed for the food. (See Plate 2). The shrimp trawl was being dragged during these operations with the boat making two to three miles per hour. For this reason the shrimp boat would gradually pull away from the activity centered about any one shovelful of fish that had been thrown over, but the sharks were sufficiently plentiful that each succeeding shovelful would also be taken almost immediately. The trash fish was thrown over by shovelsful near the stern with the boat slowly under way. Then a 5% sea water solution of the WBOR-copper acetate mixture was sprayed overboard near the bow forming a ribbon-like pattern 10 to 12 feet wide as the boat moved through the water. The trash fish was discarded at a uniform rate, and was thrown into the repellent treated area when that area reached the stern. In this test all immediate activity was stopped by the repellent in the treated area with the trash fish floating untouched on the surface until the repellent became so diluted that it no longer offered protection. When the spraying of the repellent was discontinued the sharks could again be gradually brought back to feed at the stern of the boat. The action during this test was recorded on 16 mm. Kodachrome motion picture film.

Series III

This was another type of mass feeding test conducted from the shrimp boat. The surface shark activity was obtained in the same manner as in Series II, but the dry repellent mixture was used instead of a sea water solution. The dry repellent mixture comprising 80% Calco WBOR and 20% copper acetate was mixed with a quantity of trash fish from the shrimp trawl. The approximate proportion of the repellent mixture used was 5% by weight. Successive shovelsful of clean trash fish were thrown over and taken almost immediately by the sharks. With no time interval interposed several portions of the repellent-treated fish were thrown over. Activity was observed in the vicinity of the repellent-treated fish almost immediately but it was primarily a churning of the water and it was not possible to observe whether any of the fish was actually taken. The action started at almost the instant the treated trash fish hit the water before the repellent had time to dissolve appreciably. The activity stopped as the repellent diffused throughout the area. In the second and third tests of this series the only activity that was observed in the vicinity of the treated trash fish were sharks moving away after they had evidently been attracted by the splash in the water, and then driven away by contact with the repellent. A motion picture

record was also made of a typical test of this series.

DISCUSSION OF RESULTS

31. Results of Field Tests. In any discussion of the means by which a chemical substance acts to prevent bait or food being attacked by sharks it is necessary to consider the sensory stimuli involved in shark feeding. It is difficult to make any factual statement regarding the relative importance of the visual stimulus and the olfactory stimulus, or any other stimulus that may be involved in the feeding habits. Also the part played by each is probably not constant but changes with conditions and degree of excitation of the sharks.

32. The field tests cover a wide range of levels of excitement or activity of the sharks. They vary from the slowest line fishing tests where only one or two sharks would be caught in an hour to the tests where dozens of sharks could be observed fighting for food on the surface at one time. In the case of slow fishing tests, regardless of what senses are used by the sharks in locating their food some stimulus other than the visual must have been sufficiently strong to make them take cognizance of the copper acetate used as a repellent.

33. It was not expected that the dark dye, Calco #18 would produce any more than a visual stimulus in the dilutions met with under field conditions, but the success of line fishing tests made on moonless nights indicated that even under these conditions, the visual stimulus remained sufficiently strong to be effective, or that some other response was being produced by the dye.

34. A substance that depends for its repellent ability on its effect on one sense alone, must necessarily suffer a decrease in effectiveness when the importance of that sense is shifted into the background by some environmental change. A substance or combination of substances whose effectiveness depends on the stimulation of several senses would be certainly less likely to suffer a large decrease in efficiency as the relative importance of the various senses is changed by external conditions during the search for food. It was for this reason that a combination of the dyestuff, Calco #18, and copper acetate was prepared and used for the final field tests. It was possible to include 20% of copper acetate in the final formula without sacrificing any of the desirable solubility characteristics of the repellent.

37. The results of the final field tests with the dye-copper acetate mixture were very encouraging. The repellent was effective in protecting fresh fish on which the sharks were accustomed to feed so voraciously. These tests differed from the line tests in that the repellent was not constantly being replenished from a cake of the solid material but the repellent was only supplied once to an area. It was to be expected, then, that as the repellent diffused over a large area in the water the concentration would decrease and finally reach a point where it would lose its effectiveness. In the tests where the repellent was sprayed on the surface it was estimated that the original concentration was no more than 0.1 gm per square foot of surface or about 1 parts per million if it were considered to be distributed over a depth of one foot.

38. The reaction of the sharks to the repellent at the very beginning of the mass feeding tests of Series III where the repellent was used in the dry form mixed with the bait fish was not unexpected. The highly conditioned sharks following the shrimp boat on sensing a shovelful of fresh fish hitting the water would immediately plunge into it and churn the water as they competed for the fish. When the fresh fish mixed with dry repellent was thrown over in the same way immediately afterward it was not surprising that the sharks would plunge into the mass before the repellent had an opportunity to diffuse to any appreciable

ble extent. When the sharks detected the repellent, however, they hastily moved away from it. With each succeeding addition of treated trash fish the sharks rapidly became more wary and in a short time would avoid the trash fish that was mixed with the repellent. This cumulative effect was noted to carry over to tests that were repeated in the same area several hours later in which case the treated fish was entirely undisturbed.

39. Package Design. The majority of the individuals having need for a shark repellent substance are survivors of air or marine disasters who find themselves in shark infested waters as a result of accident rather than by intent. A unit of shark repellent material may be carried for a long period of time before it is ever needed. For this reason the unit has to be compact and durable yet the repellent should be easily accessible and effective whenever it is needed.

40. The unit developed for general use consists of a flat cake of the repellent material in a bag of cotton sheeting which is protected by a water-proof outer envelope made from a vinyl-copolymer-coated fabric. Plate 7 is an outside view of the assembled unit. Plate 8 shows the front flap pulled down releasing the inner bag of active material. The unit is similar to one described in the earlier report, the main points of difference being the use of cotton sheeting instead of paper as the porous material for the inner bag and the addition of a lanyard at the bottom of the unit to help secure it to the life vests or belts. The use of cotton sheeting for the fabrication of the inner bag was adopted because it permitted higher pressures to be used in the formation of the repellent cake within the bag, and it also proved to be more serviceable in simulated use tests. The inner pocket is to give protection to the bag of repellent material when the user wishes to save it for future use after the front flap has been originally opened.

41. Specifications for the unit are given in Bureau of Ships ad interim Specification R 51548(INT), Shark-Chasers (Life Jacket) dated 15 June 1944. This specification is classified as Restricted. The Army Air Forces Specification, Packet; Shark Deterrent, No. 40828 dated 25 July 1944 is for a similar type of unit.

42. A multipocket unit was designed for use by individuals who find it necessary to be in shark infested water by intent rather than by accident. This unit is a belt type to be worn around the waist since the user would not ordinarily be wearing a life vest or belt. Instead of having a reclosure feature this unit has four individual inner bags of repellent material, each of which is sealed in a separate compartment of the water-proof outer envelope. The compartments can be opened independently, thereby releasing the individual inner bags as needed. The details of the design and heat sealing of the outer envelope are given in Plate 9. Plate 10 shows how the inner bags containing the repellent are assembled in the outer envelope and also the method of opening.

43. The inner bags are made of cotton nainsook of weight 8.5 yards 40" material per pound. Each bag contains 45 grams of the repellent mixture, pressed without heating into a cake within the bag to prevent sifting through the light weight cotton during the assembly as a final unit. The inner bags are attached to the outer envelope by means of a short strip of vinyl copolymer coated fabric. The strip is heat sealed to the back of the outer envelope and can be readily pulled off when the repellent is exhausted or no longer needed.

44. The front of the water proof envelope is provided with pull tabs and

cut in such a manner that a single compartment can be opened without destroying the water-proofness of the other compartments. A web belt with a corrosion resistant buckle serves to fasten the unit around the waist.

CONCLUSIONS AND RECOMMENDATIONS:

45. Evidence has been presented to show that a mixture of 80% dark dyestuff, Calco WBGR, and 20% copper acetate exhibited strong shark repellent properties in tests where it is used to protect potential food of the sharks.

46. No conditions were found under which the Calco WBGR-copper acetate mixture lost its effectiveness or suffered any serious reduction in effectiveness.

47. It is believed that the field tests by which the effectiveness of the repellent was evaluated simulate actual survival conditions sufficiently close to make the results valid, at least in a qualitative sense, in consideration of human survival.

48. Two types of a shark repellent unit for individual protection have been developed and tested for general serviceability and practicability. The decision as to who needs a shark repellent unit is dependent on the likelihood of exposure of the individual to shark attack and how critical are considerations of weight and space.

49. Substantiated reports of actual survival use should be given careful consideration if any change in composition or design is contemplated. It is believed that the shark repellent units as developed and described here are as effective as can be developed on the basis of existing knowledge.

50. A 16 mm. Kodachrome motion picture film with sound narration showing the development, testing and use of the shark repellent has been prepared by the Photographic Science Laboratory of the Bureau of Aeronautics for this laboratory and is available through the Bureau of Ships for viewing by interested parties.

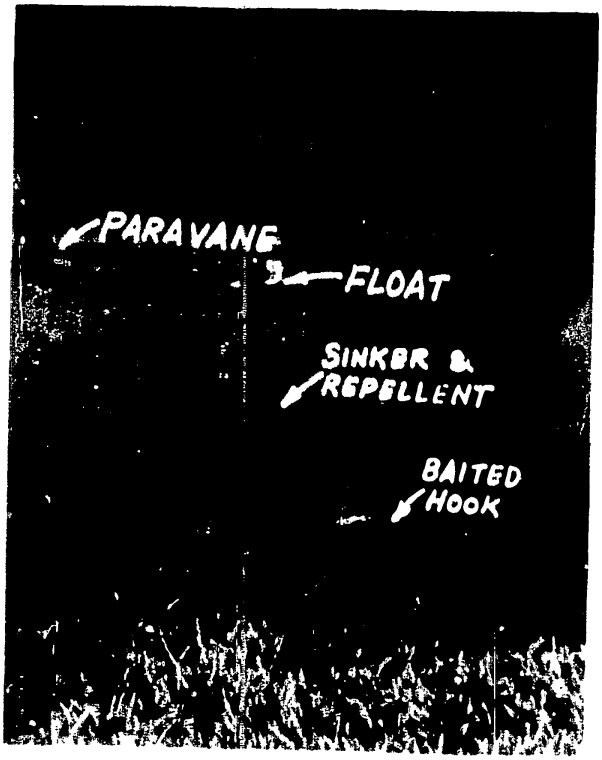


FIG. 1

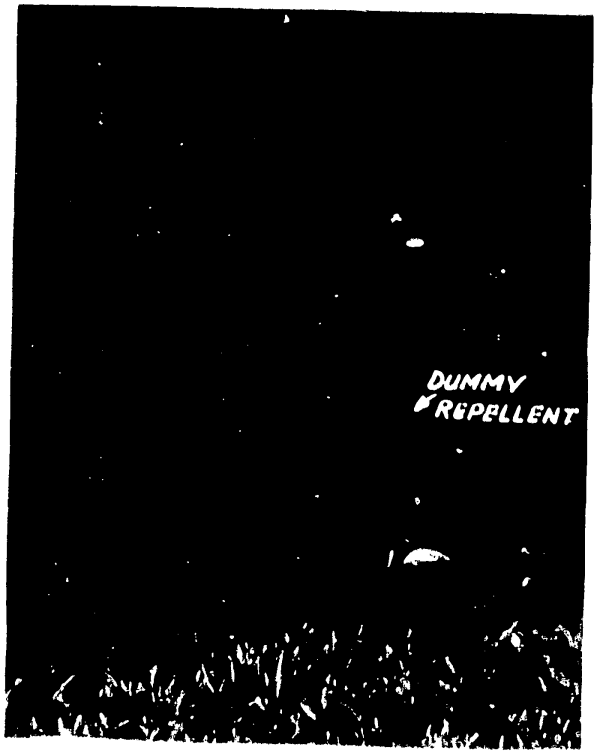


FIG. 2

PLATE 1

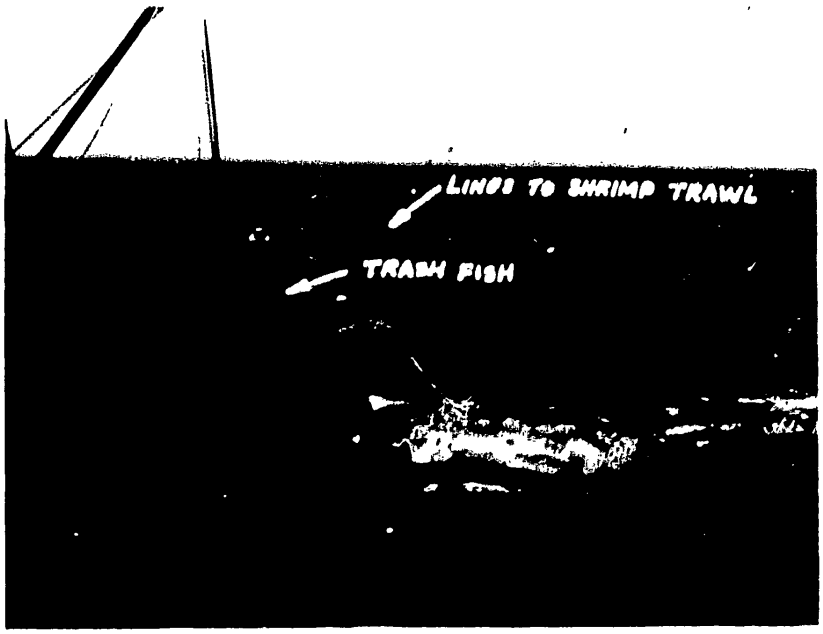


FIG. 1

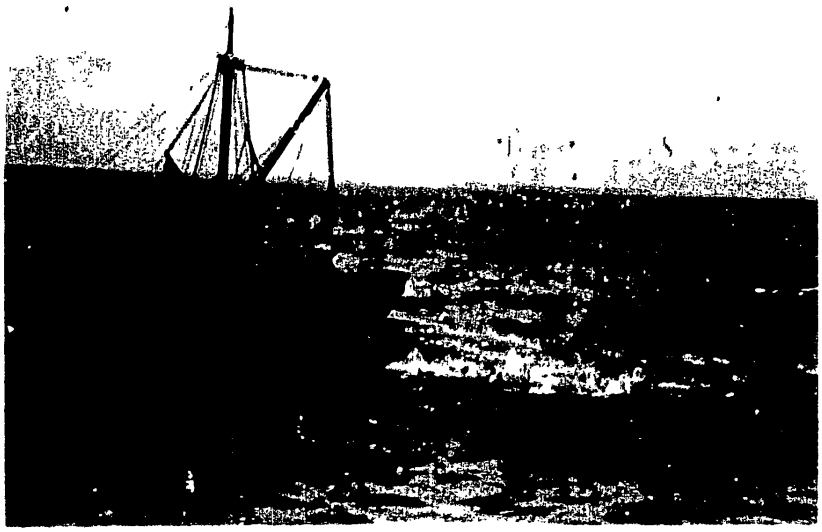


FIG. 2

PLATE 2

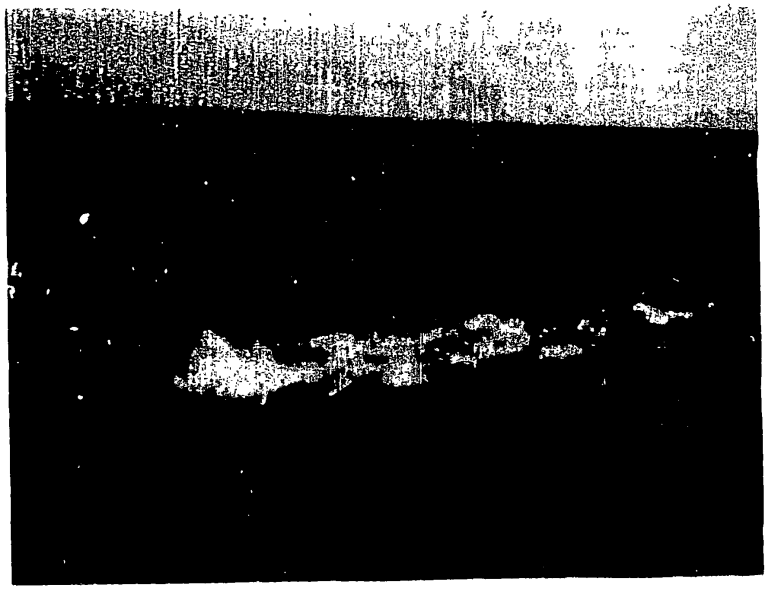


FIG. 1

FIG. 2

PLATE 3

FIG 1

FIG

PLATE

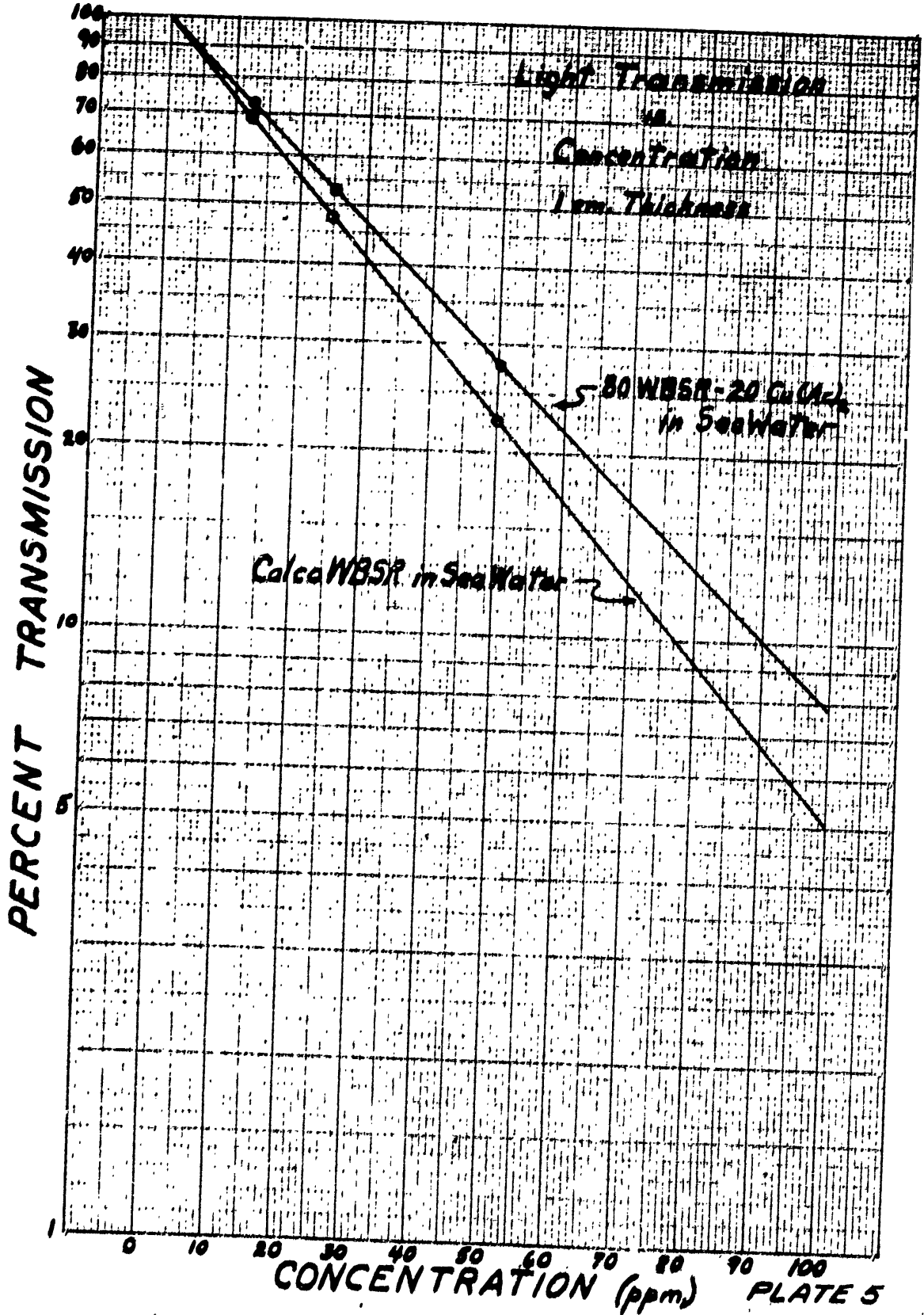
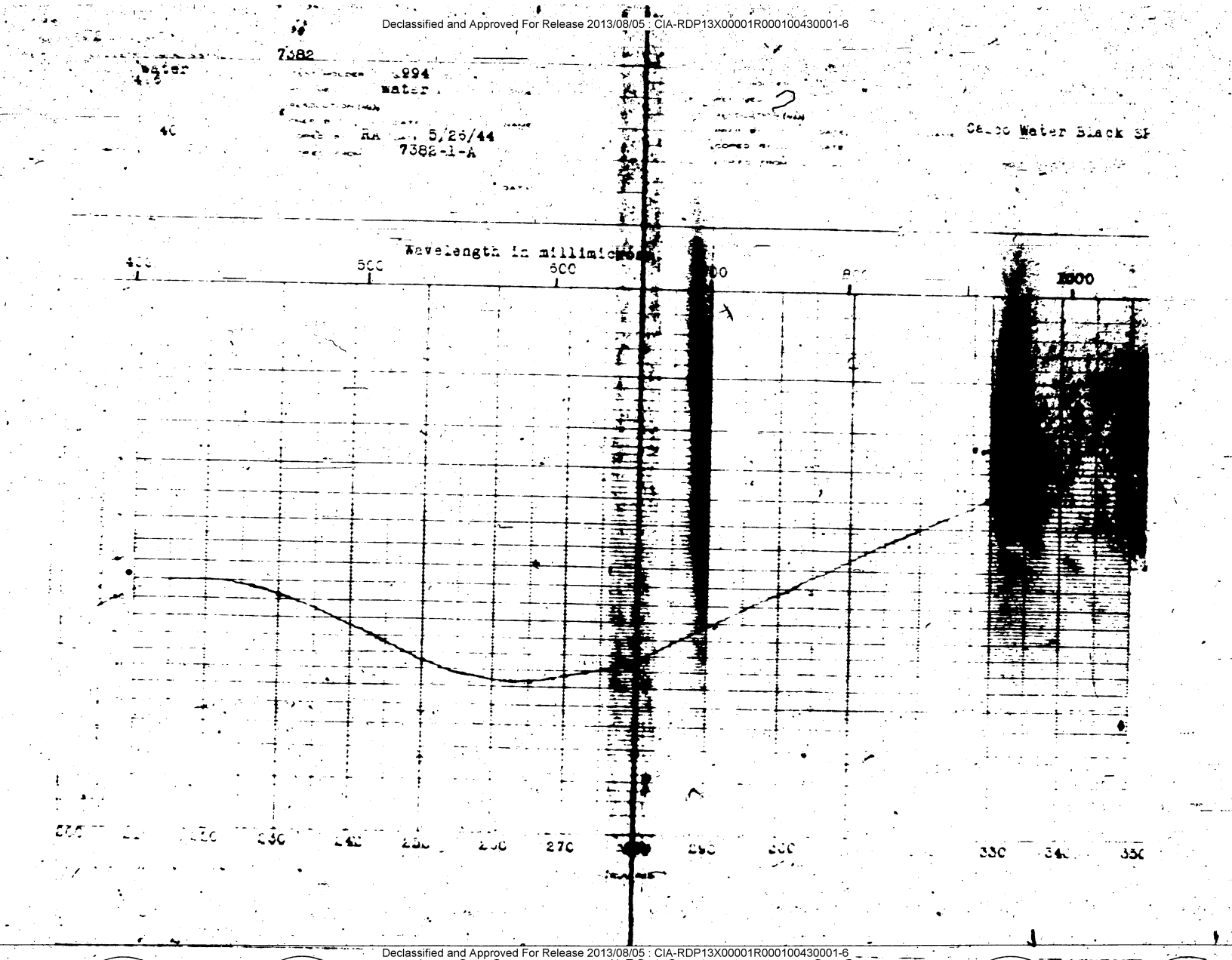


