

Image Cover Sheet

CLASSIFICATION

UNCLASSIFIED

SYSTEM NUMBER

136591



TITLE

COMPARISON OF THE RELATIVE VESICANCY OF HTV/CR, HTV/MM, AND HTV/CR/MM

System Number:

Patron Number:

Requester:

Notes:

DSIS Use only:

Deliver to:



#136591

Acct# 47-02707

DOCUMENT RECLASSIFICATION RECORD

Document TM 89 Title Comparison of the Relative Vesicancy of
HTV/CR, HTV/MM, and HTV/CR/MM.

Author(s) W. Somerville Date 3 Mar 45

Original Classification Secret

Limitation _____

Harvey Recommendation
Classification Unclassified

Limitation Unlimited Clause _____

Deletions _____

Reviewed by C. Laforce Date 7/5/97

Classification Unclassified

Limitation Unlimited

Official Warning Term _____

This Document may be released as is under ATI:

Deletions required

ATI _____ Clause _____

Other Requesters _____

I concur


Chairman/DRP

5/97
meeting

8/5/97
Date

ESS/TM 89 ^{ESS. Ref. BK.} Index
UNCLASSIFIED / UNLIMITED

X 3 Mar 45.

EXPERIMENTAL STATION

✓ SUFFIELD, ALBERTA

✓ TECHNICAL MINUTE NO. 89

DIRECTOR GENERAL
DEFENCE RESEARCH

NOV 14 1947

LIBRARY

COMPARISON OF THE RELATIVE VESICANCY OF HTV/CR, HTV/MM, AND

HTV/CR/MM.

S U M M A R Y

1. A trial has been carried out under temperate conditions, in which the relative vesicancy, through clothing of HTV/CR, HTV/CR/MM and HTV/MM was compared by applying 2 mm. drops (5.2 mg.) of each agent onto a strip of battle dress placed on each forearm of 10 observers. The strips of battle dress serge were left in contact with the skin for a period of four hours.

2. The lesions produced by the vesicant drops were measured at 24 hours, 48 hours and 72 hours. At 48 hours the total areas affected by individual drops had axial dimensions which ranged about a mean of about 3.3 x 3.0 cms.

3. A statistical analysis of the results showed that, whilst there was no significant difference between the area of vesication and erythema produced by HTV/CR/MM and HTV/MM; HTV/CR produced lesions which were on an average significantly greater (20 - 30 per cent) than those produced by the other two.

4. It was noted that this slight difference in effectiveness appeared to be related to the viscosities (4.65 p. for HTV/CR and 7.96 p. and 8.9 p. respectively for HTV/MM and HTV/CR/MM) of the materials under test.

(E.L. Davies)
Chief Superintendent,
Experimental Station.

WS/SB

Classification / Designation U/U
Changed to / Remplacée par _____
By / Autorité de C. Laforce
Date 24 Feb 98 Signature D. Kuseler
Appointment _____
Fonction _____

3rd MARCH 45

EXPERIMENTAL STATION
SUFFIELD, ALBERTA

TECHNICAL MINUTE NO. 89

COMPARISON OF THE RELATIVE VESICANCY OF
HTV/CR, HTV/MM, AND HTV/CR/MM.

INTRODUCTION

Reference: Local Trial No. 95.

1. The trial described in this report was designed to determine under laboratory conditions whether any difference in vesicant power existed between 2 mm drops (5.2 mg.) of HTV/CR, HTV/MM, and HTV/CR "monkey glanded" with MM, applied to non-impregnated clothing over the skin.

MATERIALS

2.

| | | |
|-------------------------|-------------------------|----------------------------|
| <u>HTV/CR</u> | <u>HTV/MM</u> | <u>HTV/CR/MM (0.3% MM)</u> |
| Density: 1.30 at 10°C | Density: 1.26 at 10°C | Density 1.30 at 10°C |
| Viscosity: 4.65 at 25°C | Viscosity: 7.96 at 25°C | Viscosity 8.9 at 25°C |

PROCEDURE

3. Ten observers were used.

4. On the front (volar surface) of each forearm a strip of battle dress, 6 in. x 2 in., was fixed so that it was held securely and did not slip with a change of position of the arm.

