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Pilot Production of Point Detonating Fuze Mk 78 Mod 0 for 20mm Ammunition

PART A

SYNOPSIS

1. This test was conducted to determine the functioning performance and sensitivity of a pilot lot of Mk 78 Mod 0 point detonating fuzes at various conditions and to determine the distance from the muzzle where the fuze is armed.

2. It is concluded from the results reported herein that the subject point detonating Mk 78 Mod 0 fuze as assembled in the T39E3 tetryl loaded 20mm projectile:

a. Gave a functioning performance not appreciably different from that previously exhibited by the experimental model XP-50A fuze.

b. Functioned satisfactorily with striking velocities from 1650 to 3300 ft/sec against 07020 24S-T4 aluminum alloy at obliquities of 0°, 30°, 60°, 70° and 80° and also against all other heavier targets employed at obliquities up to and including 60°.

c. Functioned unreliably at striking velocities from 1650 to 3300 ft/sec against targets of 07125 24S-T4 aluminum alloy and 07125 mild steel at obliquities of 70° and 80°.

d. Showed no fuze action against 07020 blotter paper at 0° obliquity or when fired through a heavy rain.

e. Detonated instantaneously (without delay) when fuze action occurred.

f. Was not armed at 2 feet from the gun muzzle but was fully armed at 3 feet, as fired with a muzzle velocity of 3300 ft/sec from a 1/25 caliber twist barrel.

g. Gave no bore or flight premature detonations when fired as single rounds from an accuracy type barrel, although one (1) fuze broke loose from the projectile in the gun barrel.

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Pilot Production of Point Detonating Fuze
Mk 78 Mod 0 for 20mm Ammunition

TABLE OF CONTENTS

	Page
SYNOPSIS	1
TABLE OF CONTENTS	2
AUTHORITY	3
REFERENCES	3
BACKGROUND	3
OBJECT OF TEST	3
PERIOD OF TEST	4
REPRESENTATIVES PRESENT	4
DESCRIPTION OF ITEM UNDER TEST	4
DESCRIPTION OF TEST EQUIPMENT	5
PROCEDURE	5
RESULTS AND DISCUSSION	6
CONCLUSIONS	9
APPENDIX A - EXPLANATION OF SYMBOLS USED IN TEST	1 (Only)
FIRING RECORDS	TABLE I 1-3 (Incl) TABLE II 1-2 (Incl) TABLE III 1-19 (Incl)
APPENDIX B - NPG PHOTOGRAPHS	FIGURES 1-12 (Incl)
APPENDIX C - DISTRIBUTION	1-2 (Incl)

Pilot Production of Point Detonating Fuze
Mk 78 Mod 0 for 20mm Ammunition

PART B

INTRODUCTION

1. AUTHORITY:

The subject test was conducted under reference (a), Task Assignment NPG-Re2b-327-1-52, as authorized by and in accordance with references (b) and (c).

2. REFERENCES:

a. BUORD ltr Re2b DBL:bjn NP9 Ser 33945 of 4 August 1951 to NAVPROV
b. NOL NTX 19452 of 4 September 1951 to NAVPROV
c. NOL ltr TF:DEL:mew NP/NOL/X1-1(1151) Ser 4151 of 17 September 1951 to NAVPROV
d. NPG Report No. 782 of 19 May 195'

3. BACKGROUND:

The point detonating fuze as tested herein was designated the Mk 78 Mod 0 fuze in May 1951. Prior to that time this fuze was under development by the Naval Ordnance Laboratory and was known as the P.D. Fuze XP-50A. Reference (d) reported the results of functioning tests on the experimental model. Several minor changes were incorporated in going from the experimental model to the production model. In view of these changes and the need for additional test information a lot of 1000 Mk 78-0 fuzes as manufactured by Meridian Incorporated was received at the Naval Ordnance Laboratory for assembly and tests. This report covers functioning tests of these fuzes as requested by paragraphs 4 (a), 4 (b), and 4 (c)(11) of reference (c). Pilot production as listed in the title of this report might be misleading. This is clarified when it is known that the fuzes as tested herein are not the first lot from a given production line but rather the first fuzes Mk 78 Mod 0 which were manufactured by Meridian and assembled with explosive components by Naval Ordnance Laboratory.

4. OBJECT OF TEST:

This test was conducted to determine the functioning performance and sensitivity of the subject Mk 78 Mod 0 fuze at various conditions and to determine the distance from the muzzle where the fuze is armed.

Pilot Production of Point Detonating Fuze
Mk 78 Mod 0 for 20mm Ammunition

5. PERIOD OF TEST:

a.	Date of Authorising letter	4 September 1951
b.	Dates Material Received	4 September to 26 November 1951
c.	Date Commenced Test	4 September 1951
d.	Date Test Completed	18 December 1951

6. REPRESENTATIVES PRESENT:

One or more of the following representatives witnessed all ballistic tests reported herein with the exception of ten (10) rounds fired through rain on 8 and 18 December 1951.