PLATE 5



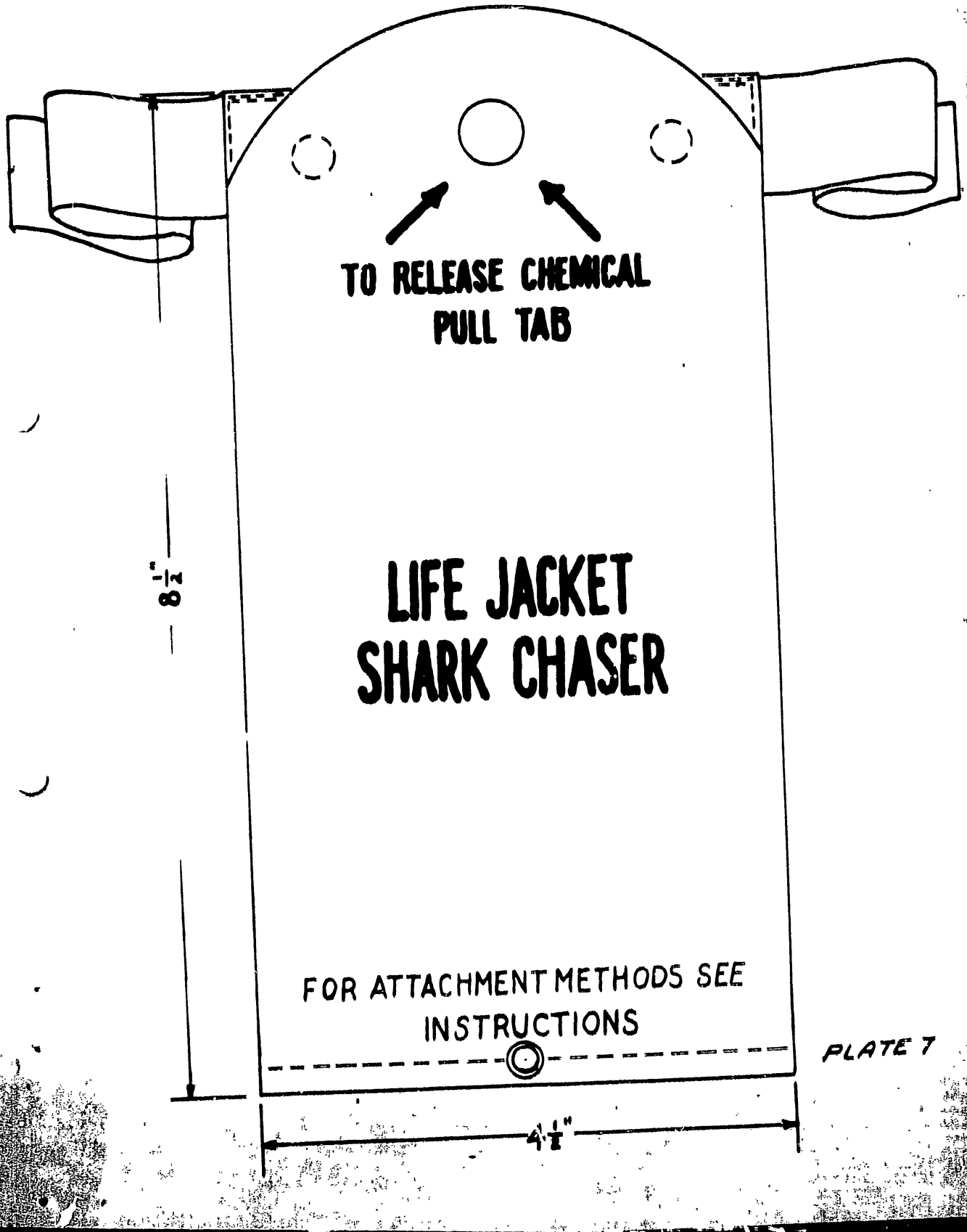


PLATE 7

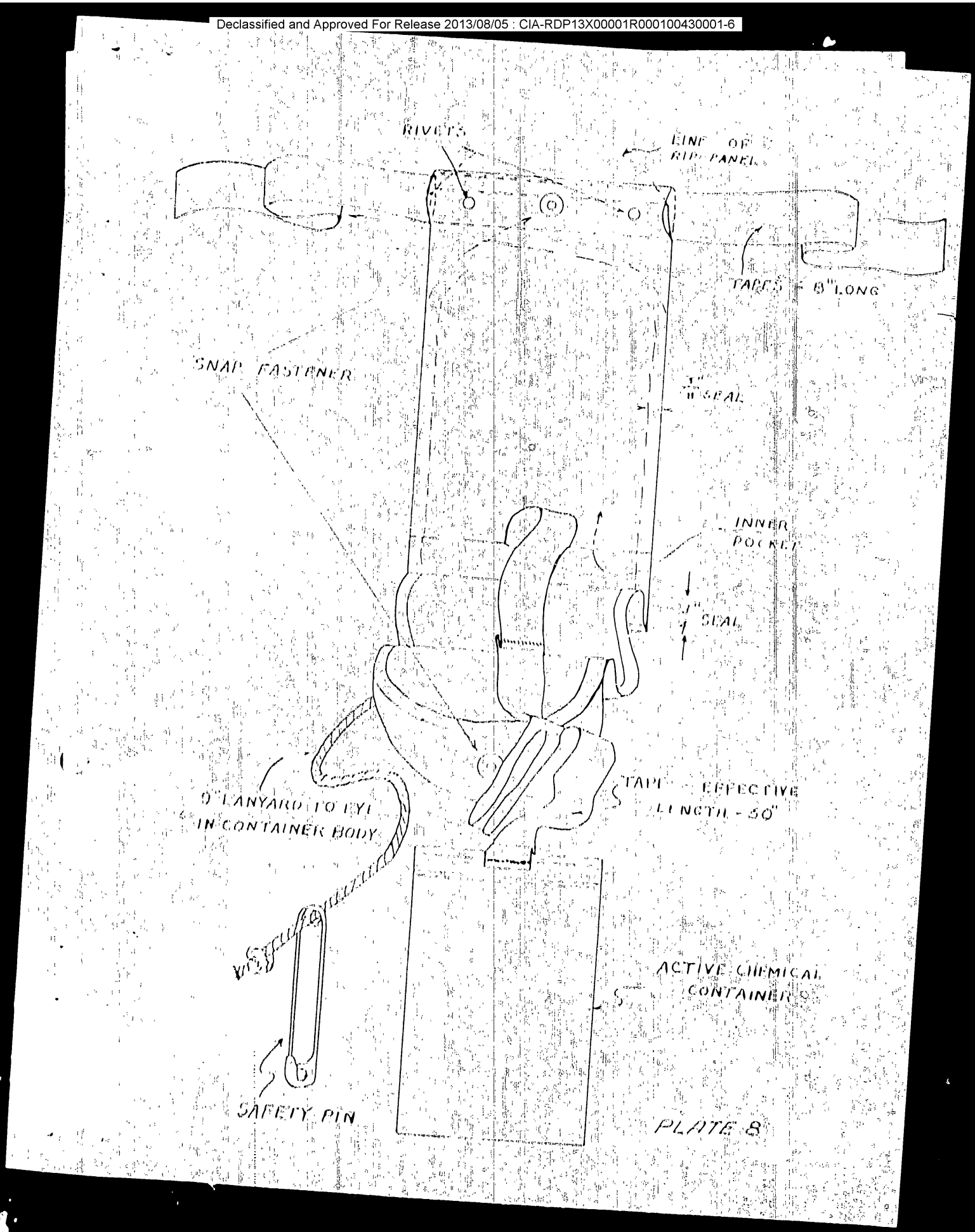
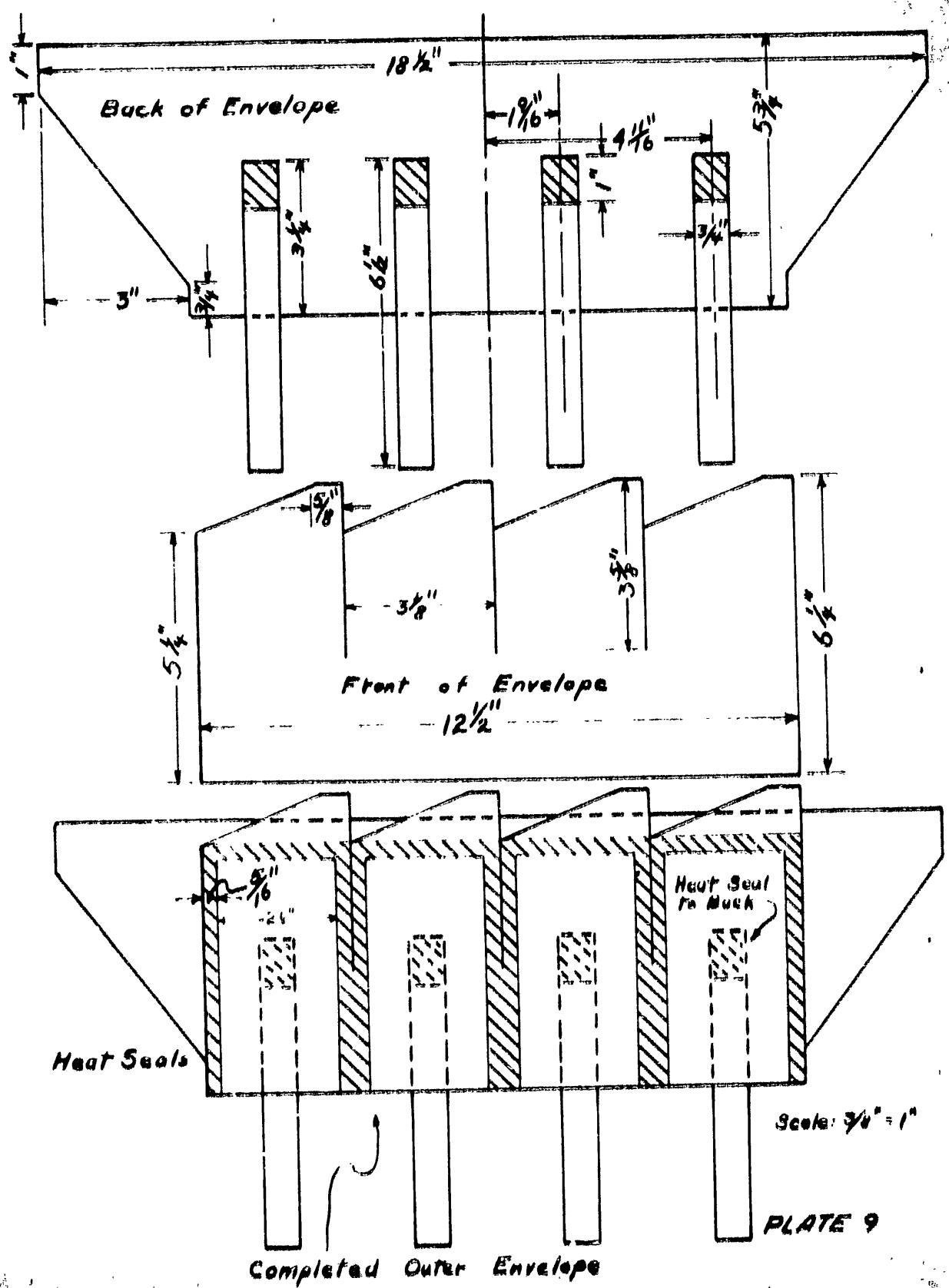
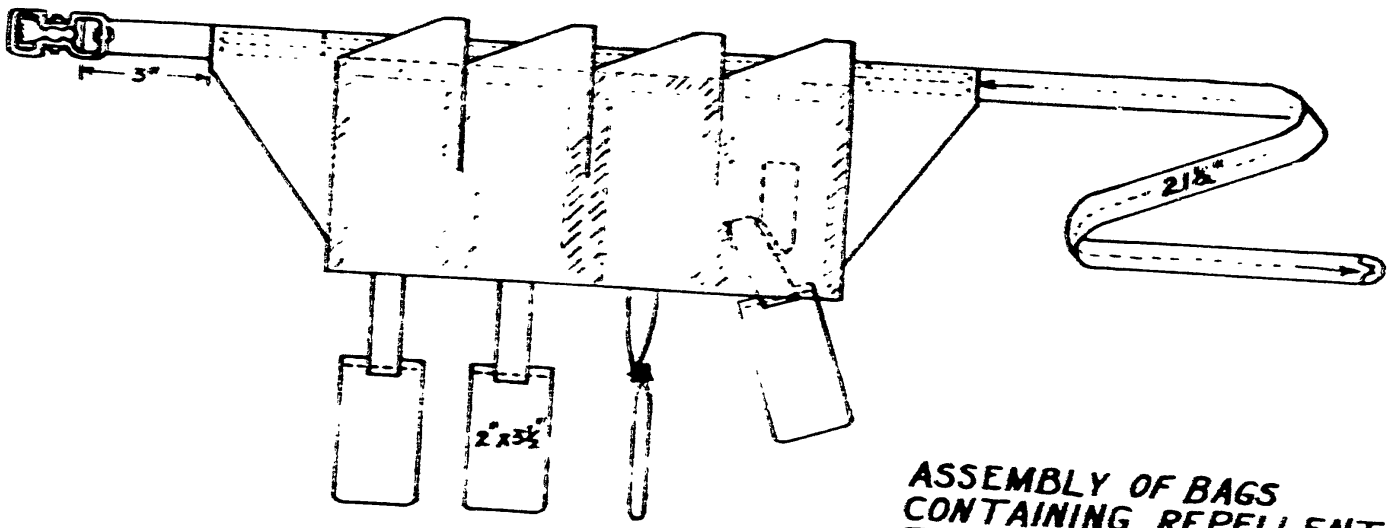
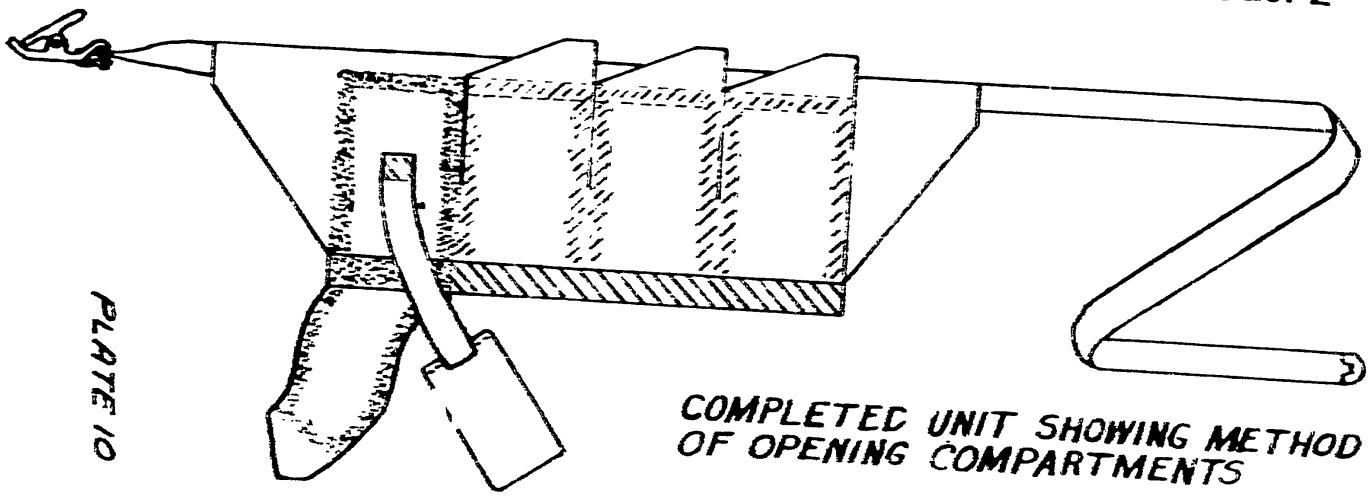


PLATE 8





ASSEMBLY OF BAGS
CONTAINING REPELLENT
TO OUTER ENVELOPE



COMPLETED UNIT SHOWING METHOD
OF OPENING COMPARTMENTS

PLATE 10

Scale: ¼" = 1"

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#16784. CHESTON TO 109. KINDLY FORWARD. SECRET

IN REFERENCE TO YOUR INSTRUCTIONS TO MCBAINE TO CONTACT DR. KARL MEYER, BACTERIOLOGY PROFESSOR AT U OF C, COLONEL CONNELY CALLED UPON DR. MEYER ON JUNE 4TH. SUBJECT TO THE APPROVAL OF THE UNIVERSITY AUTHORITIES, DR. MEYER IS GREATLY INTERESTED IN YOUR SUGGESTION AND IS AGREEABLE TO MAKE HIMSELF AVAILABLE FOR A PERIOD OF 3 MONTHS TO STUDY CONDITIONS WITHIN GERMANY. HOWEVER, DR. MEYER CANNOT DEPART BEFORE THE 1ST OF AUGUST. COLONEL CONNELY IS VERY MUCH IMPRESSED WITH DR. MEYER WHO IS OF SWISS ORIGIN. IF YOU DESIRE US TO PURSUE THIS MATTER FURTHER, PLEASE ADVISE.

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#10819. For 154 only from 110. Information: Forgan...* Bern-London #10849. Bern-Paris #11089. Reference your #5847 (OUT 10651).

1. Outlook for scientific work Germany by our unit troubles me. Europe is now filled with American scientists with specific mandates from various government departments. If we are effectively to compete we need top notch men and clear idea of our specific objectives. My talks with Chittick, Kliefoth, Remus et al. have not persuaded me that we are as yet equipped to do thorough job.

2. In certain fields we have the talent, equipment and experience to do better job than others. Personally believe in developing these fields intensively and not trying to compete in other fields which are well covered and possibly with better qualified men than we can now produce.

3. Kliefoth is quiet, modest and hardworking fellow who will be useful in capacity mentioned your concluding paragraph. He will be viewed with respect by other scientists, but is not type who would win out against competition with which we will be faced. We will, however, need a couple of scientists to analyze and process scientific material which SI teams may obtain by clandestine methods. Hence agree that we should start with Kliefoth and couple of assistants and develop from there on as work justifies, and we carve out for ourselves field in which we can do unique and not merely overlapping job.

4. Discussed this matter generally with Wisner and top members SI branch German unit in Paris last week, and believe foregoing also expresses their views.

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[illegible] FROM 154 AND SIX. INFORMATION LONDON AND PARIS.

[illegible]

1. [illegible], [illegible], 154, [illegible], AND SIX PROPOSE FOLLOWING T/O OF TECHNICAL PERSONNEL FOR GERMAN MISSION, SUBJECT YOUR APPROVAL:

3 CHEMISTS OR CHEMICAL ENGINEERS WITH INDUSTRIAL EXPERIENCE, 2 PHYSICISTS WITH INDUSTRIAL EXPERIENCE, 1 REPORTS MAN WITH TECHNICAL BACKGROUND AND JOURNALISTIC ABILITY. IS IT NECESSARY ALL HAVE FLUENT GERMAN? UNDERSTAND POSSIBILITY OBTAINING OFFICERS NOW IN ETO THROUGH COLONEL [illegible], LONDON FOR THESE POSITIONS.

2. RECOMMEND [illegible] BE IN CHARGE TECHNICAL SECTION GERMAN MISSION AND AS ONE OF CHEMISTS; CAPTAIN [illegible], LONDON, AS CHEMIST, AND LT. [illegible], LONDON, AS ONE OF PHYSICISTS. ADVISE.

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[illegible] 9 MAY 45 — INITIALS: [illegible]

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15-347
Chemical Warfare
x R.S.S. Air Germany
x Scientific Mission
x Technical Mission x Personnel

1 May 1945

TO : Director, General William J. Donovan

THROUGH : Chief, SI, Whitney H. Shepardson

FROM : Technical Section, SI, Colonel M. B. Chittick and Colonel H. W. Dix

SUBJECT : Recommended Technical Personnel ETO, From Date of Capitulation On.

The following recommendations are made as to Operations and Personnel for the European Scientific Section.

A long conference held with Mr. Shepardson on April 30th, reviewed the complete picture.

In view of this conference, and in view of the functions of the Technical Section of collecting technical information and interviewing scientists, the following recommendations as to Personnel in the following separate locations are made:

GERMAN MISSION - OCCUPATIONAL HEADQUARTERS:

It is recommended that there be six technical persons included in Mr. Allen Dulles' static mission, as follows:

3 chemists or chemical engineers, with industrial experience;

3 physicists, with industrial experience; and

1 reports man, with a technical background and who has journalistic ability.

All of these persons should have fluent German.

SECRET

It is recommended that Mr. Max Kliefoth be in charge of the Technical Section of the German Mission; Captain E. A. J. Mros, now of our London Office, would be another of the chemists; Lt. Holstein, also of our London Office, would be one of the physicists.

This would leave personnel to be obtained for Mr. Dulles as follows: one chemist or chemical engineer with industrial experience, two physicists with industrial experience, and one reports man.

All of the above recommendations are made subject to the approval of 110.

PARIS:

It is recommended that there be only one technical person in the Paris Office and that he be a reports man of some experience, as indicated above. If desired, this man can operate as headquarters for information on reports coming from Switzerland, England, or Sweden. This man could be assigned to Mr. Philip Horton, for administrative purposes.

SWITZERLAND:

It is recommended that there be one engineer, preferably a physicist, assigned to cover Switzerland, and for him to forward his reports to the reports man in Paris.

SECRET

SECRET

With the cessation of hostilities, it is believed that well-qualified people to fill the above requirements will be available in ETO, as a surplus military personnel - particularly among individuals who desire to stay in the service. The recruiting of the above requirements can be more expeditiously handled in ETO from this surplus military personnel.

15747

OFFICE OF STRATEGIC SERVICES

DATE [redacted] 1944 REC'D 12/19/44 6:31PM OUT 23778

TO [redacted], SWITZERLAND PRECEDENCE

FROM OFFICE OF STRATEGIC SERVICES CLASSIFICATION SECRET

CONFIRMATION -01

INFORMATION DIRECTOR, SECRETARIAT, MARRUNER, ETO.

Chemical warfare

TRANSMITTED IN CODE OR CIPHER

SECRET

#1657. TO 119 FROM 106 AND JACKPOT.

YOUR #1997. INTENDED ALL PERSONS NAMED OUR #1957 GO SWITZERLAND BUT EXPECT SOME WILL BE NECESSARILY DELAYED AND THERE MAY BE WITHDRAWAL SOME AND SUBSTITUTION OF OTHERS.

LIKE YOURSELF WE HAD CONSIDERED THEM AS COMPRISING SCIENTIFIC MISSION.

WILL CABLE YOU SOONEST THIS REGARD AFTER ANOTHER CONFERENCE WITH MARRINER.

ALL ARE EMINENTLY QUALIFIED FOR SCIENTIFIC UNIT GERMANY THOUGH FOR VARIOUS REASONS SEVERAL OF THEM WOULD HAVE TO RETURN HERE AND OTHERS SUBSTITUTED.

FROM THIS PERSONNEL AND OTHERS, COLONEL CHITTICK ASSUMES RESPONSIBILITY TO PROVIDE YOU WITH QUALIFIED SCIENTIFIC SECTION TO WORK IN GERMANY ON INTELLIGENCE PROGRAM AND PLANS WHICH HE WILL PLACE BEFORE YOU FOR YOUR APPROVAL.

SECRET

WDN 12/19/44 10:51 PM INITIALS: GEB WHO MMD MRC JRW

OSS
Form 69 (Revised)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE December 26, 1944

FROM BERN, SWITZERLAND

PRIORITY
ROUTINE
DEFERRED

TO OFFICE OF STRATEGIC SERVICES

IN 29338

DISTRIBUTION

(FOR ACTION) DIRECTOR — chemical warfare 15,347

(FOR INFORMATION) SECRETARIAT, SUPREMUSCO

U. S. GOVERNMENT PRINTING OFFICE 16-87183-2

RECEIVED IN CODE OR CIPHER SECRET

SECRET

#2547. Action: 109. From 110.
Information: London #3047 and Paris #3077.
(For 109 on arrival).

Your #1747 (garbled) [illegible] Believe we need here 1 senior scientist to deal with top Swiss scientists. Younger man could do leg work therefore if Chittick has scientific qualifications necessary believe he plus couple of leg men would suffice temporarily As regards scientific unit for German mission believe we can use as many top men as we can get and that as time will be of essence they should be available either Switzerland, France, or England prior German collapse, and probably best place for preparatory study for work Germany is here.

Called Dur 12/27/44 who will take any necessary action Mus.

SECRET

TOR: 12/26/44 8:31 PM

SECRET

[illegible] December 1944

Colonel [illegible]
through [illegible]
Executive Office

[illegible] Personnel [illegible]

The Director [illegible] concurr-
ing [illegible] to
the above subject.

[illegible] the
man for the purpose [illegible] consider the
job big enough for [illegible].

[illegible]obert Thrun
Assistant to the
Executive Officer

cc Mr. [illegible]

SECRET

Declassified and Approved For Release 2013/08/05 : CIA-RDP13X00001R000100430001-6

OSS Form 2202

SECRET

15,347
Chemical Warfare

FROM:

ROUTING AND RECORD SHEET

Col. Chittick

Accession No. .....

Date Rec'd. SA.....

To	Room No.	Date Rec'd	Date Fwd'd.	Officer's Initials	Comments
1. Mr. Shepardson	1212	DEC 16	DEC 18		
2. Col Buck [illegible]	220, Adm.				
3. Mr. Chen					
4. W J D -					
5.					
6.					
7.					
8.					
9.					
10.					