5. On each forearm a single 2 mm drop (5.2 mg.) of each of the following types of thickened agent was applied to the strip of battle dress;

- (a) HTV/CR/MM
- (b) HTV/MM
- (c) HTV/CR

6. To exclude the possibility of variations in reaction resulting from differences in sensitivity of the skin near the elbow and near the wrist, on the right forearm the order of application was from above downward:

- (a)
- (b)
- (c)

On the left forearm the order was

- (c)
- (b)
- (a)

7. The strip of battle dress was removed after four hours.
8. The agent was applied by means of a throttled pipette in a laboratory, the air temperature of which was 68°F. The four hour wearing period was spent in the sameroom.
9. The lesions were measured and noted at 24, 48, and 72 hours after application of the agent. Photographs of the lesions were taken at 24 hours.

RESULTS

10. From a normal visual inspection all the lesions appeared to be of the same type, a slightly oval area of vesication surrounded by a ring of erythema, and of about the same degree of severity. The results of the measurements of the dimensions of the lesions are given in tabular form in Appendix I.

DISCUSSION

11. When the tabulated results were examined it was noted that the mean areas of vesication and the erythema produced by the three vesicants differed somewhat and that these differences were in the reverse order to differences in viscosity. For example at 48 hours the mean areas of erythema for HTV/CR, HTV/MM, and HTV/CR/MM were 8.9 sq.cm., 7.7 sq.cm. and 6.9 sq.cm, respectively. A statistical analysis (Appendix II) was made, therefore, to determine whether there were, in fact any significant differences between the lesions produced by the three vesicants.

12. The analysis confirmed that the differences noted with HTV/CR were significant and suggested that this material produced lesions on the average 20-30 per cent larger than did either HTV/CR/MM or HTV/MM. It did not indicate any significant difference between the two latter materials.

13. The trial has indicated that the penetration of a droplet through clothing is possibly affected by viscosity. It is not possible to say to what extent this effect will be accentuated or diminished when other drop sizes are employed, when the clothing is different in amount and type and when the air temperature is markedly higher.

CONCLUSIONS

14. It has been shown that, when applied through one thickness of battle dress serge in 2 mm (5.2 mg) drops and allowed to remain for 4 hours with air temperature of 68°F, HTV/CR is more effective than either HTV/CR/MM or HTV/MM applied in a similar manner, and that the difference is possibly related to viscosity.

15. Although HTV/CR, under the conditions of this trial produced lesions that were 20 per cent to 30 per cent larger than those produced by the other two vesicants, it seems doubtful if this difference would be of practical significance particularly in view of the fact that the increased resistance to shatter of the higher viscosity materials would, in practice result in the distribution of more of the charging in the larger and more effective drop sizes.

This report was written by Lt-Col. ^XW. Somerville. The statistical analysis was made by Dr. B.A. Griffith.

APPENDIX I

Measurements of the Lesions Produced by HTV/CR, HTV/CR/MM,
and HTV/MM (2 mm or 5.2 mg.) Applied through a Single Layer
of Clothing on the Forearm.

Dimensions of Lesions 24, 48, and 72 hours after application of the agents.

NOTE: i. All measurements are in Centimeters.

ii. The lesions were in all cases roughly circular in outline. The two measurements given for each area of erythema or vesication represent the length of the two main axes of the lesions.

APPENDIX I

Observer No. 1809

RIGHT ARM

| Agent | | 24 hrs | 48 hrs. | 72 hrs. |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 2.7 x 2.0 | 4.4 x 2.9 | 3.3 x 4.0 |
| | V | 2.0 x 1.7 | 2.2 x 1.5 | 1.9 x 2.5 |
| HTV/MM | E | 2.5 x 2.0 | 4.2 x 3.0 | 2.8 x 4.0 |
| | V | 2.0 x 1.5 | 2.1 x 1.7 | 1.7 x 2.2 |
| HTV/CR | E | 3.0 x 2.5 | 3.7 x 3.3 | 2.9 x 3.5 |
| | V | 2.1 x 2.0 | 2.3 x 2.0 | 2.1 x 2.5 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 3.1 x 2.9 | 4.5 x 3.5 | 3.5 x 4.4 |
| | V | 2.3 x 1.9 | 2.6 x 2.1 | 2.2 x 3.1 |
| HTV/MM | E | 2.2 x 2.1 | 3.6 x 3.7 | 2.7 x 3.8 |
| | V | 1.7 x 1.5 | 2.0 x 1.7 | 1.6 x 2.2 |
| HTV/CR/MM | E | 2.2 x 2.2 | 3.7 x 3.2 | 3.1 x 3.2 |
| | V | 1.9 x 1.8 | 2.0 x 1.8 | 1.7 x 1.9 |