Each comment should be numbered to correspond with number in *To* column.
A line should be drawn across sheet under each comment.
Officer Designations should be used in *To* column.
Each Officer should initial (check mark insufficient) before further routing.
Action desired or action taken should be indicated in *Comments* column.
Routing sheet should always be returned to Registry.
For Officer Designations see separate sheet.

SECRET

STANDARD FORM NO. 64

SECRET

Office Memorandum · UNITED STATES GOVERNMENT

TO : Maj. Gen. William J. Donovan through Messrs. W. H. Shepardson and Charles Cheston

DATE: 15 Dec. 1944

FROM : Col. M. B. Chittick

SUBJECT: Technical Personnel - Bern and Stockholm

1. Reference is made to memorandum to Gen. Donovan from this office, above subject, 11 December 1944.

2. Subsequent to reference memorandum, conferences have been held with Mr. Carroll Wilson and Dr. Waterman of Dr. Vannevar Bush's office, as well as with Mr. Leland Harrison, Minister to Switzerland, and I&A.

3. Relative to the release of Drs. Roger Adams and Paul E. Klopstag by Dr. Bush for temporary duty with OSS, conversations with Messrs. Wilson and Waterman indicate that the following points may be raised by Dr. Bush:

a. "The 'national hazard' in using internationally known men with a knowledge of Drs. Adams and Klopstag for the proposed mission should they fall in the hands of the enemy."

This possibility has been discussed with Mr. Harrison and I&A who expressed the opinion that for the areas involved such a possibility is improbable.

b. "That the mission can be performed with scientists of less ability than the proposed candidates."

In this connection it should be emphasized that the proposed use of these well-known men is of a temporary nature to insure the initial success of the mission and as a secondary responsibility assist in the development of a plan and personnel for the permanent mission desired by I&O. It should be pointed out further that the quality and quantity of the anticipated results will be in direct ratio to the quality of the personnel employed.

c. "The question may be raised as to whether the potential information is sufficiently probable to justify utilizing men of Drs. Adams and Klopstag's ability."

The original request under which the current mission is being organized was initiated by I&O, who obviously recognized the need and possibilities of such a mission with highly skilled personnel.

d. "The possibility of the proposed mission conflicting and duplicating the ALSOS Mission."

SECRET

Close liaison with ALSOS is anticipated so that the two missions will actually supplement each other. In particular, it is believed that the OSS technical mission can substantially augment ALSOS by securing advance information and confirming targets for ALSOS. It should be emphasized to Dr. Bush that the proposed mission will in general be operating ahead of the lines and over a large area so that they will be able to contribute and supplement the ALSOS Mission.

4. It is recommended that clearance from Dr. Bush be handled personally by Gen. Donovan and verbally.

SCIENTIFIC DIVISION
ETO

18 November 1944

Colonel M. B. Chittick - Administrator - Toledo; CWS; Petroleum

Dr. Roger Adams — Chemistry; Explosives; Rubber

Dr. Paul Klopsteg — Physics; Instruments; Electronics (limited)

Dr. Ira Baldwin — Bacteriology; Rubber (limited); Fermentation

Electronics; Communications

Dr. Lewis

Aircraft; V-1; V-2

Ordnance; Weapons; Explosives; Metallurgy; V-1; V-2

OCT 27

SECRET

Chemical Warfare 15, 3417

Office Memorandum · UNITED STATES GOVERNMENT

TO : Brig. Gen. Wm. J. Donovan
Col. G. T. Buxton.
Mr. C. Cheston. Through: J. E. O'Gara

DATE: 26 October 1944

FROM : Lt. Col. H. W. Dix

SUBJECT: SI - Germany

In pursuance to talks with Mr. Dulles and to cable IN 20823, from Whitney Shepardson, the obtaining of SI technical information ahead of the lines out of Bern, Paris, or London has been considered and the following recommendations are made:

1. That the most important subject matter be listed and Priorities given.

   Attention is now being given to the following subjects:

   (a) Air Forces. Types and manufacture of planes; jet-propelled aircraft; V-1; V-2; jet-propulsion and its mechanisms.

   (b) Azusa.

   (c) Chemical Warfare. Materials and methods

   (d) Ordnance. V-1; V-2; jet-propulsion mechanisms; recoilless weapons. Explosives, - especially hollow charge; and processes; Metallurgy,- alloys and processes.

   (e) Quartermaster. Foods.

   (f) Signal Corps. (For Dr. Bowles and Gen. McClelland) Communication systems; electronic,- especially ultra-high-frequency; radar; control mechanisms; jamming and anti-jamming; television; etc.

   (g) Surgeon General. Medicines, and implements.

   (h) Synthetics. Petroleum; rubber; plastics.

   (i) Toledo,- including special gas masks.

2. That our selected subject matter and priorities thereof be checked with the several existing and proposed missions in order that our obtained material be supplemented by those missions after the battle lines have moved forward. This checking should be with OSRD; FEA; OPRD; Air Forces; Navy; and with the necessary Technical Services of ASF.

SECRET

3. That the personnel in MTC be under the direction of Mr. Dulles, which would liaison with the Paris and London offices, and SHAEF.

4. That the OSS personnel include:

Outstanding scientist -

Administrator - Col. W. A. Quitrick

Executive - Capt. Nicholson

Reconnaissance person - L. Berg

Personnel to handle:

Azusa - L. Berg

U.S. Colorado - Col. Chittick and ------, ------

Arkansas -

Communications -

Petroleum - Col. Chittick and ------, ------

Reviewing and Screening - J. A. Marsching and Lt. Brodie

Such other assistants as are necessary.

Chemical Warfare 15, 347

File

CONFID

Dir to ask Dr. Bush fo

October 11, 1944

To: General William J. Donovan

From: G. Edward Buxton

I agree that we should not attempt to get Dr. McMillan for SI Germany since General Groves does not wish to release him.

Do not know Dr. Hubble, but Shepardson's recommendation is a strong one. Think it would be well if you or I talked with General G. and obtained his opinion of Hubble before asking Campbell to release Hubble.

Have you previously asked General Campbell to release Hubble? Looks as if Hubble wants to come.

GEB

GEB FS Campbell has already turned us down re Lt. Col. D. Hubble.

Recommend that Gen. D. ask Dr. Bush for a suggestion.

CONFIDENTIAL

GEB ←

I do so & he says he would.

Chemical Warfare 15,347

October 16, 1944
To Gen. D.
Oct 16th

CONFIDENTIAL

File

Have ask Col Dix to ask Dr. Bush for more names —

GEB

October 11,1944

To: General William J.Donovan

From: G.Edward Buxton

I agree that we should not attempt to get Dr.McMillan for SI Germany since General Groves does not wish to release him.

Do not know Dr.Hubble, but Shepardson's recommendation is a strong one. Think it would be well if you or I talked with General G. and obtained his opinion of Hubble before asking Campbell to release Hubble.

Have you previously asked General Campbell to release Hubble? Looks as if Hubble wants to come.

GEB

GEB FS Campbell has already turned us down on

To Gen D. Hubble.

Recommend that Gen. D. ask Dr. Bush for a suggestion.

CONFIDENTIAL

I do so & he suggests same. GEB ←

To: COL. BUXTON

For comment.

W.J.D.

11 Oct. 1944

CONFIDENTIAL

Director's Office

STANDARD FORM NO. 64

CONFIDENTIAL

IS 347 "Chemical Warfare Scientific Mission"

Office Memorandum • UNITED STATES GOVERNMENT

TO : Brig. Gen. W. J. Donovan

DATE: 9 October 1944

FROM : Lt. Col. H. W. Dix (72)

SUBJECT: Dr. Edwin M. McMillan, re Scientific Division SI, ETO.

In cooperating with Mr. Stone on this subject I agreed to check further about the possibility of Dr. McMillan. This I have done by checking with General Groves' office, and I find that Dr. McMillan has been on General Groves' work from almost the beginning and through Major Smith of General Groves' office, I am advised that the General does not wish to give up Dr. McMillan and that we should take no action in regard to him.

While Dr. Hubble was here he advised Mr. Dulles, Dr. Lovell and me that he was to have a conference of several men at Aberdeen on the Azusa topic. With this thought in mind I telephoned Dr. Hubble to ascertain whether Dr. McMillan was at the conference, and if so was he still in the East. Dr. Hubble advised that Dr. McMillan was not at the conference. Also, in an off-the-record manner, Dr. Hubble advised that should we not be able to find a suitable person, he did not believe there would be any harm in going back to General Campbell and asking for reconsideration of Dr. Hubble. Such a reconsideration would appear a satisfactory move in view of the fact that Dr. McMillan is not available.

May I make the following suggestion: that you talk with General Groves regarding any person he might suggest for the work outlined in Mr. Shepardson's cable In 20825 suggesting Scientific Division SI, ETO. From my experience with General Groves and his office I would hardly expect to receive any recommendations. Should you desire to talk to General Groves before talking with General Campbell, it would then be possible to have another string to the bow before talking with General Campbell.

CONFIDENTIAL

CONFIDENTIAL

Chemical Warfare 15,347

MEMORANDUM

29 September 1944

Scientific Mission
Europe

TO: Brig. Gen. Donovan and Mr. Dulles

The Scientific Division of SI of OSS can function at various points in Europe to obtain information on the following subject matters:

Robot bombs, V-1, V-2, etc.
Structure, explosive, control, propellant fluid, metallurgical information, development and testing.

Synthetics.
Raw materials, fabrication, use of synthetic for more than one purpose, strengths, costs.

Plastics.
New developments, processes, plurality of uses (new and check old ones), new materials and treatments for specific uses.

Jet Propulsion.
Principles of operation, structures, propellant materials (solid and fluid), metallurgy of the propellant portion of the apparatus.

Special Matters.
Development of any weapon based on nuclear physics.
Scientific personnel, wind tunnels, places of research and places of trials, and results.

Control mechanisms. - Mechanical, electrical and electronic.
Procurement of information on these subjects as they are applied to the operation of Ordnance or other weapons.
Any radar developments pertinent to Ordnance weapons.

Explosives.
Type and kind, blast effect, hollow charge.

It is recommended that the highest type of administrator and scientist be obtained to prepare, outline and control procurement of information on the above points.

It would appear that this information would be of special interest to the Army and Navy.

HWD

Noted - This outline is a good idea

CONFIDENTIAL

J 32369-921

STANDARD FORM NO. 64

Office Memorandum UNITED STATES GOVERNMENT

Chemical Warfare 15, 3 42

DATE: 21 Sept. 1944

TO : Mr. W. L. Rolin

FROM : H. W. Dix HWD

SUBJECT: Attached memo.

The attached memorandum of a conversation of August 7, 1944 by a Swiss diplomat at Madrid has been reviewed with the Chief Chemist on explosives of the Ordnance Department, and the main answer is that nitrogen explosives are good but that they are most difficult for transportation and handling and are usually too sensitive to be of practical use as compared with the production, transportation and use of TNT and the modifications of TNT.

It appears that the Ordnance Department has spent a very large amount of money in experimental work on nitrogen explosives and that as a result thereof they have not produced a nitrogen explosive which they are willing to approve for manufacture and use.

In view of the tests, experience and non approval by the Ordnance Department it is not believed that this disclosure adds anything of value to the knowledge we now have.

If detailed information could be obtained this organization and Army and Navy Ordnance would be particularly interested.

CONFIDENTIAL

OSS Form 41B1

Date 9/18

To Mr. Belin

The attached was given to me by the Director who thought it might have a value from the intelligence point of view.

Suggest that you consider the subject of this paper, and with the head of SI determine what should be done about it.

E. J. Putzell Jr.
Lieutenant (j.g.), USNR
Asst. Executive Officer

Attachment

Office of the Executive Officer

(10449)

(1)

Memorandum of Conversation - August 7th 1944

Source : Swiss diplomat in Madrid - known for strong pro-allied sentiments .. 13/342

Subject : New German explosive.

General Vigón, Spanish minister for Air reported in a conversation to our source and to a Spaniard also known to us, that members of the German military mission (i.e. military attaché's office at Madrid German Embassy) had recently regained their composure and told General Vigón that they knew Germany had the means to win the war by forcing the British to come to terms.

General Vigón described the method to be used as a new German nitrogen explosive.

(2)

This explosive was said to have a disintegrating effect on all animal or vegetable life within an area of four city blocks (note. my source could not say what size blocks but believed this referred to the average new city block in rebuilt Spanish areas, I would guess this to be about the area of two Manhattan blocks in the midtown area between Fifth and Sixth Avenues). The effect of this explosive was said to penetrate seven metres underground. It was said to operate by disintegrating the air.

The carrier for this explosive was reported to be somewhat similar to the V-1 with stratosphere operation to avoid attack by British defending planes. Experiments with this bomb on cattle had

. proven highly successful that it had not yet been employed against (3)
England because of the failure of the Germans to find a way to launch the carrier with relative safety to the firing crew. The delicacy of the explosive was so great that several bombs had exploded when fired, killing the crews responsible for launching the projectile and this danger had been rumored to such an extent that certain troops selected to conduct experimental fire had mutinied against the orders to serve this new weapon.

My Swiss source said that Vigon reported the above with great sincerity as if he believed the truth of the Germans' statements to him. However since my informant has only slight knowledge of

military and technical matters, there is a considerable vagueness in the detail of his statements. -

3523

SECRET

15,182

JOINT SECURITY CONTROL Chemical Warfare

Washington 25, D.C. Biological Warfare

JSC/D9
Serial 926

7 September 1944

SECRET

MEMORANDUM FOR: Distribution List.

Subject: Classification of Matter Concerning Biological Warfare.

References: (a) C. C. S. 576/6
(b) C. C. S. 576/7
(c) Memo JSC D/9, Serial 415, Dated 5 April 1944

1. Reference (c) is hereby cancelled this date.

2. In Reference (b) the Combined British-U. S. Chiefs of Staff approved reference (a), which is reproduced herein for information and compliance.

CLASSIFICATION OF MATTER CONCERNING BIOLOGICAL WARFARE

a. TOP SECRET

(1) Military operational policies and directives.

(2) Specific agents actually being manufactured by name, code name and/or description.

(3) Processes in full detail.

(4) Munitions in full detail.

b. SECRET

(1) Evaluated intelligence.

(2) Specific agents under experimentation or development by code name, including progress reports.

(3) Phases of processes not disclosing overall process with agents and raw materials involved.

(4) Identification of our plants and experimental centers with B. W. activities.

(5) Details of defensive measures (medical, chemical and physical) either general in nature or against known enemy agents.

(6) Names and addresses of allied scientists when identified with B. W. projects.

c. RESTRICTED

(1) Mechanical defensive equipment until issued. (Note: Wide premature distribution under this heading will be avoided.

(2) General medical defensive measures.

(3) Training of troops in defense. (Note: Wide premature distribution under this heading will be avoided.)

(OVER)

SECRET

JWA

Form 97a (Revised)

OFFICE OF STRATEGIC SERVICES

DATE 19 MARCH 1945 OFFICIAL DISPATCH

FROM SIGEX, KANDY

TO

OFFICE OF STRATEGIC SERVICES		PRIORITY
(FOR ACTION) DIRECTOR	DISTRIBUTION (FOR INFORMATION) SECRETARIAT	ROUTINE
		DEFERRED IN 7842

RECEIVED IN CODE OR CIPHER

#17367. LUCY FOR COUGHLIN TO 109 AND JEFFRIES. SECRET

THEATER COMMANDER OPPOSED TO USE OF TEAR GAS, HENCE NO REQUIREMENT.

SECRET

TOR: 0116 20 MAR 45

FILE COPY

SECRET

JOINT SECURITY CONTROL

Washington 25, D.C.

JSC/D9
Serial 926

7 September 1944

SECRET

MEMORANDUM FOR: Distribution List.

Subject: Classification of Matter Concerning Biological Warfare.

References: (a) C. C. S. 576/6
(b) C. C. S. 576/7
(c) Memo JSC D/9, Serial 415, Dated 5 April 1944

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CLASSIFICATION OF MATTER CONCERNING BIOLOGICAL WARFARE

a. TOP SECRET

(1) Military operational policies and directives.

(2) Specific agents actually being manufactured by name, code name and/or description.

(3) Processes in full detail.

(4) Munitions in full detail.

b. SECRET

(1) Evaluated intelligence.

(2) Specific agents under experimentation or development by code name, including progress reports.

(3) Phases of processes not disclosing overall process with agents and raw materials involved.

(4) Identification of our plants and experimental centers with B. W. activities.

(5) Details of defensive measures (medical, chemical and physical) either general in nature or against known enemy agents.

(6) Names and addresses of allied scientists when identified with B. W. projects.

c. CONFIDENTIAL

(1) Mechanical defensive equipment until issued. (Note: Wide premature distribution under this heading will be avoided.

(2) General medical defensive measures.

(3) Training of troops in defense. (Note: Wide premature distribution under this heading will be avoided.)

(OVER)

(4) Schools when referred to by code names.

(5) Contracts and construction details of plants and arsenals when not disclosing purpose.

(6) Intelligence questionnaires seeking information regarding enemy activities and intentions and phrased to conceal from the enemy, United States and British special interests and trends of research.

d. UNCLASSIFIED

(1) Raw materials when not disclosing connection with B.W. activities.

(2) Equipment when not disclosing connection with B. W. activities.

3. It is requested that all offices dealing with the subject of this memorandum classify all documents in their possession in accordance with the subject matter as described in paragraph 2 above and notify all offices and officers, not listed in the distribution list but who have been furnished any classified documents or data on this subject, of the change in classification.

For Joint Security Control:

FORREST B. VOLKEL,
Colonel, CAC,
Secretary.

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OSRD: Dr. V. Bush
Mr. Carroll L. Wilson
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Col. K. F. Lundeberg
Col. Gaylor W. Anderson

G-2: Lt. Col. Wm. M. Adams
Lt. Col. Merillat Moses

OSS
Form 69 (Revised)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE 19 MARCH 1945

FROM SIGEX, KANDY

PRIORITY
ROUTINE
DEFERRED

IN 7842

TO OFFICE OF STRATEGIC SERVICES

DISTRIBUTION

(FOR ACTION) DIRECTOR

(FOR INFORMATION) SECRETARIAT

U. S. GOVERNMENT PRINTING OFFICE 16—27553-2

RECEIVED IN CODE OR CIPHER

SECRET

#17367. LUCY FOR COUGHLIN TO 109 AND JEFFRIES.

THEATER COMMANDER OPPOSED TO USE OF TEAR GAS, HENCE NO REQUIREMENT.

SECRET

TOR: 0116 20 MAR 45

FILE COPY

Form 97a (Revised)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE 14 MARCH 1945

FROM GUSTAV, CAIRO

TO OFFICE OF STRATEGIC SERVICES

PRIORITY
ROUTINE
DEFERRED

(FOR ACTION) DISTRIBUTION

DIRECTOR

(FOR INFORMATION)

SECRETARIAT, R&D, FIELD SECTION.

IN: 7283

U. S. GOVERNMENT PRINTING OFFICE 16-87464-3

SECRET

RECEIVED IN CODE OR CIPHER SECRET

#49047. 109 AND JEFFRIES FROM ALDRICH. IN ANSWER TO YOUR #50267 (OUT: 6053).

IT IS NOT EXPECTED THAT TEAR GAS LACHRYMATORS WILL BE NEEDED FOR USE IN THIS THEATER. IF SUCH NEED DOES ARISE, YOU WILL BE INFORMED AS TO THE THEATER COMMANDER'S ATTITUDE.

TOR: 0917 13 MAR 45

FILE COPY

SECRET

Form 088 (Revised)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE 12 MARCH 1945

FROM CASERTA, ITALY

PRIORITY
ROUTINE
DEFERRED

TO OFFICE OF STRATEGIC SERVICES

1N 7085

DISTRIBUTION

(FOR ACTION) DIRECTOR

(FOR INFORMATION) SECRETARIAT, R&D, FIELD SECTION.

14,687

U. S. GOVERNMENT PRINTING OFFICE 16—87463-3

RECEIVED IN CODE OR CIPHER

SECRET

#37994. GLAVIN TO 109 AND JEFFRIES. RE YOUR #27827 (OUT 6052).

SEE OUR ADW 341 FROM LAWRENCE AND AGOSTINI TO MCHUGH.

THEATER COMMANDER HAS DISAPPROVED USE OF TEAR GAS HERE AND WE WANT NO MORE.

SECRET

TOR: 1350 12 MAR 45

FILE COPY

IT IS FORBIDDEN TO COPY OR REPRODUCE THIS CABLE WITHOUT AUTHORIZATION FROM THE SECRETARIAT

Form 88 (Revised)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE 10 MARCH 45 REC'D 1800 11 MAR 45

TO SEE BELOW

FROM OFFICE OF STRATEGIC SERVICES

PRIORITY
ROUTINE
DEFERRED

BOOK MESSAGE (4 STATIONS)

DISTRIBUTION

(CONFIRMATION TO ORIGINATOR)

DIRECTOR

(FOR INFORMATION)

SECRETARIAT, R&D, FIELD SECTION

U. S. GOVERNMENT PRINTING OFFICE 16-67846-1

TRANSMITTED IN CODE OR CIPHER

SECRET

SECRET

#27827. TO CASERTA, ITALY (OUT-6050)
#11587. TO SIGEX, KANDY (OUT-6051)
#3257. TO MAWOI, CHUNGKING (OUT-6052)
#50267. TO GUSTAV, CAIRO (OUT-6053)

TO COUGHLIN, HEPPNER, GLAVIN AND ALDRICH FROM 109 AND JEFFRIES.

DO YOU STILL DESIRE TEAR GAS LACHRYMATORS FOR USE IN YOUR THEATER? IF SO DO YOU HAVE INFORMATION AS TO THE ATTITUDE OF YOUR THEATER COMMANDER? WE SHOULD LIKE TO REAFFIRM THAT NO USE MAY BE MADE OF THIS MATERIAL WITHOUT PRIOR EXPLICIT APPROVAL OF THE THEATER COMMANDER.

TOD: 1950 11 MAR 45

WJD

SECRET

INITIALS OF "RELEASING" OFFICER

SECRET

9 July 1944

Miss Grace Tully,
The White House,
Washington, D. C.

Dear Grace:

Here is a report which I believe will interest the President. Will you please hand it to him?

Thank you.

Sincerely,

William J. Donovan,
Director.

SECRET

SECRET

Chemical warfare
× bacteriological warfare
× poison gas
× incendiary × JIC

9 July 1944

MEMORANDUM FOR THE PRESIDENT

Here is a report from our intelligence representative at Kunming:

"Today we received a report from Captain Thompson verifying the fact that the Japanese used poison gas against the Chinese 54th Division five miles due east of Hengyang on the night of June 23rd. From the burns observed on two victims, it appears that mustard gas and Lewisite were employed. The report indicated that the Japanese, in order to safeguard their own troops, used the gas only against small groups, in limited amounts and with caution."

William J. Donovan
Director

SECRET

OSS Form 4151

Date 10 Mar. '45

To: General Donovan

The attached cable was prepared at the suggestion of Colonel Doering. It has been cleared with Major Jeffries.

RT

Office of the Executive Officer

(30449) SECRET

OFFICE OF STRATEGIC SERVICES

(fold here)

To [illegible] Date

Room Bldg.

- For your information
- Note and Return
- File
- Comments
- Investigate and Report
- See Me About this
- Mail and Files unit
- Take this up with
- Per our telephone conversation
- Prepare Reply
- Signature

Remarks

This looks OK to me. We need our people in the field to check up [illegible]

(fold here for return)

From [illegible] Date

Room Bldg.

OSS Form 41a1

MAR 9 RECD

Date 9 Mar 45

MAJOR JEFFRIES

Please with Col. Dussing's attached with as Draft Cable prepared pursuant thereto. May I have your comments on these?

R Thorn

SECRET

of the Executive Officer

OSS Form 4151

Date 6 March

To: LIEUT. THRUN

Would you please prepare for the General's consideration, first clearing with Jeffries, an inquiry to each theater, other than ETO, as to whether they still desire this material, and whether they had information as to their theater commander's attitude, particularly stressing that no use may be made of this material without prior explicit approval of the theater commander.

O. C[illegible], Jr.

SECRET

Office of the Executive Officer

(30449)

CONFIDENTIAL

OFFICE OF STRATEGIC SERVICES

WASHINGTON, D. C.

2 March 1945

MEMORANDUM

TO: Mr. Charles S. Cheston

FROM: Chief, R&D Branch

SUBJECT: Use of Tear Gas (Lachrymators) by OSS

On 20 July 1944 R&D recommended that, "since tear gas is freely used by Police Departments throughout the United States, and is procurable without any special license or permit, there seems to be no reason why tear gas should not be made available to OSS at the discretion of its Theater Commanders".

Notice of approval of this recommendation by the Acting Director was received 9 August 1944.