Observer No. 1811

RIGHT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 2.5 x 2.0 | 3.2 x 2.2 | 2.8 x 3.7 |
| | V | 1.7 x 1.4 | 1.7 x 1.4 | 1.4 x 1.7 |
| HTV/MM | E | 3.8 x 2.9 | 3.9 x 2.9 | 3.2 x 4.5 |
| | V | 2.0 x 1.7 | 2.6 x 1.9 | 2.1 x 3.0 |
| HTV/CR | E | 3.5 x 2.5 | 3.9 x 3.0 | 3.5 x 5.0 |
| | V | 2.3 x 1.5 | 2.5 x 1.9 | 2.1 x 3.1 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 3.2 x 2.3 | 3.1 x 2.4 | 3.8 x 2.3 |
| | V | 1.7 x 1.3 | 2.2 x 2.2 | 1.6 x 2.0 |
| HTV/MM | E | 3.5 x 2.5 | 3.1 x 2.5 | 2.5 x 4.0 |
| | V | 1.6 x 1.6 | 2.2 x 1.7 | 1.9 x 2.5 |
| HTV/CR/MM | E | 3.2 x 2.9 | 2.7 x 2.7 | 3.0 x 3.0 |
| | V | 1.5 x 1.6 | 1.9 x 1.9 | 2.0 x 2.2 |

Observer No. 1819RIGHT ARM

| Agent | | 24 hrs | 48 hrs | 72 hrs |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 3.9 x 3.0 | 3.6 x 2.4 | 2.6 x 3.8 |
| | V | 1.4 x 1.4 | 1.8 x 1.7 | Broken |
| HTV/MM | E | 3.9 x 2.4 | 4.1 x 2.5 | 4.1 x 2.3 |
| | V | 1.5 x 1.5 | 2.0 x 1.5 | 2.2 x 1.5 |
| HTV/CR | E | 3.7 x 2.4 | 4.0 x 2.5 | 4.0 x 2.9 |
| | V | 1.7 x 1.7 | 2.1 x 1.8 | 1.9 x 2.3 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 3.5 x 2.5 | 3.8 x 2.7 | 4.0 x 2.4 |
| | V | 1.8 x 1.6 | 2.2 x 1.5 | Broken |
| HTV/MM | E | 3.0 x 2.9 | 2.5 x 3.0 | 3.1 x 2.5 |
| | V | 1.6 x 1.5 | 1.9 x 1.6 | 2.0 x 1.7 |
| HTV/CR/MM | E | 2.5 x 2.5 | 3.0 x 2.7 | 3.2 x 2.7 |
| | V | 1.5 x 1.6 | 1.9 x 1.8 | 2.0 x 2.0 |

Observer No. 1827RIGHT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 2.1 x 2.0 | 3.0 x 2.6 | 2.8 x 3.0 |
| | V | 1.5 x 1.2 | 1.9 x 1.7 | 1.9 x 1.9 |
| HTV/MM | E | 2.5 x 2.3 | 3.2 x 2.7 | 2.8 x 3.3 |
| | V | 1.6 x 1.6 | 1.9 x 1.9 | 1.9 x 2.2 |
| HTV/CR | E | 3.0 x 1.6 | 2.9 x 2.0 | 3.1 x 3.6 |
| | V | 2.1 x 1.8 | 2.1 x 2.3 | 2.1 x 2.4 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 3.6 x 2.4 | 3.5 x 2.6 | 3.2 x 4.0 |
| | V | 2.2 x 1.7 | 2.5 x 2.0 | 2.2 x 2.6 |
| HTV/MM | E | 2.9 x 2.5 | 2.8 x 2.6 | 2.5 x 3.3 |
| | V | 1.7 x 1.6 | 2.1 x 2.0 | 1.9 x 2.3 |
| HTV/CR/MM | E | 2.7 x 2.7 | 2.9 x 3.1 | 3.1 x 3.1 |
| | V | 1.8 x 1.9 | 2.3 x 2.3 | 2.4 x 2.2 |

Observer No. 1831

RIGHT ARM

| <u>Agent</u> | | <u>24 hrs</u> | <u>48 hrs</u> | <u>72 hrs</u> |
|--------------|---|---------------|---------------|---------------|
| HTV/CR/MM | E | 4.5 x 3.5 | 5.2 x 3.2 | 5.1 x 4.3 |
| | V | 2.9 x 2.0 | 3.4 x 2.1 | 3.5 x 2.5 |
| HTV/MM | E | 4.3 x 3.4 | 4.8 x 2.7 | 3.5 x 4.5 |
| | V | 2.6 x 2.0 | 3.2 x 2.0 | 2.3 x 3.2 |
| HTV/CR | E | 4.9 x 4.5 | 4.3 x 4.6 | 4.3 x 5.5 |
| | V | 3.0 x 2.4 | 3.9 x 3.0 | 2.7 x 3.9 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 4.5 x 4.0 | 5.2 x 3.0 | 3.9 x 5.4 |
| | V | 3.1 x 1.8 | 4.1 x 2.4 | 2.6 x 4.4 |
| HTV/MM | E | 4.1 x 3.2 | 4.0 x 3.0 | 3.4 x 4.2 |
| | V | 2.4 x 2.0 | 3.2 x 2.4 | 2.5 x 3.3 |
| HTV/CR/MM | E | 3.5 x 3.0 | 3.4 x 3.0 | 3.3 x 4.2 |
| | V | 2.0 x 1.9 | 2.6 x 2.5 | 2.6 x 3.0 |

Observer No. 1833

RIGHT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 2.1 x 2.0 | 2.0 x 1.9 | 2.0 x 2.0 |
| | V | 0.7 x 0.6 | 0.8 x 0.8 | 1.0 x 1.0 |
| HTV/MM | E | 3.4 x 3.5 | 3.4 x 3.0 | 3.4 x 3.0 |
| | V | 1.4 x 1.5 | 1.6 x 1.8 | 2.0 x 1.8 |
| HTV/CR | E | 3.5 x 3.2 | 4.1 x 3.5 | 4.0 x 3.9 |
| | V | 1.9 x 2.0 | 2.0 x 2.0 | 2.3 x 2.1 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 4.0 x 3.8 | 3.5 x 3.1 | 3.0 x 3.0 |
| | V | 1.7 x 1.5 | 2.1 x 1.8 | 2.2 x 1.9 |
| HTV/MM | E | 3.3 x 2.9 | 2.5 x 2.6 | 2.4 x 2.2 |
| | V | 1.2 x 1.3 | 1.5 x 1.2 | 1.5 x 1.3 |
| HTV/CR/MM | E | 2.3 x 2.5 | 2.5 x 2.1 | 2.5 x 2.5 |

Observer No. 1836RIGHT ARM

| Agent | | 24 hrs | 48 hrs | 72 hrs |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 2.2 x 1.6 | 3.0 x 2.2 | 3.2 x 2.6 |
| | V | 1.5 x 1.1 | 1.6 x 1.3 | 2.0 x 1.5 |
| HTV/MM | E | 2.0 x 1.6 | 3.2 x 2.2 | 3.2 x 2.6 |
| | V | 1.5 x 1.4 | 1.7 x 1.0 | 1.9 x 1.8 |
| HTV/CR | E | 2.1 x 2.1 | 2.7 x 2.5 | 2.8 x 3.0 |
| | V | 1.6 x 1.5 | 1.7 x 1.8 | 1.9 x 1.9 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 2.5 x 2.1 | 3.5 x 2.4 | 3.5 x 2.6 |
| | V | 1.6 x 1.3 | 1.7 x 1.4 | 1.8 x 1.4 |
| HTV/MM | E | 2.5 x 2.1 | 3.3 x 2.3 | 3.2 x 3.0 |
| | V | 1.5 x 1.4 | 1.7 x 1.5 | 2.0 x 1.9 |
| HTV/CR/MM | E | 2.5 x 2.3 | 3.7 x 2.4 | 3.4 x 2.8 |
| | V | 2.0 x 1.5 | 2.2 x 1.6 | 2.5 x 2.0 |