The above information was transmitted to R&D field men and limited quantities of the gas tubes were sent out. In ETO a letter was addressed to the Executive Officer of OSS requesting approval of the Theater Commander of the use of this weapon. The proposal was considered by G-1, G-3 and the Judge Advocate's office of ETO and SHAEF by means of eight indorsements.

The request for approval of tear gas was denied on the basis of the fact that the Germans might use this as a justification for starting gas warfare.

John M. Jeffries
Major, CE
Chief, R&D Branch

CONFIDENTIAL

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : Brig. Gen. W. J. Donovan
Col. G. B. Buxton

FROM : Lt. Col. H. W. Dix HWD

DATE: 6 October 1944
TO 230

SUBJECT: Toledo

In checking some of the information relating to the subject Toledo, I came across the following compilation entitled "INTERNATIONAL DELIBERATIONS ON THE PROHIBITION OF THE USE IN WAR OF ASPHYXIATING, POISONOUS OR OTHER GASES".

I thought you might wish to have a copy of this for your files for reference, as the references are from treaties and acts of Congress, etc.

Enc. 1
cc: Mr. Stone, R&D - TO 234

14,689

INTERNATIONAL DELIBERATIONS ON THE PROHIBITION OF THE USE IN WAR OF ASPHYXIATING, POISONOUS OR OTHER GASES

Hague, 1899

527. Hague, International peace conference, 1899. The Hague declaration (iv, 2) of 1899 concerning asphyxiating gases. Washington, D. C., The Endowment, 1915, 2 p. (Carnegie endowment for international peace. Division of international law. Pamphlet no. 8)

JX1906.A3 no. 8

Washington, 1921-22, including "Treaty ... in relation to the use of submarines and noxious gases in warfare."

528. U. S. President, 1921-1923 (Harding) Conference on the limitation of armament. Address of the President of the United States submitting the treaties and resolutions approved and adopted by the Conference ... Washington, Govt. print. off., 1922, 132 p. "Treaties and Resolutions": p. 91-132. (67th Cong., 2d sess. Senate. Doc. 125)

JX 235 1922 b

529. Washington, D. C. Conference on the limitation of armament. Armament conference treaties. Treaties and resolutions approved and adopted by the Conference ... Washington Govt. print. off., 1922, 44 p. (67th Cong., 2d sess. Senate. Doc. 124)

JX235 1922 d

530. Washington, D. C. Conference on the limitation of armament. Conference on the limitation of armament, Washington, November 12, 1921-February 6, 1922. Washington, Govt. print. off., 1922, 1757 p. English and French. Includes: Minutes, etc. Appendix, consisting of the treaties and resolutions.

JX1974.5.A55

531. Washington, D. C. Conference on the limitation of armament. Conference on the limitation of armament. Subcommittees. Washington, Govt. print. off., 1922, 747 p. incl. tables. English and French. "Minutes of the Subcommittee on poison gas": p. 280-291.

JX1974.5.A55 1922 b

532. Washington, D. C. Conference on the limitation of [illegible] international law documents. Washington, Govt. print. [illegible] Discussions upon international law at the Naval [illegible] conducted by George Grafton Wilson, ... one of [illegible] at the Conference ..." Includes: Treaties

JX1974.5.A22

533. Washington, D. C. Conference on the limitation of armament. Treaties and resolutions of the Conference on the limitation of armament as ratified by the United States Senate; facts and tables. New York and Washington, Federal trade information service, c1922, 60 p. incl. tables.
JX235 1922 a

534. Washington, D. C. Conference on the limitation of armament. Washington Conference on the limitation of armament. New York city, Greenwich, Conn., American association for internation conciliation, 2 vols. (International conciliation, pub. monthly by the American association for International conciliation ... December 1921, no. 169, March 1922, no. 172)
JX1907.A6 no. 169, 172

Geneva, 1925

535. Conference for the supervision of the international trade in arms and ammunition and in implements of war, Geneva, 1925. Protocol for the prohibition of the use in war of asphyxiating, poisonous or other gases, and of bacteriological methods of warfare. Geneva, June 17, 1925. London, H. M. Stationery off., 1930, 7 p. (Gt. Brit. Foreign office. Treaty series, 1930, no. 24) English and French text.
JX6123.G3C6 1925 E

Geneva, 1930. Preparatory commission

536. Gt. Brit. Delegation to the League of nations. Memorandum on chemical warfare presented to the Preparatory commission for the disarmament conference by the Delegation of the United Kingdom. Geneva, November 1, 1930 ... London, H. M. Stationery off., 1930, 2 p. (Foreign office. Miscellaneous no. 17, 1930)
JX5390.G8 1930 a

Geneva, 1932 /Preliminary documents/

537. League of nations.
Conference for the reduction and limitation of armaments ... Prohibition of the use in war of asphyxiating, poisonous and other gases and of bacteriological methods of warfare. Geneva, 1932, 13 p.
JX5390.L5 1931

Office of Strategic Services

OSS
Form 11564

MESSENGER RECEIPT

Date: 10/6/44

To: Brig. Gen. W. J. Donovan

From:

Lt. Col. H. W. Dix

Description of Material:

TO 230

Received by:

(22168)

SECRET

9 August 1944

Mr. Lovell

Lt. Putzell

Your memorandum of 22 July 1944 - "Use of Tear Gas by OSS".

This is to inform you that the Acting Director has approved the recommendation obtained in subject memorandum from you to General Donovan.

E. J. Putzell, Jr.
Lt. (j.g.) USNR
Assistant Executive Officer

CC: Colonel Hoffman
Files

SECRET

SECRET

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

14,687
JUL 25 RECD
(Incendiaries

22 July 1944 Teargas

MEMORANDUM

TO: General William J. Donovan

FROM: Stanley P. Lovell

SUBJECT: Use of Tear Gas (Lachrymators) by OSS

My judgment on this matter is that since tear gas is freely used by Police Departments throughout the United States of America, and since it is procurable without any special license or permit, being offered for sale to the general public, that there is no sense or reason in withholding it from what is frankly an unorthodox fighting unit, such as our SO, OG and SI groups.

The argument generally employed against its use is that it will precipitate chemical warfare. I hold it untenable to say that supplying tear gas to our operators or to resistance groups will have this result. If the enemy wish to employ chemical agents, they will do so without waiting for OSS to employ harmless, non-lethal tear gas. They will not wait for such use by OSS as a signal to institute chemical warfare.

I therefore recommend that OSS make its tear gas supply available at the discretion of its Theater Commanders.

OK

Stanley P. Lovell

Stanley P. Lovell, Director
Research and Development

cc/Maj. Carl O. Hoffman

SECRET

74, 687

Chemical Warfare

Tear Gas

OFFICE OF STRATEGIC SERVICES

WASHINGTON, D. C.

4 July 1944

TO: Brigadier General William J. Donovan

FROM: Major Carl O. Hoffmann

SUBJECT: Tear Gas

1. I return herewith the tear gas memorandum. I recommend that this item be made available to SACO for the natives and to General Chennault for such use as he may see fit. will discuss the matter in detail with Colonel Coughlin.

2. I am sure that the Chinese representatives at SACO and General Chennault will place a high value at having this item on hand.

3. The memorandum calls for a decision by you on the general use of this item as a matter of over-all policy. I believe that you determined last night that the use suggested above is an appropriate use of the item.

CARL O. HOFFMANN
Major, AUS
Chief, SO

Attachment

9960

14.687
Chemical Warfare

SECRET

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

30 June 1944

MEMORANDUM

TO: Colonel G. Edward Burton

FROM: Frank T. Stone

SUBJECT: Tear Gas

Mr. Mayo informs me that tear gas in Fountain Pen Guns has been shipped to the theaters in the quantities indicated below:

ETO	451
MTO	150
MATO	500
FETO	25

In addition, tear gas has been procured and issued as follows:

FOUNTAIN PENS

1 - Margaret Griggs
1 - Colonel Carl F. Eifler
6 - Captain John Hahn (X-2)
250 - Martin I. McHugh
2 - Lt. C. Lewis
6 - Major Watts Hill
9 - Ensign R.T. Walsh
67 - Warehouse (Capt. Jack Tranes)

1" Cal. Guns

2 - Comdr. A.B. Leggett

Riot Guns - 25 mm.

1 - Major Watts Hill

Grenades

10 - Far East
3 - Comdr. A.B. Leggett

Billies - 10"

3 - Henry Gibbons (Far East)

SECRET

SECRET

These are standard items of American procurement and were obtained by Mr. Mayo in response to requisitions submitted to him by the various Branches. He informs me that no instructions as to their use have to the best of his knowledge been sent to the field. He does not know whether or not any of the items have actually been used.

Major Watts Hill informs me that Lt. Leslie Fossell, Norwegian Desk, SI London, reported that tear gas pistols, fountain pen type, had been used by Norwegians working with us, and on one occasion had saved the lives of approximately 30 of such Norwegians. Major Hill is under the impression that tear gas guns, fountain pen type, are being issued to Norwegians under instructions from the Norwegian Desk of the London SI Office. He has no knowledge of what instructions accompany such issue.

Frank T. Stone, Deputy Director
Research and Development

SECRET

USE FORM 41B1

To Col Buxton

Date 14 June

To: OCD

Ensign Donovan says the problem is: Whether or not Mr. Lovell should turn over to Major Watts Hill tear gas weapons designed for use here by FI agents in Scandinavia. Ensign Donovan had spoken to you about the fact that Hill asked Lovell to turn these weapons over to him and Lovell said he wanted an OK on it before turning them over to Hill. Donovan asked Montgan to look into it and this is the result.

We have recd no formal request from Mr. Lovell for this.

SECRET

LMoD

Office for the Executive Officer

(30449)

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

14.689

TO : Colonel Doering

FROM : Secretariat

DATE: 13 June 1944

SUBJECT: Use of Tear Gas in Warfare

While the United States is not bound by any treaty not to use poisonous gas in war fare, the settled policy of the War Department seems to be that gas will not be used except in retaliation for chemical warfare instituted by an enemy. Lt. Pugliese consulted with Lt. Col. Abe Goff, War Plans Division, Judge Advocate General's Office. It was Colonel Goff's opinion that while tear gas is not a poisonous gas, it is a noxious one which falls within the prohibition of the War Department policy. A copy of a memorandum dated 5 April 1943 prepared by Lieutenant, then Sergeant Pugliese, is attached for your information. Substantially the same result was reached by Ensign Donovan who made a similar inquiry for another agency on 23 February 1943.

Mr. Mayo has stated that 350 standard type tear gas guns have been ordered by this agency. Apparently, these guns are of the type usually used by police officers in this country. In view of the fact that the United States is not bound by treaty to refrain from using poisonous gas and that apparently the only prohibition against the use of such gas is embodied in a War Department policy, personnel of this agency who are not operating in uniform could be authorized to use tear gas if the performance of their mission requires it. Such use, it is felt, would not compromise the position of the United States regarding poison gas since tear gas is not itself poisonous and such personnel normally operate in an unorthodox manner. If the use of tear gas is limited to personnel who are not uniformed, the possibility of reprisals is almost completely minimized.

It is recommended that military or naval personnel be prohibited from using tear gas.

I concur

J. J. Monigan
Major, CAC

STANDARD FORM NO. 64

Office Memorandum · UNITED STATES GOVERNMENT

14,687

TO : Chief, Secretariat

FROM : Lt. P. F. Pugliese

DATE: 9 June 1944

SUBJECT: Use of Tear Gas in Warfare

1. I called Lt. Colonel Abe Goff, War Plans Division, Judge Advocate General's office, and inquired as to whether the use of tear gas in warfare is prohibited by any international treaty or custom. Before giving me a definite answer, he checked his own files on the matter and called back later. The substance of his reply is given below.

2. Although the United States is not bound by any international treaty or custom prohibiting the use of poisonous or noxious gases in warfare, it has been strict War Department policy that no such gas be used. Gas was used in the last war only in retaliation after the Germans had used the gas against American and French troops. Tear gas of course is not a poisonous gas. Lt. Colonel Goff, however, considers it a type of (noxious) gas which is harmful, and therefore should not be used by our armed forces.

3. For your information I am attaching a copy of a memorandum, subject "Treaties Prohibiting the Use of Poisonous Gases in Warfare", dated 5 April 1943, together with a copy of a memorandum received from the Legal Adviser of the Department of State, 20 April 1943. These memoranda discuss briefly the provisions of international treaties on the use of poisonous, etc., gases. According to our research, the United States is not bound by any of these treaties but, as Colonel Goff has pointed out, the War Department has followed the provisions of the treaties rather strictly.

PFP

PFP

COPY

DEPARTMENT OF STATE

The Legal Adviser

April 20, 1943

USE OF ASPHYXIATING, POISONOUS OR OTHER GASES IN WARFARE AND BACTERIOLOGICAL METHODS OF WARFARE

The First Hague Conference adopted a declaration that "The Contracting Powers agree to abstain from the use of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases;" this declaration was not signed by the American delegates who gave their reasons in a special report (Foreign Relations 1899, 613, 610-620).

The Second Hague Conference concluded a Convention Respecting the Laws and Customs of War on Land on October 18 1907. This Convention was signed and ratified by the United States. It provided in part as follows:

Article XXII

The right of belligerents to adopt means of injuring the enemy is not unlimited.

Article XXIII

In addition to the prohibitions provided by special Conventions, it is especially forbidden:--

(a.) To employ poison or poisoned weapons;

(e.) To employ arms, projectiles, or material calculated to cause unnecessary suffering;

The Convention also provides:

Article II

The provisions contained in the Regulations referred to in Article I, as well as in the present Convention, do not apply except between Contracting Powers, and then only if all the belligerents are parties to the Convention.

In view of these provisions the Convention is not binding on the United States during the present war.

On February 6, 1922 the United States signed a Treaty between the United States of America, the British Empire, France, Italy, and Japan relative to the protection of the lives of neutrals and noncombatants at sea in time of war and to prevent the use in war of noxious gases and chemicals. The Treaty provided in part as follows:

Article V

> The use in war of asphyxiating, poisonous or other gases, and all analogous liquids, materials or devices, having been justly condemned by the general opinion of the civilized world and a prohibition of such use having been declared in treaties to which a majority of the civilized powers are parties,
>
> The Signatory Powers, to the end that this prohibition shall be universally accepted as a part of International law binding alike the conscience and practice of nations, declare their assent to such prohibition, agree to be bound thereby as between themselves and invite all other civilized nations to adhere thereto.

The Treaty was ratified by the United States and by the other signatories except France. Since France has not ratified, the Treaty is not in effect in view of the provisions in Article VI that the Treaty "shall take effect on the deposit of all the ratifications, which shall take place at Washington."

A protocol for the prohibition of the use in war of asphyxiating, poisonous, or other gases, and of bacteriological methods of warfare, was signed at Geneva on June 17, 1925. The protocol was submitted to the Senate on January 12, 1926 for its advice and consent to ratification which have not yet been given. So far as the Department is informed it is not under active consideration, although it is on the calendar of the Committee on Foreign Relations of the Senate.

17,687
Chemical Loc.

Major Doering

April 5, 1943

Sgt. Pugliese

Treaties Prohibiting the Use of Poisonous Gases in Warfare

1. I have had occasion to read certain treaties prohibiting the use of poisonous gases in warfare and I thought you might be interested in knowing whether the United States had signed, ratified, or adhered to any of them.

Three treaties on this subject were called to my attention by Mrs. Swift of CID who had previously contacted the State Department: The Declaration of July 29, 1899, the Declaration of February 6, 1922, and the Protocol of June 17, 1925. Only the latter two were signed by the United States representatives, but in neither case, for different reasons, did the treaty come effective as to this country. The Declaration of 1922, according to the State Department, is a dead letter because although the United States ratified it, France did not. Apparently there was a provision in the treaty that required ratification by all of the Five Powers. The Protocol of 1925 was never ratified by this country.

The Convention of 1907, which I understand was intended to implement, if not to supersede the Declaration of 1899, does not specifically refer to poisonous gases, but it has a provision prohibiting the use of "poison or poisoned weapons." This Convention was ratified by the United States and apparently became effective.

The above four treaties are summarized in the next succeedir - paragraphs.

2. In the Declaration of July 29, 1899, drafted at the International Peace Conference at the Hague, the Contracting Powers agreed to abstain from the use of projectiles, sole object of which was the diffusion of asphyxiating or deleterious gases. The Declaration was to be binding on the Contracting Powers only in case of war between two or more of them and would cease to be binding from the time when, in a war between the Contracting Powers, one of the belligerents should be joined by a non-contracting power.

The United States apparently was not a party to this treaty.

The following countries ratified:

Austria-Hungary, Belgium, Bulgaria, China, Denmark, France, Germany, Greece, Italy, Japan, Luxemburg, Mexico, Montenegro, Netherlands, Norway, Persia, Portugal, Roumania, Russia, Servia, Siam, Spain, Sweden and Norway, Switzerland, Turkey.

Great Britain and Nicaragua subsequently adhered to the treaty.

3. At the Conference on the Limitation of Armaments held at Washington, D. C., November, 1921 - February, 1922, one of the so-called "Five-Power" treaties contained a declaration prohibiting "the use in war of asphyxiating, poisonous, or other gases, and all analogous liquids, materials or devices," and another declaration governing the conduct of submarine warfare.

Although this treaty was adopted by the Convention (February 6, 1922) and ratified by the United States, it was never ratified by France and, therefore, according to the State Department, it never did go into effect.

4. At Geneva, on June 17, 1925, a Protocol was signed by the United States, Germany, the British Empire, Japan and other countries which prohibited the use in war of asphyxiating, poisonous or other gases, and of bacteriological methods of warfare. Of the signatories mentioned above, Japan and the United States did not ratify. Russia, although not a signatory, subsequently acceded to this treaty.

Ratifications were deposited by:

British Empire, Canada, India, [illegible]
Denmark, Egypt, Finland, France, [illegible]
Poland, Roumania, Spain, Sweden, [illegible]
Venezuela and Yugoslavia.

Accessions included:

Australia, New Zealand, South Africa, [illegible]
Liberia, Persia, and Soviet Union.

5. The Convention of October 18, 1907 Respecting the Laws and Customs of War on Land

refer to poison gas. Article 23 of its annexed regulations does, however, prohibit the use of "poison or poisoned weapons." It provides in part as follows:.

"Article 23

In addition to the prohibitions provided by special Conventions, it is especially forbidden:

(a) To employ poison or poisoned weapons;

(b) To kill or wound treacherously individuals belonging to the hostile nation or army;

. . .

(e) To employ arms, projectiles, or material calculated to cause unnecessary suffering."

The above Convention was ratified by the United States on February 23, 1909 and was proclaimed by President Taft on February 28, 1910. Other countries ratifying the Convention included Austria-Hungary, Bolivia, Denmark, Germany, Great Britain, Mexico, The Netherlands, Russia, Salvador, and Sweden.

Whether or not the drafters intended the words "poison or poisoned weapons" to include poisonous gases seems doubtful because in the Declaration of 1899, which I understand this Convention was intended to supersede, a reference was specifically made to "asphyxiating or deleterious gases." Further, according to Mrs. Swift, it is the opinion of the State Department that the United States is not at present a party to any treaty prohibiting the use of poisonous gas. This would seem to indicate that the State Department does not believe that the drafters of the Convention of 1907 intended the provision in question to include the use of projectiles, sole object of which was the diffusion of asphyxiating or deleterious gases.

6. If the above interpretation of the Convention of 1907 is accepted, the United States is not now a party to any treaty prohibiting the use of poison gases in warfare. If the above interpretation is not accepted, and the provision in question is broadly construed to include use of poison gases, then it is my understanding that this would be the only treaty on this particular point which is now binding on the United States.

PFP:vap

Sgt. P. F. P.

Two special gas masks: The sighter in a gun crew wears a mask that enables him to see better than the universal mask would. The talker in the gun crew wears the special speaker-type mask that enables him to use microphone and wear headphones during gas attack.

munitions used in chemical warfare; spray tanks, bombs (chemical and incendiary), shells, smoke generators, grenades, smoke pots plus proper methods of shipping, storing, and transferring all of them.

Protection deals with the detection of and defense against chemical agents and includes the effects upon men of the agents, self aid and first aid, processing, the use of protective clothing, care, stowage, disinfection and repair of gas masks, the construction and functioning of gas-proof shelters, the decontamination of ships and shore establishments, the protection of food, water, and supplies from chemical agents, and the latest types of protection equipment.

The study of tactics deals with the offensive and defensive employment of chemical agents by naval forces. The study of weather includes weather prediction and weather factors affecting the use of chemical agents. All members of the four weeks' course take 12 hours of Army Instructors' Training. All graduates can teach gas mask drill.

All members of classes live at the arsenal. Their classes begin at 0800, and extend to between 1600 and 1700 daily.

At the present time, the Naval Unit at Edgewood not only directs the Naval courses, but is also liaison office between the bureaus of the Navy Department and the different activities at Edgewood. Medical officers and hospital corpsmen on duty there, furthermore, work in the Chemical Warfare Service's medical research department. Officers also lecture at the Medical School at Bethesda, Md.

Two recent Edgewood graduates have just prepared a booklet, "Gas! Know Your Chemical Warfare," that will be distributed throughout the Navy starting in March, and that is available to officers who write the Training Division, Bureau of Naval Personnel. Its chapters include Chemical Warfare Agents, Self-Aid, Navy Gas Mask Drill, Care and Disinfection of the Gas Mask, Materiel and Tactics, and Decontamination of Materiel.

CHEMICAL WARFARE IN 1864

New Haven, Conn., June 22, 1864

President Lincoln

Respected and honored Sir;

I find that by mingling strong sulphuric acid with strong hydrochloric or muriatic acid on a broad surface like a shovel or shallow pan a dense white cloud is at once formed, and being slightly heavier than the atmosphere rests upon the ground and is high enough to conceal the operation behind it. This may easily be continued by additional sprinkling of the two acids and a light breeze will waft it onward. When the cloud strikes a man it sets him to coughing, sneezing, etc., but does not kill him, while it would effectually prevent him from firing a gun or if he should fire, to aim at his object. It has occurred to me that Gen. Burnside . . . might on a dark night, with a gentle breeze favorable, surprise and capture the stronghold, of Petersburg, or Fort ——, perhaps, without loss or shedding of blood. I trust Your Excellency will excuse the liberty of a son of Revolutionary Soldier well known to Hon. Sec. Chase, Prof. Gillman and Gov. Buckingham and has the honor to be personally and politically

Yours,

Forrest Shepherd,
Economic Geologist
New Haven, Conn.