Observer No. 1838RIGHT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 3.0 x 2.5 | 3.1 x 2.6 | 2.8 x 3.2 |
| | V | 1.7 x 1.4 | 1.9 x 1.6 | 1.5 x 1.8 |
| HTV/MM | E | 3.0 x 2.4 | 3.1 x 2.5 | 2.6 x 2.5 |
| | V | 1.5 x 1.4 | 2.0 x 1.6 | 1.6 x 2.0 |
| HTV/CR | E | 3.5 x 2.5 | 3.6 x 3.0 | 3.1 x 4.0 |
| | V | 1.7 x 1.9 | 2.2 x 1.9 | 2.2 x 2.5 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 3.0 x 3.0 | 3.1 x 2.8 | 3.0 x 3.0 |
| | V | 1.7 x 1.6 | 1.9 x 1.7 | 1.9 x 2.0 |
| HTV/MM | E | 3.0 x 2.5 | 3.2 x 2.5 | 2.5 x 3.0 |
| | V | 1.9 x 1.8 | 2.1 x 1.7 | 2.2 x 1.9 |
| HTV/CR/MM | E | 2.5 x 2.5 | 2.8 x 2.7 | 3.0 x 3.0 |
| | V | 1.6 x 1.6 | 2.2 x 1.7 | 2.1 x 2.0 |

Observer No. 1839RIGHT ARM

| Agent | | 24 hrs | 48 hrs | 72 hrs |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 4.2 x 3.0 | 4.8 x 3.1 | 5.0 x 3.5 |
| | V | 2.5 x 2.0 | 2.7 x 2.3 | 2.9 x 2.5 |
| HTV/MM | E | 3.6 x 2.6 | 4.7 x 3.1 | 4.5 x 3.0 |
| | V | 2.4 x 1.8 | 2.7 x 2.0 | 3.2 x 2.5 |
| HTV/CR | E | 3.9 x 3.1 | 4.9 x 3.4 | 3.6 x 3.2 |
| | V | 2.5 x 2.3 | 2.6 x 2.1 | 2.8 x 2.3 |

LEFT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR | E | 4.1 x 3.6 | 4.3 x 3.7 | 4.5 x 3.8 |
| | V | 2.6 x 2.0 | 2.6 x 2.2 | 2.8 x 2.2 |
| HTV/MM | E | 3.0 x 2.5 | 4.0 x 3.0 | 4.0 x 3.0 |
| | V | 1.9 x 1.8 | 2.2 x 1.9 | 2.8 x 2.3 |
| HTV/CR/MM | E | 3.0 x 2.5 | 3.5 x 3.0 | 3.5 x 3.0 |
| | V | 1.8 x 1.6 | 2.3 x 2.0 | 2.8 x 2.5 |

Observer No. 1849RIGHT ARM

| | | | | |
|-----------|---|-----------|-----------|-----------|
| HTV/CR/MM | E | 2.9 x 2.0 | 3.6 x 2.6 | 3.5 x 3.0 |
| | V | 1.6 x 1.5 | 1.7 x 1.5 | 1.9 x 1.6 |
| HTV/MM | E | 2.5 x 1.9 | 3.1 x 2.6 | 3.1 x 2.5 |
| | V | 1.5 x 1.3 | 1.6 x 1.8 | 1.8 x 1.6 |
| HTV/CR | E | 3.0 x 2.8 | 3.9 x 2.8 | 3.5 x 3.2 |
| | V | 2.0 x 1.9 | 2.2 x 1.8 | 2.5 x 2.0 |

LEFT ARM

| | | | | |
|----------|---|-----------|-----------|-----------|
| HTV/CR | E | 2.7 x 2.3 | 2.5 x 2.8 | 3.9 x 3.4 |
| | V | 1.6 x 1.4 | 1.7 x 1.5 | 1.9 x 1.7 |
| HTV/MM | E | 3.2 x 2.5 | 4.2 x 2.9 | 4.6 x 3.2 |
| | V | 2.1 x 1.9 | 2.5 x 2.0 | 2.5 x 2.3 |
| HTV/CR/M | E | 3.0 x 2.5 | 3.0 x 2.6 | 3.5 x 3.4 |
| | V | 1.6 x 1.6 | 2.0 x 1.7 | 2.0 x 1.9 |

APPENDIX II

Statistical Analysis of Data on the Relative Effectiveness of HTV/CR, HTV/MM, and HTV/CR/MM Applied Through Clothing.