His Excellency
Abraham Lincoln

REFERENCE AND TRAINING CHART

CHEMICAL WARFARE AGENTS

SYMBOL	NAME	COLOR & STATE		ODOR (FIELD CONCENTRATIONS)	PERSISTENCE	PRIMARY PHYSIOLOGICAL CLASS	PHYSIOLOGICAL EFFECT	PROTECTION	COMBAT FIRST AID	PRIMARY TACTICAL CLASS	MUNITIONS	[illegible] OF MUNITIONS	TACTICAL USES	FIELD [illegible]
		LOADED	RELEASED											
H	MUSTARD	HEAVY DARK, OILY LIQUID	Liquid Slowly Vaporizes	Garlic Horseradish Mustard	Open—[illegible] days Woods—[illegible] weeks to all winter	Blister Gas	Itching, redness and blisters of skin. Injures eyes, lungs, nasal passages and throat		Blot off excess. Use protective ointment S-461 or S-330. Wash with soap and water. Irrigate eyes with water.			H GAS	To neutralize areas Counter-battery Attack on Personnel	[illegible]
L	LEWISITE	HEAVY DARK, OILY LIQUID	Liquid Slowly Vaporizes	Biting Geraniums	Open—[illegible] days Woods—[illegible] week	Blister Gas	Same as H except burns are painful		Blot off excess. Use ointment BAL in eyes and on skin.			L GAS	Similar to Mustard	[illegible]
HN	NITROGEN MUSTARDS	COLORLESS TO PALE YELLOW SOLIDS OR LIQUIDS	Solids and Liquids slowly Vaporize	Fishy or soap-like to practically odorless	2 Hours to days	Blister Gas	Same as H very injurious to the eyes		Same as H. Use excess of ointments. Bathe with soap and water as soon as possible.			HN GAS	Similar to Mustard	Same as H
CG	PHOSGENE	COLORLESS LIQUID	Colorless gas	Musty Hay Green Corn Ensilage	[illegible] to [illegible] minutes	Choking Gas	Causes painful breathing. Injures lungs causing development of fluid in them		Rest. Maintain body temperature.			CG GAS	Surprise attacks on occupied targets. For quick physical effect.	[illegible] (e.g. [illegible] soap in hot water)
DP	DIPHOSGENE	COLORLESS LIQUID	Liquid Evaporates like water	Musty Hay Green Corn Ensilage	30 minutes	Choking Gas	Same as CG		Same as CG			DP GAS	Casualty and harassing effect on personnel	Same as CG
PS	CHLORPICRIN	YELLOW OILY LIQUID	Liquid Evaporates like water	Flypaper Anise	[illegible] hour to [illegible] week	Choking Gas	Coughing, crying, nausea, vomiting, and injury to the lungs		Irrigate eyes with water. Rest. Maintain body temperature.		CN	PS GAS	Harassing and casualty fire	Use [illegible]
AC	HYDROCYANIC ACID	COLORLESS LIQUID	Liquid quickly Vaporizes	Bitter Almonds	[illegible] to [illegible] minutes	Blood and Nerve Poison	Causes collapse and unconsciousness from systemic poisoning		Inhale amyl nitrite. If not breathing give artificial respiration.			AC GAS	Attack on personnel in enclosed places	Same as CG
CNS	CHLORACETO-PHENONE SOLUTION	STRAW-COLORED LIQUID	Cloud of Particles, Droplets	Sweetish Flypaper	[illegible] hour to [illegible] week	Tear Gas	Crying, vomiting, irritation of skin and eyes		Irrigate eyes with water. Wash skin with soap and water.			CNS GAS	Counter-battery harassing fire	[illegible]
BBC	BROMBENZYL-CYANIDE	DARK BROWN OILY LIQUID	Liquid Slowly Vaporizes	Sour fruit	Several days (weeks in winter)	Tear Gas	Crying and irritation of the skin		Same as CNS			BBC GAS	To neutralize areas Counter-battery	[illegible]
DM	ADAMSITE	YELLOWISH-GREEN GRANULAR SOLID	Yellow Smoke	No odor Irritating	[illegible] to [illegible] minutes	Vomiting Gas	Headache, vomiting, sneezing and coughing		Sniff Chloroform. Do not [illegible] mask from face until actually vomiting.			DM GAS	Gas Cloud Attacks [illegible]	[illegible]
HC	HEXACHLOR-ETHANE MIXTURE	GREY SOLID	White to grey smoke	Sharp-acrid	While burning	Screening Smoke	Harmless	[illegible]	None Needed			HC SMOKE	To screen operations	[illegible]
FS	SULPHUR TRIOXIDE IN CHLOROSULFONIC ACID	CLEAR TO BROWN LIQUID	Dense White Smoke	Acrid	5-10 minutes	Screening Smoke	Irritates eyes and skin		Irrigate eyes with water. Wash skin with soap and water.			FS SMOKE	For screening as local front	Same as CG
FM	TITANIUM TETRA-CHLORIDE	YELLOWISH TO BROWN LIQUID	White Smoke	Acrid	Up to 10 minutes	Screening Smoke	Harmless	None Needed	None Needed			FM SMOKE	Screen small operations	Same as CG
WP	WHITE PHOSPHORUS	PALE YELLOW SOLID	Burns to white smoke in air	No appreciable odor	Up to 10 minutes	Screening Smoke	Causes burns	None Available	[illegible]			WP SMOKE	[illegible]	[illegible]
TH	THERMATE / MAGNESIUM BOMB	DARK GREY SOLID / SILVER COLORED METAL	White Hot Metal / Burns with brilliant white light	Odorless	While burning	Incendiary	Causes burns	None Available	Cool residues until safe. Use dressing in sheet and powder. Treat as ordinary burns.				Destruction of structures and materiel	[illegible]
IM NP	THICKENED GASOLINE	PALE YELLOW JELLY	Burns with yellow smoky flame	Burning oil	While burning	Incendiary	Causes burns	None Available	Use dressing in sheet and powder. Treat as ordinary burns.				[illegible]	[illegible]

Artillery Shell — 155 mm. holds 11.4 lbs. of H; 105 mm. holds 3.2 lbs. of H

Artillery Shell — 75 mm. holds 1.3 lbs. of H

Mortar Shell — 4.2 in. holds 6.5 lbs. of H

Mortar Shell — 81 mm. holds 4.1 lbs. WP

Chemical Bomb (all types)

Airplane Spray

Flame Thrower holds [illegible] lbs. of NP

Gas Mask

Protective Clothing

Casualty Gases

Screening Smoke

Harassing Gases

Incendiaries

Chemical Cylinder holds [illegible] lbs. FS

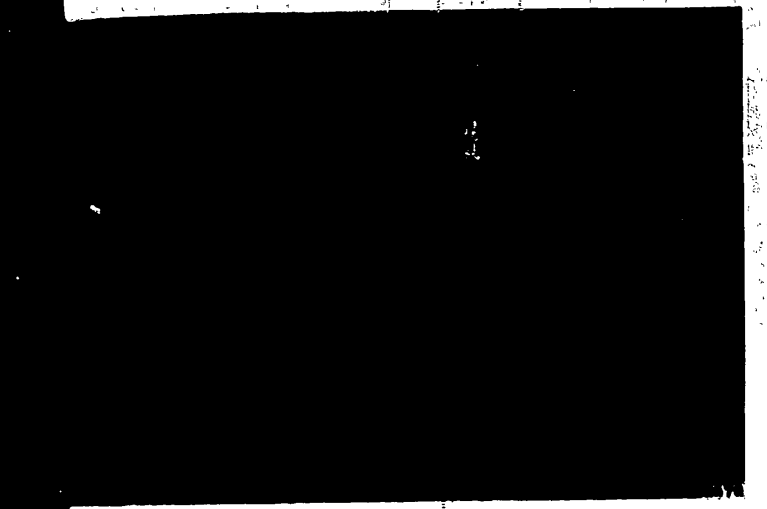
Land Mine holds [illegible] lbs. of H

Irritant Gas or Incendiary Grenade holds [illegible] oz. CN-DM

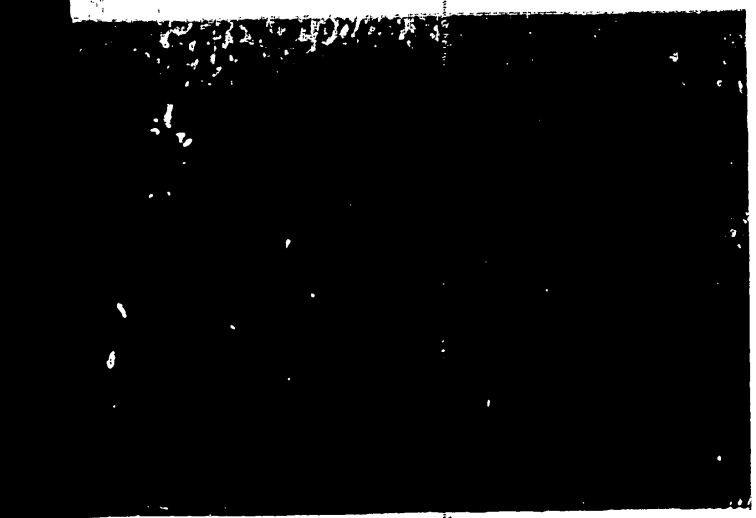
Frangible Grenade holds approximately 1 pint of agent

[illegible]

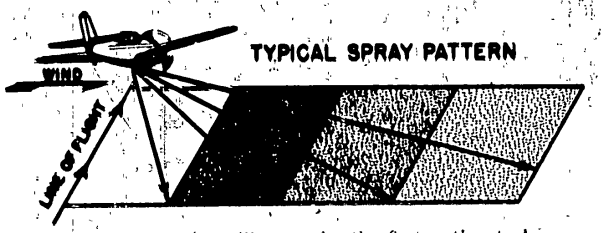
EDGEWOOD SHOWS MUSTARD GAS ABOARD SHIP AND TELLS HOW IT IS ABLE TO GET THERE



1. This is mustard, still king of the war gases, as it looked on stack and ventilators of Eagle boat in experiment at Edgewood. This heavy, dark oily, persistent blister gas can, in liquid form, penetrate even leather shoes and gloves and get to skin in a short time.



2. Here is mustard on ship's bulkhead; below, a medium contamination sprayed by plane on beach. Before men and materiel could pass over such a beach, decontamination parties would have to clear out roads.



3. The United States will never be the first nation to loose a gas attack, but an enemy nation could launch gas against our ships or landing operations by means of artillery, chemical, or infantry mortars; chemical projectors or cylinders; grenades, candles, or smoke pots, or by air bombs or spray as in this drawing. (What such a spray can do to a beach was shown in lower left-hand corner.) The new booklet, "Gas! Know Your Chemical Warfare" says that, because mustard often freezes at a plane's altitude, a mixture of mustard and lewisite might be used. Airplane spray, says the book, always falls in this pattern. The pilot attempts to get section closest to plane (with heaviest drops of gas) on the target. A ship has these natural defenses: The wind, which dilutes, decontaminates, and blows away gas; movement, which makes a ship hard to hit; the water, which dilutes any "near miss," and cover for all hands below decks.

4. This is the Mark IV, a universal U. S. Navy gas mask. It is protection against mustard vapor—but not against mustard liquid, which can reach any part of the body besides the masked face through ordinary clothes. The Navy mask is protection against all known war gases; a side view of mask, with its parts named, appears on next page.

13,867.
Chemical Warfare -
Smoke Grenade
Hall

SECRET

SECRET

OSS/R&A New Delhi Office

29 February 1944

To: Brig. General Wm. J. Donovan

From: Lt. Col. Robert B. Hall RBH

Please find enclosed a copy of a memo to me from Capt. G. L. Setman, CWS, relating to the shipment of a HCN or smoke grenade. This grenade was captured by one of our 101 patrols in Northern Burma; I submitted it to our local CWS men and to the Army Engineers. It was received with considerable excitement because:

(1) It is the first frangible grenade to reach the hands of our army experts. A number were taken at Attu, but never reached Washington. The British have reported at least two which were inadequately examined in the field.

(2) This particular grenade lacks the metallic flakes reported to have been contained in the others. For this reason Capt. Setman has covered himself by referring to it as an HCN or smoke grenade.

I have requested 101 to furnish further information as to the details of capture, exact location, number of grenades seen, etc. This report will be forwarded immediately upon receipt.

A copy of the enclosed memo is going forward to Stanley Lovell with a letter from Major Lucy. Still another copy is being sent to Dr. Langer.

If the object in question should prove to be a gas grenade, its importance is very great.

Encl. 1 copy Ltr to Lovell for examination

STANDARD FORM NO. 64

Chemical Warfare 13229A

Office Memorandum • UNITED STATES GOVERNMENT

SECRET

x Cross Bow

TO : File

FROM : Major Monigan

DATE: 26 June 1944

SUBJECT: "Cross Bow"

x Phosphorous Bombs
x F. W.

Colonel Buxton and Dr. Lovell today talked with General White , A-2, who is much impressed with Dr. Lovell's device as outlinod in memorandum of 2 March 1944 to the Secretary, Joint Chiefs of Staff.

The suggestions in that memorandum coupled with the use of drums of fuel oil to which was attached an incendiary device, much impressed General White. He is to take the matter up with General Arnold. Apparently, they were unfamiliar with our memorandum of 2 March.

J. J. Monigan
Major, CAC

SECRET

2 March 1944

SECRET

MEMORANDUM

TO: Capt. Forrest B. Royal, USN
Secretary, Joint Chiefs of Staff

FROM: General William J. Donovan

SUBJECT: "CROSS BOW"

1. Although a large tonnage of H.E. bombs has been dropped on the rocket coast, the installations have not been destroyed. The targets are so small and scattered, it seems apparent they cannot be rapidly eliminated by the use of high explosive bombs.

2. Bombing with White Phosphorous, rather than high explosives, would appear to be an effective and rapid way of eliminating the rocket coast installations. This is because the enemy has tremendous anti aircraft concentration and little fighter protection. White Phosphorous bombs, which have proven most effective in Hamburg and Berlin raids against personnel, should reduce and neutralize the anti aircraft defense. Equally important, White Phosphorous is most corrosive on all delicate instruments and should destroy the effectiveness of whatever instrumentation is at the target.

3. This office recommends the immediate dropping of a large concentration of White Phosphorous bombs now available in England on the Pas de Calais and Cherbourg installations, followed by low level precision bombing after anti aircraft has been silenced.

William J. Donovan
Director, OSS

SECRET

SECRET

2 March 1944

Capt. Forrest P. Sherman, USN
Secretary, Joint Chiefs of Staff

General William J. Donovan

*CROSS BOW

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Chemical

SECRET

x bacteriological warfare
x Intelligence

21 March 1944

MEMORANDUM FOR THE SECRETARY, JOINT U. S. CHIEFS OF STAFF

FROM: General William J. Donovan

SUBJECT: Recent Intelligence Concerning Bacteriological Warfare

1. From our representative at Berne, Switzerland, we have received the following report which I feel should be brought to your attention:

"From a German Source, Doctor Briault of the Pasteur Institute receives information about the preparing of a bacteriological combination containing the following ingredients in the given proportions (French expressions are used):

50% Typhuse Exanthematique
30% Psittacose
10% Peste
10% Morve

For Morve, Peste and Psittacose, vaccines are unknown; only the Pasteur Institute knows of a vaccine for Typhuse Exanthematique. St. Gobain-en-Ardennis is making the jars, which are oval shaped, constructed of unbreakable glass with tubes inside of breakable glass to hold the elements. Some sort of escape opening is provided. Additional particulars on this subject are being sought."

2. Dr. Lovell of our Research and Development

SECRET

Group says that everything recited in the cable is scientifically valid. He believes that the source must have had information from some scientific authority. In his opinion, this is the first cable on this subject which bears the stamp of expert authenticity and, for this reason, gives it some significance.

William J. Donovan
Director

Form [illegible] (Revised)

SECRET (1)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE March 16, 1944

FROM

BERN, SWITZERLAND

TO

OFFICE OF STRATEGIC SERVICES

PRIORITY

ROUTINE

DEFERRED

DISTRIBUTION

IN-5321

(FOR ACTION)

SHEPARDSON

(FOR INFORMATION)

DIRECTOR, SECRETARIAT, MAGRUDER

U. S. GOVERNMENT PRINTING OFFICE 16-87665-1

RECEIVED IN CODE OR CIPHER

#2481-2482. TOLEDO.

Through 284-A, we received the data on this subject which is given below. The report is not completely intelligible: From a German source, Doctor Brisault of the Pasteur Institute receives information about the preparing of a bacteriological combination containing the following ingredients in the given proportions (French expressions are used):

50% Typhuse Exanthematique

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Typhuse Exanthematique.

TOR: 3/17/44 4:05 p.m.

SECRET

Chemical Warfare -
x "Cross Bow"
x Explosive for incendiary
x Phosphorus bombs

THE JOINT CHIEFS OF STAFF
WASHINGTON

5 March 1944.

~~SECRET - SECURITY~~

SECRET

MEMORANDUM FOR THE COMMANDING GENERAL, ARMY AIR FORCES:

Subject: CROSSBOW.

Enclosure: Copy of memorandum to the Secretary, Joint Chiefs of Staff, from the Director, Strategic Services, dated 2 March 1944.

The enclosure is furnished the Commanding General, Army Air Forces, for his information.

(SIGNED)

A. J. McFARLAND,
Colonel, G.S.C.,
Deputy Secretary.

cc - Director, Office of Strategic Services
Asst. Chief of Staff, OPD, WDGS

SECRET

SECRET

13,229 A
Chemical Warfare
~~Gas~~ Bombs
x Phosphorous Bombs
x Bacteriological

2 March 1944

MEMORANDUM

TO: Capt. Forrest B. Royal, USN
Secretary, Joint Chiefs of Staff

FROM: General William J. Donovan

SUBJECT: "CROSS BOW"

1. Although a large tonnage of H.E. bombs has been dropped on the rocket coast, the installations have not been destroyed. The targets are so small and scattered, it seems apparent they cannot be rapidly eliminated by the use of high explosive bombs.

2. Bombing with White Phosphorous, rather than high explosives, would appear to be an effective and rapid way of eliminating the rocket coast installations. This is because the enemy has tremendous anti aircraft concentration and little fighter protection. White Phosphorous bombs, which have proven most effective in Hamburg and Berlin raids against personnel, should reduce and neutralize the anti aircraft defense. Equally important, White Phosphorous is most corrosive on all delicate instruments and should destroy the effectiveness of whatever instrumentation is at the target.

3. This office recommends the immediate dropping of a large concentration of White Phosphorous bombs now available in England on the Pas de Calais and Cherbourg installations, followed by low level precision bombing after anti aircraft has been silenced.

4 - Dr. Lovell has discussed this with Dr. Bush who, Lovell tells me agrees -

William J. Donovan
Director, OSS

SECRET

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

SECRET

2 March 1944

MEMORANDUM

TO: General William J. Donovan

FROM: Stanley P. Lovell

SUBJECT: "CROSS BOW" (Pocket Coast Counter Measures)

Supplemental to memorandum of 26 February 1944, I spent three hours yesterday with Colonel Arthur Fickel and Colonels LeRoy A. Whittaker and J.P. Nicholas on the above subject.

Installations called ski sites are substantially in appearance like the attached rough sketch. 97 of them are known to exist as per attached map.

Colonel L.W. Sweetser, A-2, reports that Winston Churchill wants to employ gas warfare against Cross Bow, but that he is prevented from authorizing this by the Russian reaction which holds that the Germans will then use gas against Russia, and thus check further Russian advances.

White Phosphorous bombs, recommended in my memorandum of 26 February, are available in quantity to both RAF and Fifth Air Force and can neutralize these sites by saturating them with Phosphorous, because they are defended only by heavy mobile anti aircraft installations and are not given any fighter or interceptor cover. Furthermore, White Phosphorous being extremely corrosive, would have every opportunity to contaminate and corrode the delicate instruments at the sites. White Phosphorous does not contravene the Geneva Conventions and does not institute chemical warfare, being classed as an incendiary.

Attached reports confirm the effect of its use at Hamburg and Berlin.

Stanley P. Lovell

Stanley P. Lovell, Director
Research and Development

SECRET

This to be taken up in Secretary's with him by the Director

G.A.R.

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

SECRET

26 February 1944

MEMORANDUM

TO: General William J. Donovan

FROM: Stanley P. Lovell

SUBJECT: Rocket Coast Counter Measures ("CROSS BOW")

To see me with Lovell

How to evaluate and how to neutralize enemy installations along the rocket coast is a problem in the charge of Major General Stephen G. Henry under special appointment from General George C. Marshall. I have been brought into this problem by General Henry who is also a member of Joint New Weapons Committee and by Dr. Vannevar Bush, the chairman of that Committee. I have the following suggestion to propose to you for proper channeling.

It was felt by British and American Air Forces that these installations known as "ski sites" could be allowed to reach a finished state of construction and then be quickly blasted out of existence by a concentrated air attack using high explosive bombs. This is a fine theory, but it hasn't worked. To date some 28,000 tons of HE bombs has been dropped on the ski sites without apparent damage to them. It is now obvious that the Organization Todt took the bombs into consideration before the sites were built.

I have been approached by Colonel Robert G. Butler, U.S. Army Ordnance, Bombs, and Lt.Col. J. Druitch, U.S. Army Air Forces, who were exploring the use of large magnets to be dropped on the bomb sites in an effort to temporarily disturb any magnetic installations contained in the structures. Since the sites were built of non-magnetic insulating material, it follows that if they cannot be hit by orthodox bombs they cannot be hit by a magnetic bomb. In this negative conclusion these two gentlemen agree.

On the constructive side, OSS has a wealth of evidence which implies that the use of phosphorous bombs in the Hamburg and Berlin raids is far more effective than high explosives or standard incendiaries. White Phosphorous (WP) contaminates an area as effectively as many poison gases. Unlike gases, it is permitted by Combined Chiefs and is freely available to both British and American Air Forces. I suggest a saturation blitz of WP on the rocket coast which, if it does nothing more, will neutralize the anti aircraft installations and for a period of many days prevent both anti aircraft and ski site personnel from operating. With anti aircraft eliminated or neutralized, bombing with high explosives can be resumed at tree-top height with a real probability of blasting the whole project out of the picture.

SECRET

This is not an over-simplification, but the best possible attack that can be made on these targets with the materials at hand. It should be authorized and carried into effect immediately.

Stanley P. Lovell

Stanley P. Lovell, Director
Research and Development

SECRET

26 February 1944

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TO: General William J. Donovan

FROM: Stanley P. Lovell

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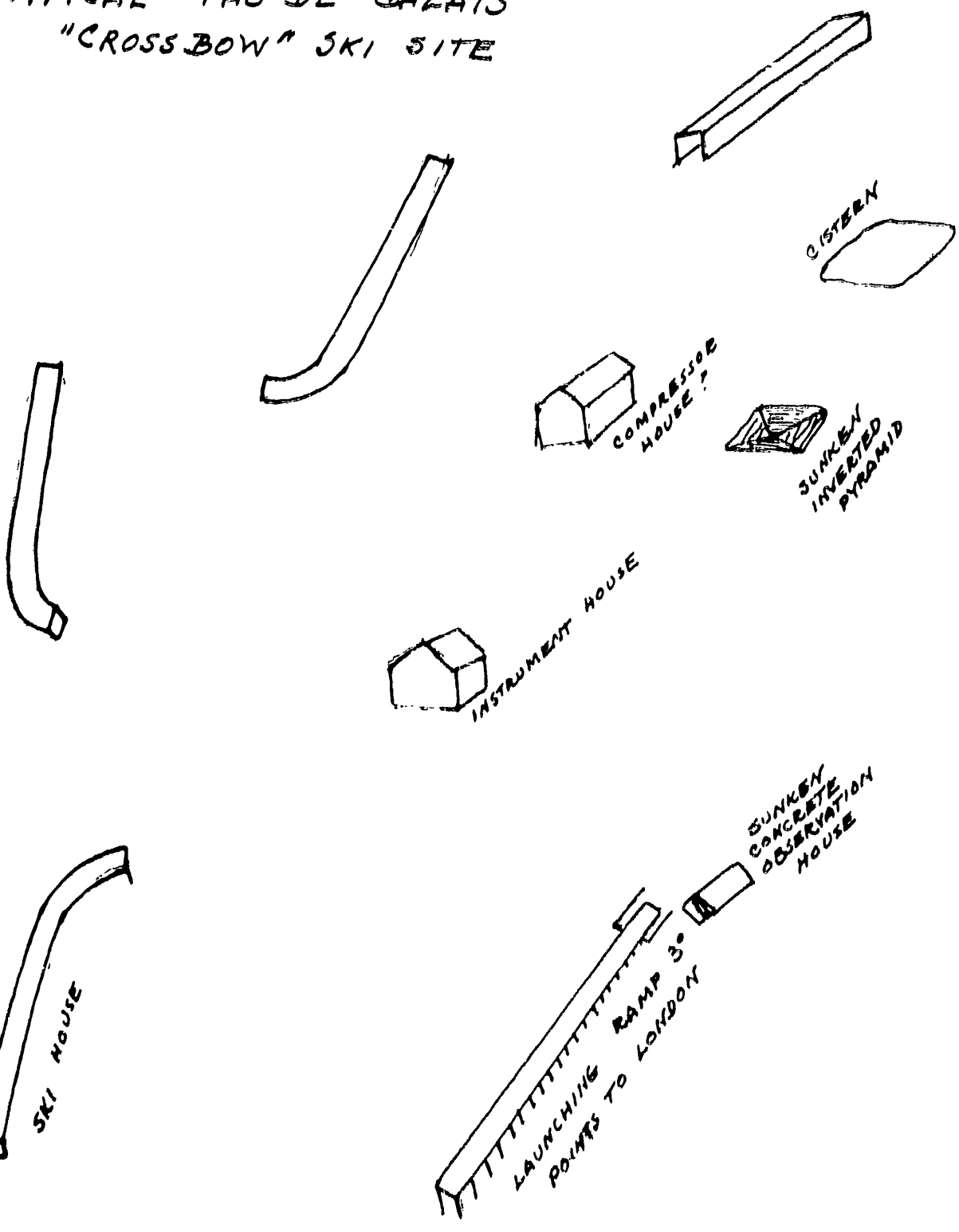
Stanley P. Lovell, Director
Research and Development

SECRET

TYPICAL PAS DE CALAIS "CROSSBOW" SKI SITE



S.P. Lovell
8-21-44

UNITED STATES OF AMERICA
OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

COUNTRY	Germany	DISSEMINATION NO.	A-17367
		Report No.	G-663
SUBJECT	Results of Allied bombing	NUMBER OF PAGES	2
SOURCE	"Z"	ATTACHMENTS	
SUB SOURCE		OSS EVALUATION	Not stated
DATE OF ORIGIN	Prior to November 9, 1943	DISTRIBUTED	December 23, 1943
PLACE OF ORIGIN	Near Enat	CONFIRMATION OF / SUPPLEMENTARY TO DISSEMINATION NO.	

Previously distributed to JICAME

There is no doubt that the greatest damage to Germany is being done through Allied aerial bombings. These bombings are having a crushing effect on the German people.

At one time, before the large-scale bombings took place, when the alarms sounded in Germany, people used to take refuge in the shelters and regard the whole thing as a joke. Then, a new manner of living had started in these shelters. Many people continued their work there; some offices continued their daily routine jobs within the shelters; amusements were organized and everybody was more or less gay. Today, on the other hand, life in these shelters can be called only one thing: "Hell."

Nowadays, British bombers start their operations by dropping flares all around the targets they intend blasting. The Germans call these flares "Christ Baum's." Following the dropping of the flares, hundreds of aircraft fly over the target like a weaving machine and drop their loads of bombs. Other parts of the town attacked are also being visited by Allied aircraft, and the people who have taken refuge in the shelters hear a continual roar of aircraft passing overhead, a roar which has great effect on their nerves.

Some of the people in these shelters are chosen to act as sentinels, their job being to control the liquid from phosphorous bombs as it starts oozing into the shelters. During big bombings the shelters are thick with strangling smoke. Even gas masks are sometimes used against the fumes. These are the places where Hitler is openly sworn at.

The normal phosphorous bombs burn everything they come against. But another sort which is called "Phosphorous Kornister" is not even eliminated by contact with water. Thus, when the water dries, the

CONFIDENTIAL
CLASSIFICATION

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substance or person which touched this special sort of liquid starts burning all over again

Nowadays the greatest danger is in the shelters. When a part of a town is burning on all sides, people who happen to be in the shelters of that region can no longer bear the heat and stuffiness of the shelters and dash out of them - only to be sucked into the pulp which was once asphalt roads - for the phosphorous eats up and burns and melts the asphalt. People who are enveloped in soaked blankets can bear the heat until the blankets dry once more in the stupendous heat created by the burning buildings and asphalt. But when the blankets dry, there is danger of these people suddenly going into flames.

It is very difficult to be saved if someone happens to be caught in such an air raid, for the fires continue indefinitely and cannot be put out easily. During the bombing of Berlin, the fires continued for twelve days despite the fact that the fire-brigades of all the neighboring towns came to help the extinguishing operations within the capital. During these raids on Berlin - during three days - 17,000 habitations were destroyed and 27,000 people killed. Before showing the regular films, the cinemas first show in what way the people are to act in case of raids.

Nowadays, the jobs of the passive defense and fire-extinguishing squads have become by far the most dangerous. As a result, most of the people killed are found to be of these squads.

The bombing of Hamburg is in the mouth of everybody as a story of a catastrophic nature. It is reported that 170,000 people were killed in Hamburg.

CONFIDENTIAL

SECRET

13 August 1943

A German military official has said to an official of a German allied Government that Hamburg is entirely destroyed. The extinction of fires was made impossible because of high velocity wind and a shortage of water. Destruction of the water system was most severe. Confusion and panic prevailed among the citizens. Bottled drinking water was ordered to Hamburg from all possible depots because of the danger of enterion. The raid of August 7 took out the various alarms systems and thus on August 8 the raid found the streets crowded, causing very high casualties. Most awful were details about the use of phosphorous as a weapon in those raids. Informants stated that this action of phosphorous was more horrible than any conception of gas warfare.

SECRET

COPY

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

AIRGRAM

FROM

STOCKHOLM

Dated: August 14, 1943

Rec'd: August 31, 11 a.m.

Airraid results - Hamburg

Descriptions of the Hamburg airraids given to the Stockholm press by Swedes who have fled from the city appear daily. These reports, which supplement the Legation's airgram A-496 of August 4, 1943, 10 A.M., are summarized below:

One informant stated the destruction is so widespread that there can be no thought of merely repairing the damage. It will be necessary "to build a completely new Hamburg on the ruins". 65 percent of the city is in ruins. No reliable casualty figure is available and the Copenhagen paper NATIONALTIDENDE of August 11 states that the total will probably never be known as there is no record of the number of persons who left the town before and after the raids. In an interview published in the Swedish paper SVENSKA DAGBLADET of August 13 a returning Swede stated it was estimated there were at least 47,000 buried in the ruins, but no doubt the figure would be found to be higher. NY DAG of August 13 reported that 45,000 corpses had been taken from the ruins and it is estimated that 200,000 have been killed.

All persons interviewed speak of the devastating effect of the phosphorus incendiary bombs. Fire brigades from towns all over northern Germany were rushed to the burning city, but as one person interviewed put it: "What can the fire brigades do when it rains fire and sulphur from the sky?". Fires started by the phosphorus bombs could not be extinguished with water. If a wet blanket or rug was handy an individual whose clothes were afire could smother the blaze, otherwise he burned to death. Many sought to save themselves by jumping into canals. Identification of the charred corpses was difficult and most of the bodies were placed in hastily prepared mass graves.

The small shelters in the residential buildings became so hot the persons in them were forced to leave and go out into the inferno raging in the streets. In parts of the city the shelters were inadequate to accommodate all those seeking protection. There was great indignation over this shortage and many people accused the Nazi government of having brought this misery on the people. Their feelings were defined bitterly in the following words: "Hitler started the total war, but the British are conducting it."

During the heaviest attacks all was chaos, according to the NY DAG report. Neither food nor water were available. The smoke was so thick that it was completely dark in the middle of the day.

Great difficulties were encountered in leaving the city. Taxis were out of the question. Streets were blocked by collapsed walls, fallen lamp-posts, etcetera. Street car tracks were coiled in the air like spring. A short stretch of the subway was operating, but otherwise one had to resort to walking. On the streets it was necessary to cover the head with a damp cloth for protection from the heat and smoke. Progress was slow as glowing collapsed walls, furniture, etcetera, gathered on the streets had to be passed. At any time a chimney or house wall could fall.

The relief organisations functioned surprisingly well. Canteens were set up in public buildings and wagons loaded with food taken from military stores drove around the city. From these it was possible to obtain sand-wiches with thick layers of butter, slices of cheese or meat, and milk or meat broth. During the first several days money in sums up to 2,000 RM was distributed. Food and board could be obtained gratis from the relief organisations and in the large department stores goods were distributed free of charge. Tickets on trains leaving the city were issued without payment

Latest reports indicate that most of the main thoroughfares are now passable and the Lombardsbrucke is open. Sidestreets, however, are not yet cleared. Women and children are for the most part evacuated, but the men are occupied in blasting the ruins and clearing away the debris. Many sleep in bombproof underground shelters some of which can accommodate 5,000 to 6,000 persons. All water must be boiled.

SVENSKA DAGBLADET of August 14. A German war correspondent in an account from the badly bombed harbor town writes that Hamburg is alive. Life is again beginning to pulsate in the streets. From early in the morning until late at night there is a lively traffic down to the Elbe where water is fetched in buckets in order to extinguish fires which still smoulder here and there in the ruins. Outside a meat store whose windows have been replaced with boards a paper sign announces "Sales continue". On a door near the postoffice an employee has written on a piece of paper: "All un-damaged mailboxes are being emptied as usual".

The nights are the worst here in Hamburg the reporter continues. When dusk falls people come with travelling bags on their way to the shelters where they stand in line to assure themselves of a night's lodging within protec-ting walls. In many offices and at factories the employees stay overnight sleeping on benches, chairs, and on the floor. At night one can now and then still see the flames from fires which have not been completely extinguished in the destroyed blocks.

SVENSKA MORGONBLADET of August 12 published an eyewitness description by a Swedish businessman who arrived in Malmo from Hamburg via Copenhagen after experiencing Hamburg raids. According to this source Hamburg is a dead and smoking heap of ruins. Half of the population or about one million people

is probably killed and the greater part of the other half has left the town. Most of the corpses are still under debris or decaying in the streets. Mass graves were dug in cemeteries with excavators and the corpses conveyed there by the cartload as there was no time for funerals. During the raids of July 24 and 25 practically the entire inner district was wiped out. Heavy landmines levelled entire blocks. The pilots hit the targets with great exactness. Besides landmines the greatest destruction and horror was caused by phosphorus bombs. After covering areas with fluid phosphorus, incendiaries were dropped and instantly the ground houses and people were ablaze. Nothing could extinguish the fire. For five days no water was available for washing. Thanks to their underground pipes some districts still had water but on July 26 no water was available anywhere and on July 27 no bread either although other towns helped considerably. Enormous Hamburg war industries have disappeared and so have disappeared and so have railways and stations. The only Hamburg rail communication is the electric railway to Ahrensburg and Lubeck. For a week nights were spent in the open in Hamburg's suburbs. The air defense functioned well in the beginning but after violent raids, they were disorganized and the flak was silenced. Waterpipes were blown up, light failed and sirens put out of action. The people were most astonished and discontented about the fact that no notice was given enabling them to leave the town in time. The population was deceived by official brag about the flak's efficiency and caught napping by events. The number of those still believing in German victory may be quickly counted.

COPY

AIRGRAM

FROM

STOCKHOLM

Dated: August 17, 1943

Rec'd: September 1, 11 a.m.

Effects of Airraids - New method employed in Hamburg raids.

The Berlin correspondent of AFTONBLADET in the August 11 issue of the paper describes a new method of aerial bombardment employed by the British during the recent raids on Hamburg.

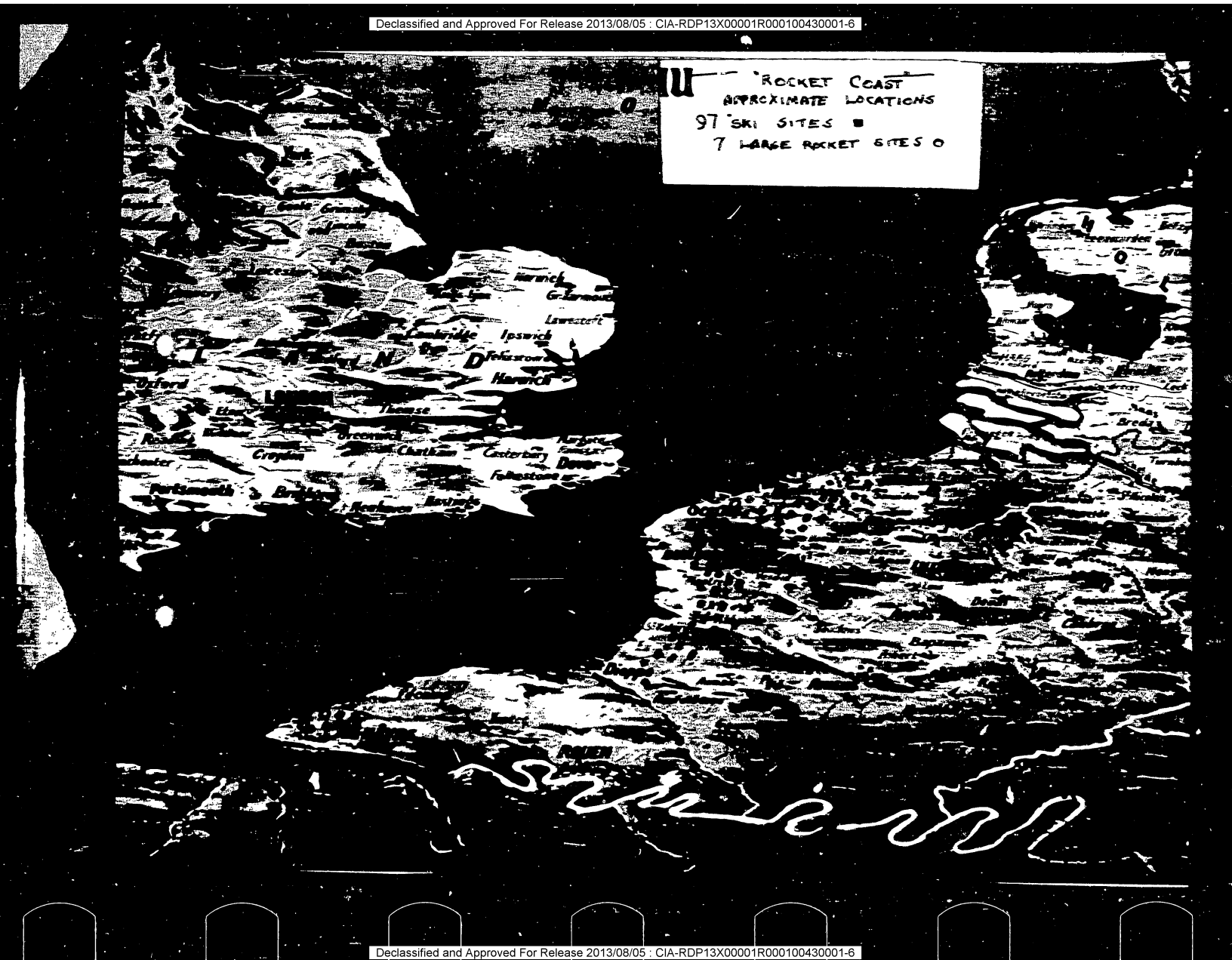
Before each night raid special R.A.F. reconnaissance formations marked densely populated districts with rings of green flares and subsequent waves of bombers then covered the peripheries of the rings with a constant rain of explosives and incendiaries. The intention was obviously to prevent rescue squads from entering and assisting the affected district. The entire surface inside the rings was covered chiefly with incendiaries and phosphorous canisters so that the entire district very shortly became a sea of flames. Owing to the tremendous heat the district's oxygen supply soon was exhausted, causing the air from neighboring areas to rush into the vacuum created over the district concerned. Thus a whirlwind was caused which was so strong that people fleeing from the district were blown down and lay on the streets exposed to the phosphorous rain without firemen being able to reach them with fire fighting apparatus. The violent air currents undoubtedly contributed to the spread of the fire to neighboring districts. This technique, for the first time applied in the Hamburg raids, had also another consequence namely, many people were killed merely by the oxygen shortage caused by the tremendous heat. Hamburg has many excellent airraid shelters, but when opening perfectly intact bunkers people were found dead without showing any signs of injury. They sat or lay there peacefully as though asleep. Death by suffocation apparently came quite suddenly without their being able to evade it.

Trade with Hamburg - According to the DEUTSCHE ZEITUNG IN NORWEGEN of August 12, 1943, the Reich Chamber of Commerce has announced that all firms doing business with Hamburg concerns and which cannot communicate with these because of the airraids should get in touch with the District Chamber of Commerce, Hamburg 11 which is in a position to give information. All Hamburg firms, which have moved their offices or plants outside Hamburg or which have left Hamburg temporarily, are requested to notify immediately the District Chamber of Commerce.

Nurnberg Airraid - The air attack against Nurnberg can almost be compared with the raid against Hamburg, so formidable were the effects, according to a Bern report to AFTONTIDNINGEN published in the August 13 issue. Fires are still raging in all parts of the city, and in some places the fires are so widespread that the fire fighting crews cannot penetrate to the center of the blaze. It is not known how many persons may have perished in the flames in the burning parts of the city. The entire male population in Nurnberg is helping to extinguish the flames and to salvage what remains. The injured persons are taken to Bayreuth, Wurzburg and Regensburg. Several employees of the Reich Ministry of Supply, which only a few days ago was moved from Berlin to Nurnberg, have perished. Numerous casualties have been caused by phosphorous and incendiary bombs. So far 2,460 corpses have been found. 45,000 bombed-out people are being cared for and fed by the Wehrmacht's canteens.

Mannheim Ludwigshafen Airraid. - The Bern correspondent of SVENSKA DAGBLADET reports in the August 11 issue of the paper that 176 persons, of which 122 in one shelter alone, were killed during the Mannheim Ludwigshafen raid. Fires were still burning late in the afternoon of the day of the raid. 175,000 persons are homeless and the population is leaving both towns since further Allied raids are expected.

Evacuation measures - The Berlin correspondent of POLITIKEN, writing in the August 11 issue, reports the evacuation from threatened German areas is putting great demands on German organizations, especially the various departments of the Nazi Party which have undertaken to handle the work. Day and night several hundred women are on duty at all railroad stations, prepared to receive people from bombed areas and to help them as best they can. Measures have been taken at the stations to provide evacuees with meals and drinks. In the vicinity of the stations premises are available where evacuees can spend the night, and it is stated that special bombproof shelters have been built where children can sleep under supervision of kindergarten-teachers.



MOST SECRET

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

Chemical Warfare 13,229

1944 FEB 21 PM 5 00

MEMORANDUM

TO: Ensign E. J. Putzell, Jr. DATE: 19 February 1944

FROM: Stanley P. Lovell

SUBJECT: Conversation regarding OSS memorandum to Joint Chiefs of Staff, 17 December 1943.

Thursday evening, 17 February, I attended, by invitation, a staff dinner given by Dr. Vannevar Bush, at which all Branch Heads and OSRD committee members were present. During the informal discussion which followed dinner, I was approached by Mr. Harvey H. Bundy, Sr., Assistant to the Secretary of War. Mr. Bundy told me that the OSS memorandum, identified above, was a most timely document; that it had found the Chemical Warfare Service "way off base"; that confirmation of our fears had been received "from the other side", and that we had performed an opportune and useful service to the War Department.

Stanley P. Lovell
Director
Research and Development

SPL:MAC

MOST SECRET

(Biological Warfare)

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OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

MEMORANDUM

TO: Colonel G. Edward Buxton

DATE: 7 February 1944

FROM: Stanley P. Lovell

SUBJECT: OSS Bacteriological Warfare Position

TOLEDO - CROSSBOW

(Biological or Bacteriological Warfare, "BW")

OSS has kept informed on this subject since September 1942. On 17 December 1943 OSS sent the Secretary, JCS, a memorandum (900)JCS625) based on actual S.I. reports received. Joint Chief Planners referred the problem to Joint New Weapons (Bush-Conry-Solamy) who, in turn, appointed two sub-committees: (1) Barcelona, under George Merck, to evaluate BW, and to recommend offensive and defensive measures (through Chemical Warfare Service) and (2) Crossbow: Countermeasures and Interpretation Committee under General S. G. Henry.

Dr. Vannevar Bush sent JCS a report (about 15 January 1944) which, we are told, confirms the importance of OSS memoranda. The only dissenting opinion was from the Surgeon-General's office, USA, which attacked the technical accuracy of our basic information. Since this was not germane, I understand it has been withdrawn.

OSS was the first to suggest to JCS that any invasion of Western Europe should consider BW. It was pointed out that BW appears to fit the few facts known about enemy missiles and rockets. This position is supported by Chemical Warfare Service which points out that biological agents are held to be "many thousand times as toxic as ordinary chemical warfare agents such as phosgene". The Independent Crossbow Committee holds that the pay load of the German pilotless plane, or rocket, is not to be high explosive, but an incendiary, toxic gas or BW. (This, I think, is a revolutionary conclusion. It was arrived at because of the OSS memo.)

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Chemical Warfare 13.29

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X German
X JCS
X Surveying

No satisfactory countermeasures are known. Immunization by vaccination is slow and only covers one strain of toxin. Under-Secretary, Robert Lovett, U.S.A. Air Forces, is believed to have ordered day and night bombing of all probable installations from which BW may be launched. The British underslung, 40 mm. on single fighters are suggested. S.I. has asked for the specific information that experts need to accurately appraise the enemy capabilities.

Major General William N. Porter, Chief, CWS, advises me that they have a directive from the Secretary of War to build a plant for the manufacture of BW munitions.

Perhaps the most valuable function of OSS in this regard has been to alert the Joint Chiefs to the possibilities inherent in enemy action at the time of an Allied invasion. At the date of Colonel Buxton's memo of 17 December 1943, all thinking was in terms of orthodox explosives and incendiaries. Now JCS may plan in terms of BW or CW. Since chemical warfare is involved in control of the air, it follows that BW is the more logical conclusion - assuming, as the evidence indicates, that the enemy has a ten-year start in this field.

The almost unanimous support which Colonel Buxton's daring memorandum has received has, I feel, raised OSS to a new, high level of importance in service to its chiefs, JCS.

Appended are copies of reports of:

(1) Chemical Warfare Service "Evaluation of Damage to be Expected of Biological Warfare". 20 January 1944.

(2) U.S. Army Committee on Countermeasures. 22 January 1944, Col. A. A. Fickel, Chairman

(3) Secret Weapons Estimate - Interpretation. 22 January 1944 (Second and Latest Report). Col. L. A. Whittaker, Chairman.

Stanley P. Lovell

Stanley P. Lovell
Director
Research and Development

SPL:MAC
Attachments (3)

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(1)

b. Evaluation of damage to be expected from possible enemy attacks by means of biological warfare.

Biological warfare may be waged against us by the enemy on either a sabotage or a combat basis.

Undoubtedly the enemy has already resorted to the limited use of biological warfare on a sabotage basis. This tactic could be greatly exploited by the enemy. In all probability the use of sabotage would affect relatively small numbers of humans or domestic animals or relatively small areas of crop plants. It is possible that the enemy by sabotage methods might be able to start an epidemic of widespread proportions, but the success of initiating epidemics is doubtful; and, if such were done, the chances of the epidemic spreading to the enemy would be great.

Far greater danger than sabotage usage lies in the possible enemy use of biological warfare on a combat basis. The present state of our knowledge, acquired through experimentation by agencies of the United States and its Allies, indicates that biological warfare could probably be used effectively on a combat basis against humans, domestic animals, or plants.

In theatres of war which are essentially continental in character, agents directed against humans, domestic animals or plants, might be used effectively. In theatres of war which are essentially of island character, the enemy probably would resort to agents effective against humans.

It seems probable that our greatest danger at the present time from enemy attacks, using biological warfare, is in the European theatre.

This new form of warfare may be used against the British Isles where it might affect both military forces and civilians; or it may be reserved for use against the invasion forces, either when they are in transit across the Channel or after they have established beach heads on the continent.

Dispersal of biological agents will probably be through theuse of specially designed munitions. Planes, rockets, or pilotless planes may serve as the agencies for the distribution of these special biological warfare munitions. On the beach heads, artillery projectiles, concealed spray guns, or land mines, may also be used to distribute biological agents. In general it may be expected that biological agents will be used at long range; however, many biological agents lend themselves to the use of retreating troops.

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Biological agents are in general slower in action than are the usual chemical agents. Biological warfare casualties may be expected to appear in from one to fourteen days.

Perhaps the principal advantage of biological agents lies in the fact that extremely small amounts may be effective, if properly distributed. Preliminary investigation indicates that certain biological agents are many thousand times as toxic as ordinary chemical warfare agents such as phosgene. In field use however because of the difficulty of dispersing BW agents the efficiency of these agents is not expected to exceed several hundred times that of CW agents.

Due to the extremely small amounts of many biological agents needed to produce casualties, physical means of protection, including gas masks and protective clothing, are less effective against biological warfare than against chemical warfare.

Due to the character of the biological agents and the fact that they are effective in such minute amounts, detection is an extremely difficult problem. Although there are many methods of detection available at the present time, all known methods are too slow or too inexact to be of much use under combat conditions.

The fact that it is possible to prepare agents of biological warfare in large amounts and that it may be possible to distribute them in an effective form by means of bombs, rockets, other projectiles, and possibly, sprays makes it likely that our forces would suffer seriously, if the enemy is prepared and wishes to use biological warfare on a combat scale.

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Chemical Warfare 13,229
x German
x JCS
x Simon, Prof H

WAR DEPARTMENT
New Developments Division
Washington 25, D.C.

SECRET

31 January 1944

SUBJECT: CROSSBOW Reports.

TO: Rear Admiral W. S. Delany, JCS,
1901 Constitution Avenue,
Washington 25, D.C.

1. Inclosed for your information is complete copy of Countermeasures Report of 22 January 1944 prepared by the Committee in this Division.

2. In the future you will receive complete reports and not extract copies as forwarded by memorandum, 27 January 1944.

/s/ S. G. Henry

S. G. HENRY,
Major General, U. S. Army,
Director, New Developments Division.

1 Incl.
Copy of Countermeasures
Report dtd 22 Jan 44.

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22 January 1944

CROSSBOW COMMITTEE

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COUNTERMEASURES SUBCOMMITTEE

Report as of 22 January 1944 (last Report 17 January 1944).

SECTION I - ACTION TAKEN.

1. A letter was despatched to the Commanding General, European Theater of Operations, explaining the establishment of the War Department CROSSBOW Committee. The CG, ETO, was notified that the letter was being despatched in a cable, 19 January 1944 (Cm-OUT 7455).

2. Major Sewell, Headquarters, Army Air Forces, presented the Army Air Forces Board at Orlando, Florida, on 17 January 1944 with the CROSSBOW project, together with portfolio of informational data. Colonel Harry Montgomery of the Tactics Division is in charge of the project. Arrangements were made for interchange of information between Orland and Washington by means of a periodic courier, who will maintain contact with Major Sewell and also with Colonel Maklin, Air Forces Board, Control Office. The first comprehensive report from the Army Air Forces Board is expected 25 or 26 January 1944.