1. The data consisted of areas of erythema and vesication produced by drops of equal size applied to clothing fixed to the right or left forearm of human observers. These areas were measured at three observation times - 24, 48 and 72 hours after application of the vesicant drops.
2. The first step in the analysis dealt with the possibility that equal drops of the same vesicant material would produce effects of different magnitudes when applied to clothing near the elbow of one arm or the wrist of the other arm. For each of the ten observers treated, results are available for drops of one of the vesicants (HTV/CR/MM) applied near the elbow of the left arm and near the wrist of the right arm. Similar results are also available for a second vesicant (HTV/CR). The third vesicant, HTV/MM, was applied on each forearm intermediate between the other two. The area of vesication on the right arm (due to HTV/CR/MM) at one time of observation (24 hrs.) was subtracted from that on the left arm (due to HTV/CR/MM) of the same observer and a set of ten differences (one for each of the ten observers) was obtained. By considering other times of observation, the other two vesicants and areas of erythema as well as vesication, a total of 18 sets of such differences was obtained. Student's *t* test was applied to determine if the mean difference (for each set) was significantly different from zero. It was found that, of the 18 mean differences obtained, only one differed from zero by an amount which could be considered possibly significant. These results provide definite evidence that drops of equal size and of the same vesicant material produce, when applied through clothing on the same man, effects which are essentially independent of the position of the drop on the forearm and independent of the arm (right or left) to which they are applied.
3. From the results established by the argument of para. 2 it is clear that all drops of one vesicant material applied to a single observer can be treated on an equal basis. Accordingly areas of vesication or erythema on each observer furnish four comparisons of any two vesicants (A and B) at any one time. Areas of vesication (and erythema) at any one time and on any one observer were differenced in all possible ways (4) for each observer and the differences analysed to determine if their mean was significantly different from zero. In all, 9 comparisons (3 for each of HTV/CR/MM vs. HTV/MM, HTV/MM vs. HTV/CR and HTV/CR vs. HTV/CR/MM) were possible for areas of vesication and a similar 9 comparisons for areas of erythema. It was found that the mean differences for HTV/CR/MM and HTV/MM were not significantly different from zero, although one of these six mean differences was possibly significant - in this case, the observed mean difference (in areas of erythema at 48 hrs.) could be expected to occur, due to chance alone, in only about one trial out of 40. On the other hand, the mean differences in areas of vesication (and erythema) produced by HTV/CR and HTV/CR/MM or HTV/MM were all found to be significantly different from zero - in most cases the differences were highly significant. In all cases the drops of HTV/CR produced, on the average, greater areas of vesication (or erythema) than did drops of HTV/CR/MM or HTV/MM. This result is interesting in view of the fact that the viscosity of the HTV/CR was only slightly more than half that of the HTV/CR/MM and the viscosities of the HTV/MM and HTV/CR/MM were not greatly different from each other. It would appear that the material of lower viscosity penetrated the cloth more readily. However, the observed mean differences in areas of vesication (or erythema), due to HTV/CR and HTV/CR/MM or HTV/MM amounted to at most 20 to 30 per cent of the mean area of vesication (or erythema) produced by either HTV/CR/MM or HTV/MM.
4. It is concluded that there is no significant difference in areas of vesication (or erythema) produced through clothing on the human forearm by drops of equal size of samples of HTV/CR/MM and HTV/MM having approximately the same viscosity. The areas of vesication (or erythema) produced through clothing on the human forearm by drops of HTV/CR are significantly greater (20 to 30 per cent) than those produced by drops of the same size of HTV/CR/MM or HTV/MM, when the viscosity of the HTV/CR is approximately half that of the other chargings.

AK

DIRECTORATE OF
SCIENTIFIC INFORMATION
SERVICES
DEFENCE RESEARCH BOARD
ROOM 4744, "A" BUILDING
OTTAWA 4, ONT., CANADA

Date: **OCT 15 1963**

From: _____

Copy No. 1 of 1

Acc. No. H7/2707

ABSTRACTED BY
S. K. D.
OCT 25 1963

#136591