3. At the request of the New Developments Division, Lt. Colonel A. H. Warner of the Radiation Laboratory of M. I. T., and Captain J. B. Rawls, Jr., Headquarters, A. A. Command, Richmond, Virginia, studied the practicability of employing American A. A. Units against CROSSBOW projectiles. Their memoranda were submitted to the Subcommittee, 21 January 1944.

4. The Weather Section, Headquarters, Army Air Forces, was requested to prepare a study of expected weather in France from February through June 1944. This report will be available 25 January 1944.

5. A Memorandum, dated 22 January 1944, was prepared to the Commanding General, Army Air Forces, requesting that Mr. Lovett's recommendations regarding CROSSBOW countermeasures be transmitted to the Army Air Forces Board for its consideration.

6. Investigation reveals that Memorandum, Office Chief of Staff, relative to Bacteriological Warfare, to Commanding General, Army Service Forces, dated 13 January 1944, is now in the hands of General Porter, Chief of Chemical Warfare Service.

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SECTION II - COUNTERMEASURES DEVELOPMENT

7. Under Secretary of War for Air. Mr. Lovett is very strongly impressed by the possibilities of using fire as a destroying weapon. If newly developed incendiaries can be accurately placed on the targets, the overall effect on installations thereat may be more devastating than damage caused by relatively localized high explosive bursts. With respect to incendiaries, he recommended specifically that tests be conducted using the aimable cluster, Type E8, R2, with magnesium incendiary bomb.

8. It was suggested that possibilities be explored of the use of the Navy 7.2 rocket to be fired from a launching cradle which can be lowered from the bomb bay of the A-20 or the A-26. A weapon of this power and accuracy might provide new potentialities to our minimum altitude tactics.

9. It was also suggested by Mr. Lovett that detailed consideration be given to the possibility of employing repeated "pecking" attacks against the targets with purpose of disrupting construction work, of causing minor but continued damage, and of lowering morale among the workmen. These attacks should be carried out night and day, using all known navigational aids in combination with dropping of flares to mark targets.

10. Antiaircraft. The conclusions presented by the two antiaircraft artillery officers mentioned in paragraph 3 above are as follows:

a. It is possible for one battery to be placed so that it can engage all the targets which may be launched (undeviated) from one launching point in France. As many as 50 rounds can be fired against each missile. The two officers are optimistic over the ability to hit the pilotless aircraft because of the following reasons:

(i) The greater accuracy and speed of the SCR 584 which exceeds by far present accuracy under visual sighting methods.

(ii) The constant speed and the predetermined flight path of the pilotless aircraft.

b. It will be necessary to institute an intensive training program to acquaint the crews with the new radar set. Ten radar experts should be sent to the United Kingdom as early as possible to assist the Commanding General in establishing his training program.

c. Preparation for CROSSBOW antiaircraft fire will be inval-

uable training for OVERLORD. In this connection it should be noted that General Eisenhower has not yet answered our query (our S217, which is CM-OUT 6811, 17 January) as to the effect on OVERLORD if U. S. antiaircraft units are diverted to participate in CROSSBOW.

11. Admiral Furer. Rear Admiral J. A. Furer, USN, in a letter dated 15 January 1944, suggests the use of antiaircraft and contributes the following additional suggestions:

a. That there be maintained a continuous high altitude observation plane, or planes, over the area covered by the German sites for the purpose of spotting flame and smoke from the launching sites, that proximity fuses be used in the antiaircraft firing against pilotless aircraft.

12. Toss Bombing. Dr. Robertson suggested that several papers written by Lt.Col. H.S. Morton of the Ordnance Department on Toss Bombing be made available to ETO. Col. Morton states that these papers have been turned over to the Commanding General, Army Air Forces, who has, in turn, given them to the Army Air Forces Board as a project for development. Col. Morton claims that this toss bombing is of such revolutionary accuracy that it would be extremely hazardous to our tactical employment of heavy bombers were they to fall into the hands of the enemy. It is believed that any further investigation of this matter is to be made through the Air Forces Board.

13. Strategic Bombing of Germany. The present opinion of the Plans Division, Headquarters, Army Air Forces, is that the Strategic Bombing Forces should not be diverted to the "rocket coast", except as a target of opportunity when the weather prohibits POINTBLANK operations.

14. GAF Order of Battle. Discussion with Major LeRoy, War Department General Staff, G-2, on the disposition of German fighters indicates that there has been no perceptible movement of German Air Force fighters to protect the CROSSBOW sites.

15. "Tank Busters." In extensive British use in the Tunisian Campaign were two underslung 40 mm. guns on single-engine fighters. This installation is quite effective against small tank units but they no more than damage the huge German Tiger tank. From all available Intelligence reports, however, it appears that the armament installation is sound and thoroughly tested so that this type aircraft can accurately bring fire to bear against certain parts of the sites. It is suggested that they can be used against transportation employed in supplying the sites.

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16. Auxiliary Installations. Dr. Loomis suggests that attack upon the installations which are auxiliary to the sites should not be neglected, both because of the effect on the morale of the personnel involved and also because of the possibility of destroying vital supplies and building materials.

ARTHUR A. FICKEL,
Colonel, U.S.C.

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27 January 1944

SUBJECT: CROSSBOW Reports.

TO: Rear Admiral W. H. Delany, JOH,
1001 Constitution Avenue,
Washington, D. C.

1. Inclosed for your information are:

a. Extracts of Countermeasures Report of 22 January 1944.

b. Interpretation report of 22 January 1944. All prepared by the Committee in this Division.

H. O. HENRY,
Major General, U. S. Army,
Director, New Development Division

2 Incls.
Incl. 1 - Extracts of Counter-measures Report, 1-22-44.
Incl. 2 - Interpretation report, 1-22-44.

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24 January 1944

PERIODIC REPORT BY THE SUBCOMMITTEE ON INTERPRETATION,

NEW DEVELOPMENTS DIVISION, WAR DEPARTMENT GENERAL STAFF.

SECRET WEAPONS ESTIMATE

AS OF 22 JANUARY 1944 (SECOND REPORT).

The following secret weapons estimate (second report) is made on the locations called "Ski Sites" and those called "Large Sites", based on the interpretation of the data available to the subcommittee as of 22 January 1944.

1. Purpose and Details of the Ski Sites.

a. The subcommittee has entered upon a detailed interpretation of all available photographic coverage of the ski sites, with the objective of preparing an individual black and white drawing for each site which will present all photographic interpreted data. From preliminary studies on a few of these sites, it is probable that the following buildings, not mentioned in our report of 10 January 1944, also are common to the ski sites:

(1) Building "A" - Presumed to be a store house, invariably located near a main highway. The purpose of this building is not yet known.

(2) Cistern of Water Supply from Source Outside of the Site: Each of the completed ski sites are apparently furnished with quantities of water which in some cases may be brought to the site by pipe line from an outside source or obtained from a cistern, or well, on the site.

(3) Large excavation approximately 60' long, 40' wide and 15' deep is found in the vicinity of many ski sites. The purpose of this excavation is not known at the present time.

(4) "E" - A square pyramidal excavation 50' x 50' with depth of 9 feet and sloping sides. This excavation is generally found along side of or fairly close to Building R2 and may be a reservoir of water for use with an air compressor or in a cooling process. This vat could hold approximately 40,000 gallons. The exact use of this structure has not yet been disclosed but its proximity to Building R 2 would indicate that it is required for operations that take place in that building.

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(5) "K" - Firing Point - It is noted that water is piped to this building from the cistern or outside sources. There is at present no information available to indicate the necessity of water at this location.

(6) "St" Building - This building, marked "Stosslager" on some drawings, is presumed to be "Propellant Storage" indicate that the contents of the building constitute a hazard to the site; namely, blast wall of brick three feet thick on entrance side, and high earth embankments on three sides. The location of the structure is generally opposite and facing the small rectangular "R2" but, in some instances, it is found as far away as 200 feet from "R2".

b. Type of Munitions used in War Heads. No additional data has been presented or deduced on the type of filler to be used, It is noted that one report states: "The Germans expect retaliation. Orders have been issued for the construction of disinfection units and for exercises and marches with gas masks." (OSS Report #308, 15 Nov 1943).

2. The following elements of the ski sites are particularly puzzling and no plausible explanations are yet found or deduced:

a. Curved end of ski buildings generally faces the approximate center of site but, in one case, Site No. 34 (Ailly - Le Haut Clocher), the curved end of S5 building faces away from the center of the site.

b. Two different lengths of the three ski buildings on each site (one 241 ft. long and two 208 feet long).

c. Purpose of odd shaped excavation "E".

d. Necessity of water supply to "K" and "St".

3. The British Summary of 16 January 1944 suggests that the pilotless plane could be launched by utilizing a powerful stream of water directed against a Pelton Wheel on a launching cradle. This method of launching is considered entirely feasible and if used would serve to explain the construction of the launching platform

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and ramp above the ground level, rather than partially excavating for the ramp in order to obtain the desired launching slope, as would normally be expected. This method of launching would require no power, compressed air or water at the launching site, if Building #2 was used to charge large cylinders containing compressed air at 150 atmospheres and water which could then be taken to the launching platform for use in launching.

4. CONCLUSIONS ON RKI SITES.

There is at present no evidence to cause the committee to change the conclusions made in its report of 10 January 1944 (First Report) on the following hypotheses:

a. RKI sites are for launching four to five-ton, jet-propelled, pilotless aircraft carrying a payload of 1½ to 2 tons, with a range of approximately 150 miles.

b. That such planes are controlled by magnetic auto pilots and a distance-measuring device.

c. That no radar or radio control is required.

d. That the rate of launching will not exceed six per hour per site in operation at any one time.

5. Large Sites.

a. Number.

(1) The latest information available to the sub-committee indicates that certain construction has been identified as "Large Sites", namely:

Location	General Area
(a) Mimoyecques	Calais - Abbeville
(b) Watten/Eperlecques	" "
(c) Lottinghem	" "
(d) Wizernes	" "
(e) Siracourt	" "
(f) Martinvast	Cherbourg
(g) Rottevast	"

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(2) In addition to the above, the description of the construction reported near Octeville contains some of the characteristics found in the large sites, and, until further developments, may be suspected as an additional site.

b. Purpose.

(1) The subcommittee feels that these sites are either:

(a) underground storage,

(b) defense structures against invasion,

(c) underground rocket projectors.

(2) The following characteristics are noted in connection with those sites for which data is at hand:

(a) Served by railway spurs leading into tunnels,

(b) Openings in the ground above the tunnels, apparently camouflaged with haystacks.,

(c) Large excavations near the tunnels.,

(d) Important structure with one axis at right angles to the direction of London, in the case of the Calais-Abbeville area and Bristol in the Cherbourg area.,

(e) Sites are within 120 miles of London or Bristol.,

(f) Sites are well withdrawn from the coast.

(3) These sites are not well located for invasion defense as they are grouped into two general localities; general area 20 miles south of Calais and 10 miles southeast of Cherbourg. These sites are not well located for storage or supply depots as they appear to be too near the coast, too close together and are also considered to be too massive and of non-conventional design for such purposes.

(4) Assuming that these large sites are to be used for the underground launching of rockets of considerable size, they would require:

(a) Good rail facilities to handle weights on the order of 60 tons.

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(2) The filler for the pilotless plane projectile is an incendiary, toxic gas, or BW, not HE.

(3) The large sites will require large sources of electric power and compressed air, furnished by electric-driven compressors, will be used for launching.

(4) The large sites will use a projectile weighing at least 25 tons.

b. The following specific inquiries be directed to the A.C/s, G-2, ETOUSA, for the attention of Dr. Robertson, covering the following:

(1) All technical and photographic coverage of the large sites not previously furnished to be forwarded to the War Department.

(2) Probable use of all buildings on the ski site.

(3) Why is one ski building shorter than theother two?

(4) Why is so much water and compressed air at the sites?

(5) Any further data on the type of filler used in the war head.

(6) Flow of planes and method of moving these about the site.

(7) Any special precautions being taken by troops or personnel in the vicinity of the ski sites and supply depots connected therewith.

(8) Any unusual radar or radio installations which may be connected with the operation of the two . es under study.

L. A. WHITTAKER,
Colonel, C. A. C.,
Chairman, Sub-Committee on Interpretation.

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Chemical Warfare 13, 32[illegible]

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17 December 1943

MEMORANDUM FOR THE SECRETARY, JOINT CHIEFS OF STAFF

FROM: ACTING DIRECTOR, OSS

SUBJECT: Implications of Recent Intelligence Regarding Alleged German Secret Weapon.

Professor Wilmuth Simons, a biochemist of international standing in microbiology (Appendices I, II and III), has advised our contacts in Zurich, Switzerland that the Germans will, in his opinion, use as their secret weapon the toxin of bacillus botulinus.

A report of credibility A-1, 8 December 1943, (Appendix IV), states that the Germans, after years of research have found a method of spreading bacteria from the air without destroying its effectiveness.

The toxin from bacillus botulinus has been the subject of work by the Canadian Government for many months.

Animal experimentation with the air-borne powder indicates a lethal quality in extremely great dilution.

Conferences with the NDRC, particularly Dr. Roger Adams, lead to estimates that a 70% mortality could be presumed to result from its dissemination in the absence of rain or high winds.

While the quantity of this toxin necessary to effectively contaminate a large area is not known, it is thought to be possible that it exists and could be disseminated by the Luftwaffe, or the rumored installations of rocket projectiles.

Since the employment of this toxin would constitute a

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Since the employment of this toxin would constitute a

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general contamination of the atmosphere, the known eccentricity and unreliability of rockets would assist rather than detract from their use as a means of distribution.

U. S. Army Chemical Warfare Service has a pilot plant production of the above toxin at Camp Dietrick, Maryland. As this camp a method of inoculation giving immunity to the toxin has been experimentally proven. The scientific factors would seem to be:

(1) That his toxin is not contagious and its military use by the Germans, would, therefore, not backfire onto the continent.

(2) The air-borne dust would have no odor or taste, and thus a population would have no reason to protect itself with gas masks. Symptoms do not develop until four or five hours after contact when death inevitably follows.

(3) The cause of death is an embolism and would tend to bewilder medical opinion.

(4) The toxin would be most difficult of analysis and identification, and if mixed with high explosives might not be detected except by deductive reasoning sometime after the blow had been delivered.

Counter measures are obviously very difficult. To innoculate a large civilian population against this particular toxin would require extensive, trained personnel and great organization.

If the enemy is considered capable of employing this hor-

rible weapon, it is submitted that only the fear of instant reprisal in kind would restrain him.

In view of the possible serious implications, it is recommended that this memorandum be brought to the attention of the Joint Chiefs of Staff.

Chemical Warfare 11,219
× Gerson 9a
× Treaties
× U.S.

OFFICE OF STRATEGIC SERVICES

INTEROFFICE MEMO

TO: General Donovan DATE: April 23, 1943

FROM: The Secretariat

SUBJECT: Adherence of United States to Treaties Prohibiting Use of Poisonous Gases in Warfare

1. You will recall that earlier this month we sent you a memorandum on the above subject. Our conclusion was that the United States did not appear to be bound by any treaty specifically prohibiting the use of poisonous gases in warfare.

2. Pursuant to your suggestion that we check our conclusion with the State Department, we requested Mr. Kimbel to make such inquiry. The attached is a copy of a memorandum sent by the Legal Adviser of the Department of State in response to Mr. Kimbel's request.

3. You will note that the attached covers the same four treaties discussed in our memorandum of April 5th and confirms the conclusion stated therein. With regard to the protocol of June 17, 1925, the State Department further indicates that this treaty was submitted to the United States Senate on January 12, 1926, for its advice and consent to ratification which have not been given. To the Department's knowledge, although the treaty is on the calendar of the Senate Committee on Foreign Relations, it is not under active consideration at the present.

4. In addition to the State Department's memorandum, we are also attaching for your files our original memorandum on the above subject.

Sgt P. F. P.

APPROVED:

Otto C. Doering, Jr.
Major, AUS
Chief, Secretariat

11219

COPY

DEPARTMENT OF STATE

The Legal Adviser

April 20, 1943

USE OF ASPHYXIATING, POISONOUS OR OTHER GASES IN WARFARE AND BACTERIOLOGICAL METHODS OF WARFARE

The First Hague Conference adopted a declaration that "The Contracting Powers agree to abstain from the use of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases;" this declaration was not signed by the American delegates who gave their reasons in a special report (Foreign Relations 1899, 513, 519-520).

The Second Hague Conference concluded a Convention Respecting the Laws and Customs of War on Land on October 18 1907. This Convention was signed and ratified by the United States. It provided in part as follows:

Article XXII

The right of belligerents to adopt means of injuring the enemy is not unlimited.

Article XXIII

In addition to the prohibitions provided by special Conventions, it is especially forbidden:--

(a.) To employ poison or poisoned weapons;

* * * * * * * * * * * * * * * * * * * *

(e.) To employ arms, projectiles, or material calculated to cause unnecessary suffering;

The Convention also provides:

Article II

The provisions contained in the Regulations referred to in Article I, as well as in the present Convention, do not apply except between Contracting Powers, and then only if all the belligerents are parties to the Convention.

In view of these provisions the Convention is not binding on the United States during the present war.

On February 6, 1922 the United States signed a Treaty between the United States of America, the British Empire, France, Italy, and Japan relative to the protection of the lives of neutrals and noncombatants at sea in time of war and to prevent the use in war of noxious gases and chemicals. The Treaty provided in part as follows:

Article V

> The use in war of asphyxiating, poisonous or other gases, and all analogous liquids, materials or devices, having been justly condemned by the general opinion of the civilized world and a prohibition of such use having been declared in treaties to which a majority of the civilized powers are parties.
>
> The Signatory Powers, to the end that this prohibition shall be universally accepted as a part of international law binding alike the conscience and practice of nations, declare their assent to such prohibition, agree to be bound thereby as between themselves and invite all other civilized nations to adhere thereto.

The Treaty was ratified by the United States and by the other signatories except France. Since France has not ratified, the Treaty is not in effect in view of the provisions in Article VI that the Treaty "shall take effect on the deposit of all the ratifications" which shall take place at Washington."

A protocol for the prohibition of the use in war of asphyxiating, poisonous, or other gases, and of bacteriological methods of warfare, was signed at Geneva on June 17, 1925. The protocol was submitted to the Senate on January 12, 1926 for its advice and consent to ratification which have not yet been given. So far as the Department is informed it is not under active consideration, although it is on the calendar of the Committee on Foreign Relations of the Senate.

Date April 11, 1943

To: GENERAL DONOVAN

You may be interested to know that it appears from the attached that this country is not a party to any treaty prohibiting the use of poisonous gases in warfare.

→ O.C.D. Jr.

Let me check this through the State Dep't. - I T
[illegible] -

(0130)

Chemical Warfare 11,219
X Poison, Gas
X Treaties
X U.S.

OFFICE OF STRATEGIC SERVICES

INTEROFFICE MEMO

TO Major Doering

DATE: April 5, 1943

FROM Sgt. Pugliese

SUBJECT Treaties Prohibiting the Use of Poisonous Gases in Warfare

1. I have had occasion to read certain treaties prohibiting the use of poisonous gases in warfare and I thought you might be interested in knowing whether the United States had signed, ratified, or adhered to any of them.

Three treaties on this subject were called to my attention by Mrs. Swift of OID who had previously contacted the State Department: The Declaration of July 29, 1899, the Declaration of February 6, 1928, and the Protocol of June 17, 1925. Only the latter two were signed by the United States representatives, but in neither case, for different reasons, did the treaty become effective as to this country. The Declaration of 1928, according to the State Department, is a dead letter because although the United States ratified it, France did not. Apparently there was a provision in the treaty that required ratification by all of the Five Powers. The Protocol of 1925 was never ratified by this country.

The Convention of 1907, which I understand was intended to implement, if not to supersede the Declaration of 1899, does not specifically refer to poisonous gases, but it has a provision prohibiting the use of "poison or poisoned weapons." This Convention was ratified by the United States and apparently became effective.

The above four treaties are summarized in the next succeeding paragraphs.

2. In the Declaration of July 29, 1899, drafted at the International Peace Conference at the Hague, the Contracting Powers agreed to abstain from the use of projectiles, sole object of which was the diffusion of asphyxiating or deleterious gases. The Declaration was to be binding on the Contracting Powers only in case of war between two or more of them and would cease to be binding from the time when, in a war between the Contracting Powers, one of the belligerents should be joined by a non-contracting power.

The United States apparently was not a party to this treaty.

The following countries ratified:

Austria-Hungary, Belgium, Bulgaria, China, Denmark, France, Germany, Greece, Italy, Japan, Luxemburg, Mexico, Montenegro, Netherlands, Norway, Persia, Portugal, Roumania, Russia, Servia, Siam, Spain, Sweden and Norway, Switzerland, Turkey.

Great Britain and Nicaragua subsequently adhered to the treaty.

3. At the Conference on the Limitation of Armaments held at Washington, D. C., November, 1921 - February, 1922, one of the so-called "Five-Power" treaties contained a declaration prohibiting "the use in war of asphyxiating, poisonous, or other gases, and all analogous liquids, materials or devices," and another declaration governing the conduct of submarine warfare.

Although this treaty was adopted by the Convention (February 6, 1922) and ratified by the United States, it was never ratified by France and, therefore, according to the State Department, it never did go into effect.

4. At Geneva, on June 17, 1925, a Protocol was signed by the United States, Germany, the British Empire, Japan and other countries which prohibited the use in war of asphyxiating, poisonous or other gases, and of bacteriological methods of warfare. Of the signatories mentioned above, Japan and the United States did not ratify. Russia, although not a signatory, subsequently adhered to this treaty.

Ratifications were deposited by:

British Empire, Canada, India, Austria, Belgium, Denmark, Egypt, Finland, France, Germany, Italy, Poland, Roumania, Spain, Sweden, Turkey, Venezuela and Yugoslavia.

Accessions included:

Australia, New Zealand, South Africa, China, Liberia, Persia, and Soviet Union.

5. The Convention of October 18, 1907, entitled "Convention Respecting the Laws and Customs of War on Land" does not specifically

refer to poison gas. Article 23 of its annexed regulations does, however, prohibit the use of "poison or poisoned weapons." It provides in part as follows:

"Article 23

In addition to the prohibitions provided by special Conventions, it is especially forbidden:

(a) To employ poison or poisoned weapons;

(b) To kill or wound treacherously individuals belonging to the hostile nation or army;

. . . .

(e) To employ arms, projectiles, or material calculated to cause unnecessary suffering."

The above Convention was ratified by the United States on February 23, 1909 and was proclaimed by President Taft on February 28, 1910. Other countries ratifying the Convention included Austria-Hungary, Bolivia, Denmark, Germany, Great Britian, Mexico, The Netherlands, Russia, Salvador, and Sweden.

Whether or not the drafters intended the words "poison or poisoned weapons" to include poisonous gases seems doubtful because in the Declaration of 1899, which I understand this Convention was intended to supersede, a reference was specifically made to "asphyxiating or deleterious gases." Further, according to Mrs. Swift, it is the opinion of the State Department that the United States is not at present a party to any treaty prohibiting the use of poisonous gas. This would seem to indicate that the State Department does not believe that the drafters of the Convention of 1907 intended the provision in question to include the use of projectiles, sole object of which was the diffusion of asphyxiating or deleterious gases.

6. If the above interpretation of the Convention of 1907 is accepted, the United States is not now a party to any treaty prohibiting the use of poison gases in warfare. If the above interpretation is not accepted, and the provision in question is broadly construed to include use of poison gases, then it is my understanding that this would be the only treaty on this particular point which is now binding on the United States.

Sgt. P.F.P.
Sgt. P. F. P.

OSS Form No. 4006

TOP SECRET

10,693 B

Chemical Warfare × Germany × Russia × Info

SIGNATURE RECORD SHEET

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Addressed to: Director	Accession date: Jan 6, 1945
Document date: Jan. 5, 1945	Office or Branch: Director
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2.	Col. Buxton	G. Edward Buxton	1/6	6PM	GEB	1/8	4PM
3.	Col. Doering	O. Doering	8/1	5:30	OCD	10/1	10:30
4.							
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OSS
Form 62 (Revised)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE January [illegible], 194[illegible]

FROM [illegible]

TO [illegible]

PRIORITY
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14 478

OFFICE OF STRATEGIC SERVICES

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MO([illegible]), [illegible]

RECEIVED IN CODE OR CIPHER

[illegible] To General [illegible] from [illegible]. TOP SECRET [illegible]

[illegible] has informed me that he does not have additional information on gas line, re your State Department cable #2865, 31st of December, [illegible]. He further [illegible] that "There is [illegible] for supposition that the information about the gas line was inspired by Germans themselves and relates to the [illegible] series of single [illegible] secret weapon [illegible]".

TOP SECRET

ACTION: General Donovan

FOR INFO: O.D., General [illegible]

[illegible]-4[illegible]6 (5 Jan 45) OTO [illegible]

TOR: [illegible], [illegible]

COPY 1

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Form 88 (Revised)

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE DECEMBER 10, 1944 REC'D 12/19/44 6:00 p.m.

TO AMERICAN EMBASSY, MOSCOW

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SECRET

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TRANSMITTED IN CODE OR CIPHER

SECRET

Donovan: OSS to Leahy.

Please convey my appreciation to Fitin for material forwarded in your MX 21162. It has proved valuable. We have been asked whether further information can be obtained on gas lines mentioned. Please ask Fitin if more data on this subject is available.

TOD: 12/20/44 2:41 p.m. WJD

SECRET

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INITIALS OF "RELEASING" OFFICER

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SECRET

OFFICE OF STRATEGIC SERVICES

WASHINGTON, D.C.

9 December 1944

TO: Major General William J. Donovan

FROM: Walter C. Langsam

THROUGH: Mr. Whitney H. Shepardson

SUBJECT: Proposed cable to Berne

1. On the basis of cable IN [illegible] (received 2 October 1944) a dissemination was prepared which then was sent to G-2, among other offices.

2. G-2 now has commented as follows: "Desire more information on these gas items. An excellent report."

3. Hence, I should like to suggest sending a cable (Donovan to Berne, [illegible]) requesting additional information of the type furnished in September by [illegible] on the [illegible] gas line behind Germany's eastern front.

Approved

ATTACHED

SECRET

OFFICE OF STRATEGIC SERVICES

WASHINGTON, D. C.

DISTRIBUTED 4 October 1944
COUNTRY Germany
SUBJECT Gas Warfare Preparations

DISSEMINATION NO. A-40482
ORIGINAL REPORT NO. RB-21516
DATE OF REPORT 28 September
EVALUATION ---------

CONFIRMATION
SUPPLEMENT
CORRECTION

SOURCE 2
SUB SOURCE As stated

NUMBER OF PAGES 2
ATTACHMENTS 1 map
THEATRE WETO

DATE OF INFORMATION Current
PLACE OF ORIGIN Europe

RS-CL 39 / 1

The following information was reported by a high United Nations official.

1. There is a chemical works manufacturing Lewisite and "Zeif" gases and employing 700 people situated at Schildberg, Poland near a large lumber mill 800 meters northeast of the station along the Ostrawo-Schildberg-Kempen highway.

2. Another chemical works with 2,000 employees, manufacturing [illegible]-pound chemical bombs filled with "Zeif", is located at Merseburg (26 kms. west of Leipzig), about 2100 meters from the station on the north side of the highway in some woods. A torpedo testing station is situated in this section.

3. An underground chemical plant manufacturing the "Blue Cross" type of gas is situated at the station, 1800 meters from Parade Platz, next to Koernerstrasse (in the neighborhood of the Bellevue Theatre). The factory has 1,000 employees and covers an area of 700 square meters. (OSS Washington Comment. This appears to refer to Stettin.)

4. A chemical factory manufacturing "Zeif"-filled grenades is situated at Oderthal Waren in the vicinity of Gleiwitz, two kilometers from the oil refinery in the woods near the highway going east. There are 450 people employed in the factory.

5. Another chemical works, manufacturing grenades and bombs

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CLASSIFICATION

MID	DNI	A-2	STATE	TREAS.	OWI	FEA	AMS	YC	FCC	JICA	L
✓	✓	✓				✓					

loaded with gas in at Koenigshuette (165 kms. southeast of Breslau), Upper Silesia, near blast furnaces, situated 500 meters southeast of the station. There are 600 workers in the factory, which is underground.

A plant with 700 workers filling tanketten with explosives is located at Nakel (45 kms. west of Bromberg), 1,200 meters from the station along a highway leading toward Poznan (94 kms. south southwest of Nakel), 800 meters from the road.

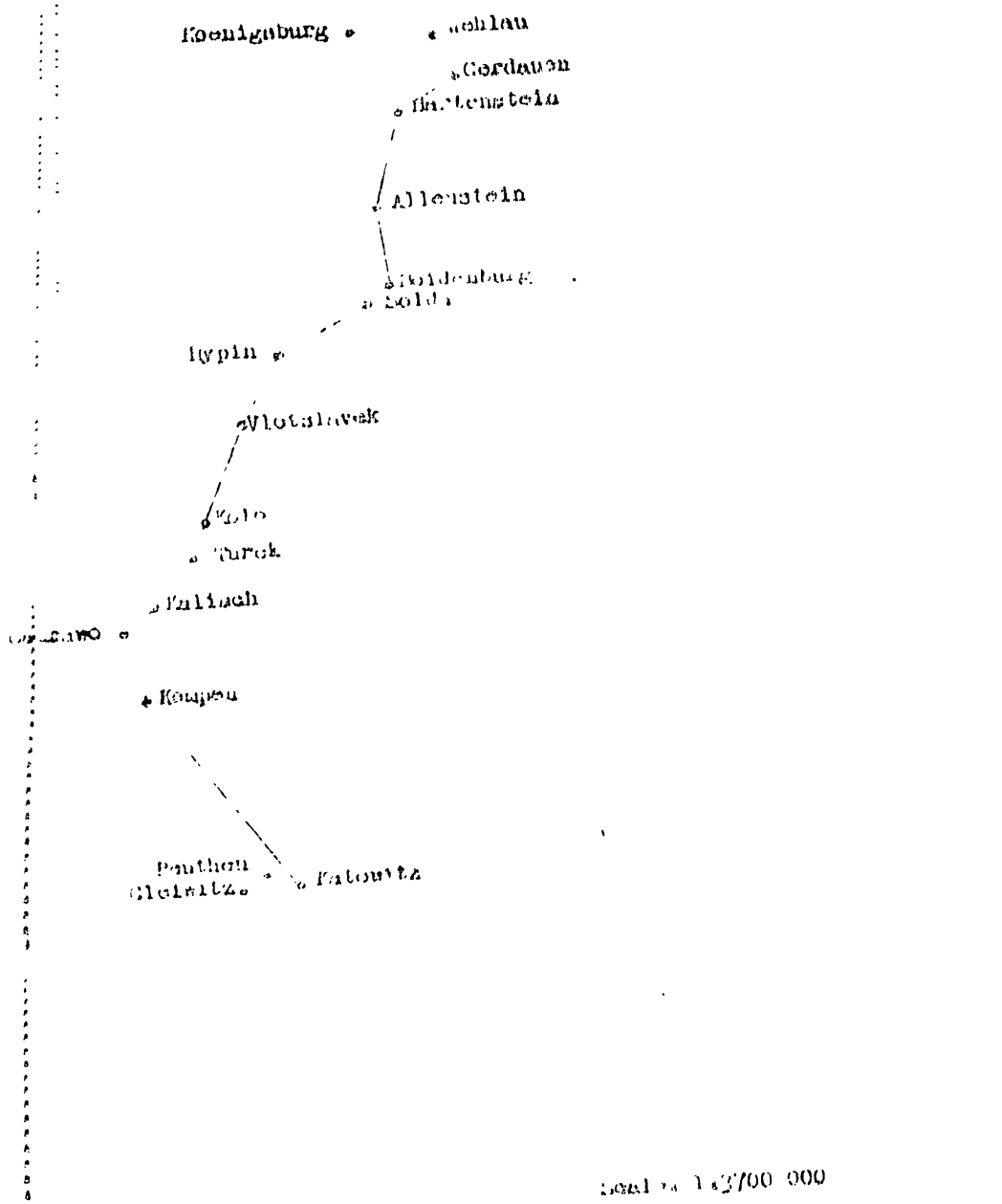
Ordinary torpedoes are built, manufactured in an underground plant located at Swinemuende (56 kms. north northwest of Stettin), 400 meters from the port and 500 meters to the right of the road going to Stettin. The plant has 1,100 workers.

The Nazis in January 1944 began to construct gas lines and fortifications along their eastern frontiers. The gas lines are one and a half meters below the surface, and have armor plating above them. They were put in by SA Sappers. The pipeline was laid between Gleiwitz and Koenigsberg, going through Beuthen, Kattowitz, Kempen, Ostrowo, Kalisch, Turek, Kolo, Wloclawek, Kutpin, Soldau, Neidenburg, Allenstein, Rastenburg, Gerdauen, and Wehlau. Permanent fortifications have been constructed 800 to 1,700 meters away from the pipeline. Gas may be released in separate sections through the main line and side branch lines. The gas may be turned off if a section of the line is destroyed. (See map attachment)

SECTION

No

A-40482



SECRET

Form 88 (Revised)

8-43 @ 2996

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

DATE September 28, 1944

FROM US MILITARY MISSION, MOSCOW

TO	WAR DEPARTMENT CG, USSAF, IN EUROPE, LONDON [redacted] AFHQ, CASERTA, ITALY	X PRIORITY / ROUTINE / DEFERRED

OFFICE OF STRATEGIC SERVICES

DISTRIBUTION

(FOR ACTION) DIRECTOR

(FOR INFORMATION) SECRETARIAT, MAGRUDER, BIGELOW, MTDTO, X-2, SI, R&A

IN 21516

RECEIVED IN CODE OR CIPHER

SECRET "AFHQ"

#IX 21162. Deane to Baker, Spaatz, and Donovan. AFHQ kindly forward to Headquarters MAAF.

The material on Germany which appears below was furnished us by General Fitin.

1. There is a chemical works manufacturing Lewisite [redacted] "Zeif" gases and employing 700 people, situated at Shildberg, [redacted] near a large lumber mill 800 meters NE of the station along the Ostruv-Shildberg-Kermono highway.

2. Another chemical works with 2,000 employees, manufacturing 2,000-pound chemical bombs filled with Zeif, is located at Perzeburg, some 2100 meters from the station on the north side of the highway in some woods. A torpedo testing station is situated in the same section of the country.

3. An underground chemical plant manufacturing the "Blue cross" type of gas is situated at the station 1800 meters from Paradon Platz Square next to Fernestrasse (in the neighborhood of the Bellview theater). The factory has 1,000 employees and covers an area of 700 square meters.

4. A chemical factory manufacturing Zeif-filled grenades is situated at Orenthal Waren in the vicinity of Gmidvitz, 2 kilometers from the oil refinery in the woods near the highway going east. There are 450 people at work in the factory.

5. Another chemical works, manufacturing grenades and bombs loaded with gas is at Konighshutte (Upper Silesia), near blast furnaces, situated 500 meters SE of the station. There are 600 workers in the factory, which is underground.

6. A plant with 200 workers filling tankettes with explosives is

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OSS Form No. 3

OFFICE OF STRATEGIC SERVICES

OFFICIAL DISPATCH

FROM

TO OFFICE OF STRATEGIC SERVICES

REF. NO.

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SECRET

at Halel (in the vicinity of Bromberg), 1200 meters from the station along a highway leading toward Posnan, 800 meters from the road.

7. Ordinary torpedoes are being manufactured in an underground plant located at Svinemunde, 400 meters from the port and 500 meters to the right of the road going to Stettin. The plant has 1200 workers.

The Nazis began in January of this year to construct gas lines and fortifications along their eastern frontiers. The gas lines are 1½ meters below the surface and have drop plating every three; they were put in by [illegible] pipers. The pipelines [illegible] Gleivitz and Koenigsberg, going through Deutsch Eylau, Rastenburg, Ostruv, Yalish, Turel, Lolo, Vlotklavel, Ripin, Soldau, Hindenburg, Allenstein, Bartenstein, Gerdauen, and Velau. Underground fortifications have been constructed 800 to 1200 meters away from the pipeline. Gas may be released in separate sections through the main line and side branch lines. The gas may be turned off if a section of the line is destroyed.

ACTION COPY

ACTION: OSS
INFORMATION: [illegible] G-2, C of S
CM-IN-2647 (29 Sept 1944) 20:53
TOR: 9/29/44 12:46 pm

SECRET

FILE COPY

10-693A
Chemical Warfare

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

CONFIDENTIAL

MEMORANDUM

TO: The Director

DATE: 8 September 1944

FROM: Stanley P. Lovell

SUBJECT: Probabilities of Chemical Warfare in Europe

1. In the writer's judgment the Germans have not previously employed chemical warfare because their ammunition, food and other supplies were largely transported by horses. The retaliatory use of chemical warfare would have immobilized this vital transportation.

2. If the Germans get behind the West Wall, stretching from Basel to Cleve, every attempt will be made to harden the combat into a war of position. One of the most effective ways of creating a warfare of position would be the use of mustard, Lewisite, Adamsite and other chemical agents. A breach of the West Wall would probably be attempted by tanks and ground forces, neither of which can advance through contaminated terrain.

3. An instant retaliation by the United States, both from the air and artillery, might not be considered too high a price for the retention of the West Wall as a rampart. The German Engineer Corps has been building this wall since 1936, and it is believed that the fortifications themselves are designed to be proofed against gas. It would thus follow that our retaliation would be effective against German cities, but ineffective in causing a breach in the rampart.

4. Assuming the mixture of high explosives and chemical bombs to create a new horror in the bombing of civilian cities, the sadistic quality of Hitler's mind might prefer that sort of defeat to a more orthodox and less horrible one.

5. Finally, it is certain that the Germans have been manufacturing chemical munitions for the past ten years. It would require a most powerful deterrent to have them face defeat without using this weapon. They know as well as we do that one-third

Held for WDD

CONFIDENTIAL

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of our casualties in World War I were caused by chemical warfare. Secret intelligence from all sources in the past few weeks has repeatedly stressed the imminence of its use by Germany, and it is the writer's opinion that, barring a total collapse of German resistance, it should be most seriously considered as an imminent possibility.

6. R & D has perfected a line of weapons in the CW field whereby it is felt that sabotage, so armed, increases its effectiveness many fold.

7. If CW appears, it is recommended that all R & D officers at once become a faculty for Schools & Training in these techniques, followed by the dispatch of all R & D personnel to the theaters except a very small skeleton crew in Washington.

Stanley P. Lovell
Director,
Research and Development

SPL:MAC

CONFIDENTIAL

STANDARD FORM NO. 64

10,693a Chemical Warfare

SECRET

Office Memorandum · UNITED STATES GOVERNMENT

TO : Acting Director, Mr. C. S. Cheston and Deputy Chief SI, Mr. R. C. Foster

DATE: 31 August 1944

FROM : Lt. Col. H. W. Dix HWD.

SUBJECT: Present Status of Possibility of German use of Chemical Warfare

With the many cables and disseminations indicating activity by the Germans in chemical warfare, the situation with our CWS and elsewhere has been canvassed, and the following are the conclusions as of today:

1. British do not believe Germans will use gas. One exception: sending it over to England by V-1 bombs. Probably mustard gas only, or a mixture with mustard gas predominating.

2. US G-2 believes that Germany will not use gas.

   a. No CWS apparatus captured in Italy or, so far, in France.

   b. Allied troops moving too fast.

   c. Allied troops are not condensed sufficiently to have gas materially effective.

3. Probable use of gas too late to be effective against large numbers within small area.

4. With Allied air superiority, gas cannot rapidly be transported and used in artillery shells as artillery positions would be bombed out quickly.

5. Any use of gas by artillery would only be a tactical advantage at various spots as open warfare does not lend itself to the use of gas.

6. Many of the disseminations indicate the distribution of gas masks, but it is believed that manufacturing and distributing a sufficient quantity is not possible, due to labor and material.

7. Germans undoubtedly will not wish to use mustard gas within their own boundaries due to its lingering effects and undesirableness.

- - - - - - - - - - -

Warning: The High Command in Germany does not follow any logic in its operations. Therefore, some, or all, of the conclusions above may be untenable.

c.c. to Mr. S. Lovell

SECRET

Chemical Warfare - 10 C93-
x German -
x Luce -
x Buckley
x Lovell

March 5, 1943

MEMORANDUM

From: Colonel Donovan

To: Doctor Mason

I doubt if your paper shows enough anxiety as to the possibility of action.

It is quite possible that bacteriological warfare might be started without our knowledge and without any tangible evidence that there had been any enemy action whatsoever. It could very well be that there could be a breakdown of our Allies' Public Health Service.

W.J.D.

SECRET

New Delhi, India

28 February 1944

TO: Lt. Col. Robert B. Hall

FROM: Capt. S. L. Sherman, CWS

SUBJECT: Shipment of HBH or smoke grenade to President of Chemical Warfare Board, Edgewood Arsenal, Maryland

1. This is the first frangible grenade that we have seen and we are very anxious that a complete analysis be made of same. Our laboratory companies do not have full facilities to analize -

(a) If we are permitted to ship this to the United States complete analysis of every detail will be reported on.

(b) The analysis will be conducted without chance of losing our only sample.

(c) Our Technical Division desires to copy this grenade in every detail for further experimentation and improvement for use by our troops if found advisable.

2. Radio advice will be sent regarding the chemical contents and danger, if any, of this grenade.

3. The complete report will be sent to Lt. Col. Hall by air mail when it is completed.

4. A copy of this memo will accompany delivery of the grenade by Chemical Warfare officer courier.

5. It is items like this that are very helpful to Chemical Warfare Intelligence.

SECRET

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

September 22, 1942

Chem Warfare
Gen 8500
x Chemical Warfare
x Col Richards
x Aerial Bombardment

MEMORANDUM

To: Colonel Donovan

From: Lt. Col. Richards

Subject: Procurement of up-to-date knowledge concerning Chemical Warfare

It would seem to be within the province of the O.S.S. to ascertain what experimentation has demonstrated concerning the use of toxic gas as a war weapon, when release of gas is accomplished by containers dropped from airplanes. Recent aerial bombardment with varying proportions of high explosive and incendiary bombs, and the comparative effectiveness of different proportions, leads one to query whether the concurrent release of gas during an aerial bombardment would not further enhance the potential damage to the enemy from a physical, as well as a psychological, standpoint.

Although recognizing that the use of toxic gas is considered outlawed, it would seemingly be wise to re-examine the matter since

1. It is presumed that our enemies would not hesitate to utilize such a medium if they were in an extremity, or they felt major gains could be accomplished thereby.

2. Despite the abhorrence with which the U. S. and the English regard the use of gas, on account of its non differentiation between armed forces and civilians, it is su[illegible] that

a two-ton bomb dropped at night over a city has a comparable lack of discrimination. Incendiary material shares to a like degree in this non-distinction of combatants.

3. There may be considerable tactical advantage in inaugurating the use of gas, particularly in certain specific geographical areas, such as the Far East. Instead of waiting for the enemy to pick the time when they feel it most advantageous to commence its use, should we not be in a position to have thoroughly analyzed the situation and evolved a complete program (both offensive and defensive), taking into account such elements as

(a) Psychological factors upon the enemy as well as our own civilian population.

(b) Protective factors for the enemy and our own populus involved in the rubber situation, rapid manufacture and distribution of gas mask facilities, accumulated stores of gas masks considered effective, production facilities of toxic gas, gas containers, and logistic factors of distribution, etc.

(c) Relationship of airplane-carrying capacity of toxic gas to zone area where such gas would be effective.

Doubtless the Air Corps has collaborated with Chemical Warfare Service in obtaining data upon the elements referred to above. Some segment of the O.S.S. should become acquainted with the situation and should also have available, experimental data on the effects achieved in combining the use of high explosives, incendiary, and toxic gas bombing.

June 4, 1942

Memorandum to The Joint Chiefs of Staff

From: William J. Donovan

I attach copy of a memorandum entitled "The New German Poison Gas" dated May 27, which has come to me from Colonel Hron of the Czechoslovakian Information Service.

June 4, 1942

Brigadier General William B. Smith
The Joint Chiefs of Staff
War Department
Washington, D. C.

Dear General Smith:

I am sending you the attached memorandum which has come to us from Colonel Hron, who is head of the Czechoslovakian Information Service in this country.

Sincerely,

William J. Donovan

MEMORAN

FROM: William J. Donovan

TO: Mr. David Wil

Here is a [illegible] that I received from Colonel Hron. Will you follow [illegible] up. You will note the source of the information and also the reference to General Anilino. The individual source should not be tested until we clear with the Czechs.

Poison gas - 6555
x German
x "Blau gas"
x Hron
x Czech Info. Service

ČESKOSLOVENSKÁ INFORMAČNÍ SLUŽBA
CZECHOSLOVAK INFORMATION SERVICE
Telephone: COlumbus 5-1914
1790 Broadway New York

No. 258/42

New York, May 26th 1942

Dear Sir:-

I beg to enclose a report about the new German poison gas.

Most sincerely yours,

Lt.Col.K.Hron

Hon. Colonel William J.Donovan,
Corordinator of Information,
Washington,D.C.

New York, May 27, 1942.

NEW GERMAN POISON GAS.

1] In the year of 1935-36 the Leuna Chemische Werke were to have manufactured a new type of poison gas, called "Nervon Gas" [Nerve Gas] or "Blau Gas" [Blue Gas]; the name "Blau Gas", however, is used more frequently, probably in the effort to keep the nature of the gas a secret. The name "Nervon Gas" is mostly used for internal purposes.

"Blau Gas" is completely differen from "Blau Kreuz" Gas used in the last war.

The gas was to have been manufactured as a by-product during the production of synthetic benzin, then liquified by a catalysator and mixed together with another chemical.

2] "Blau Gas" is to be a liquid, something similar to etheric oil, colorless and odorless and is kept in 60 kilo glass bombs. It was to have been tried out for the first time in the military camp of Hannover. Being sprayed it forms a fine mist, practically invisible, from faraway appearing as light blue, just as the air over the horizon; because of this it was to have been called "Blue Gas".

The gas causes an immediate paralysis of the nerves, lasting about two hours [as the effects of an anaesthetic]; sudden paleness ranging with a light blue comes over an effected person, his eyes bulge and the whole body remains

paralysed. After awakening such a person has a headache, vomits and for a long time thereafter his nerves remain slightly effected.

This gas is to be used in the summer months; best effects are obtained in the mornings up to 10 a.m. and in the afternoons after 8 p.m. During high temperatures [at noon], in winter or in damp weather the effects are very small.

The gas penetrates into the body not only by inhaling, but also through pores in the skin.

5] Normally impregnated masks and rubber suits are a very slight protection against this gas and after being subjected to several attacks with this gas offer no protection at all.

I. G. Farben is to be manufacturing as a protection against this gas a 40 percent emulsion of "methylakrylesther". More information on this subject probably could be obtained from the General Aniline Works, [General Aniline & Film Corp., 435 Madison St., New York City] and the Rohm & Haas Co., Inc., 222 W. Washington Square, Philadelphia, Pa.

This chemical is to be used for glueing metal to wood, also during the manufacture of airplane bodies replacing glue, as well as in the impregnation proce[illegible]

The Germans used to sell it to us in very small quantities and very expensively. A certain chemic by the name of Kalla discovered the method and we started to manufacture it ourselves in Czechoslovakia, however, it was too late [Munich].

4] The Source of Information.

Informant: Vojtech Weil, Jewish emmigrant in New York, chemical engineer, formerly a chemic with the firm of Bata, according to hearsay a first class expert. In the autumn of 1937 Weil was to have been in Leverkusen [near Kolin a/R, Germany] dealing with the German factory of the concern of I. G. Farben in regard to impregnation of rubber. There he made the acquaintance of the head of the department for the manufacture of accessories necessary in the rubber industry, by the name of Dr. Kuehne, who most probably was working on the manufacture of protective garments against this gas.

Dr. Kuehne once during a private conversation was to have disclosed the above mentioned information.

The informant was reminded of this incident by the present active interest in poison gases used by the Germans.

Lt. Col. K. H r o n

COORDINATOR OF INFORMATION

UNITED STATES GOVERNMENT

AMERICAN EMBASSY

LONDON

May 21, 1942.

MOST SECRET

Dear Colonel Donovan,

There are no substantial stocks for offensive purposes of poison gas in England. Stocks of all raw materials are now held in enormous quantity. Shadow factories are complete to the last detail, but are not at present in operation.

A period of eight weeks from the start of operations will be necessary before plants are running to full capacity. From then on little difficulty would be encountered in supplying in satisfactory quantity as present production facilities are greatly in excess of estimated requirements.

As I think you know I am in a position to be very well informed on this particular subject, so that you may take it that the information I am giving you is accurate.

From the stand point of offensive warfare the use of gas over a city would produce results hardly commensurate with the trouble involved in spraying it from specially equipped aeroplanes. This is not a military opinion but represents the point of view of the practical men who handle the stuff.

Sincerely yours,

Wallace B. Phillips

Colonel William J. Donovan,
Coordinator of Information,
[illegible]

Form of Revised

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The most often repeated among the stories about new weapons which have no definite sources is one about a fog or gas which is released to blanket the target area and is subsequently set afire, thus causing a tremendous fire. According to a report from Italy, the gas contained in German gas projectiles stored in that country is known as Sulpian* or occasionally as Grison by the German troops. This report may thus hinge on the above mentioned story as Grison is the familiar name for the gas which forms in coal mines and ignites on contact with flame or spark.

*Also received as VULPIAN

TOR: 9/13/44 [illegible]

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