Mr. D. E. Lord	Naval Ordnance Laboratory
Mr. C. A. Browning	Naval Ordnance Laboratory
Mr. R. A. Buck	Naval Ordnance Laboratory
Mr. E. L. Morgan	Naval Ordnance Laboratory
Mr. M. Taslitt	Naval Ordnance Laboratory

PART C

DETAILS OF TEST

7. DESCRIPTION OF ITEM UNDER TEST:

The point detonating fuze Mk 78 Mod 0 as tested herein is described in detail in Bureau of Ordnance drawings 959705 through 959723, 959733, 883614, 883615, and 883616. It is a disc-rotor fuze, armed by set back and spin with a direct action firing pin restrained by a shear element. Some fuzes were provided with shear wires of gauge 07031, rather than the intended service type of 07051 gauge, to permit arming when fired at velocities lower than service.

8. DESCRIPTION OF TEST EQUIPMENT:

a. Projectiles:

20mm T39E3, Tetryl loaded, Lots P. A. 4678 and P. A. 5992

b. Guns, Cases, Powder:

60/20 Accuracy Barrel No. 426, 60" length, 1/25 twist, with T20 case and IMR 4903 powder.

c. Targets:

(1) Blotter paper, Chipboard (0V140-.5 lbs/ft^2), Beaverboard (0V190-.58 lbs/ft^2).

(2) Aluminum Alloy, 24S-T4 clad in thickness of 0V012.

(3) Aluminum, 3S-H14 in thickness of 0V020.

(4) Aluminum Alloy, 24S-T4 in thicknesses of 0V020, 0V032, 0V125 and 0V500.

(5) Cold rolled strip steel in thickness of 0V125 in dead soft temper at Rockwell B hardness 45±7.

d. A 160' range with armor plate butt, target mounting jig and velocity measuring equipment.

9. PROCEDURE:

a. Functioning and Sensitivity Tests.

With the concurrence of the representatives present, 20mm T39E3 tetryl loaded projectiles with Mk 78 Mod 0 fuzes were fired with propellant charges determined to give three different velocities comprising service velocity for the gun used, minimum velocity obtainable which would consistently break the 0V051 gauge shear wire, and minimum velocity obtainable which would consistently break the 0V031 gauge shear wire. The service charges gave striking velocities of 3250 ± 50 ft/sec at 160' from the particular gun employed. The minimum striking velocities at 160' were 2650 ± 50 ft/sec for fuzes with 0V051 gauge shear wires and 1750 ± 100 ft/sec for fuzes with 0V031 gauge shear wires. Rounds were fired against targets as given in paragraph 8c set at various obliquities. In addition ten (10) rounds were fired through rain or simulated rain with service velocity. Detailed conditions of test are given in Appendix (A).

b. Arming Distance Tests.

Rounds comprising the T39E3 tetryl loaded projectile and the Mk 78 Mod 0 fuze (0W051 shear-wire) were fired with service propellant charges against 0W032 24S-T4 aluminum alloy placed 2 feet and 3 feet respectively from the gun muzzle. The details of test are given in Appendix (A).

10. RESULTS AND DISCUSSION:

a. Results for all tests are given in detail in Appendix (A) and photographs of typical impacts are contained in Appendix (B).

b. Functioning and Sensitivity Tests.

(1) The results obtained using the Mk 78 Mod 0 fuze and the T39E3 tetryl loaded projectile are summarized below:

Target	Striking Velocity	Obliquity 0° Rds. Fired	0° % HO	30° Rds. Fired	30° % HO	60° Rds. Fired	60° % HO	70° Rds. Fired	70° % HO	80° Rds. Fired	80° % HO
Rain and Simulated Rain	3200-3300	10*	0								
0#020 Blotter Paper	3200-3300	10*	0								
0#020 3S-H14 Aluminum	3200-3300	10	40								
0#140 Chipboard	3200-3300	10	100								
0#012 24S-T4 Al. Alloy (Clad)	3200-3300	5	100								
0#020 24S-T4 Al. Alloy	3200-3300	10	100	5	100	10	100	10	100	10	100
0#032 24S-T4 Al. Alloy 2" from muzzle	3200-3300	10	0								
0#032 24S-T4 Al. Alloy 3" from muzzle	3200-3300	5	100								
0#125 24S-T4 Al. Alloy	3200-3300	10	100	5	100	10	100	15	80	10	30
0#125 Mild Steel	3200-3300	10	100	5	100	10	90	15	53	10	30
0#012 24S-T4 Al. Alloy (Clad)	2600-2700	5	100								
0#020 24S-T4 Al. Alloy	2600-2700	5	100							8	100
0#125 24S-T4 Al. Alloy	2600-2700	10	100							4	0
0#125 Mild Steel	2600-2700	5	100								
0#012 24S-T4 Al. Alloy (Clad)	1640-1830	5	100								
0#140 Chipboard	1640-1830	5	100								
0#020 24S-T4 Al. Alloy	1640-1830	10	100	5	100	10	100	10	100	10	100
0#125 24S-T4 Al. Alloy	1640-1830	10	100	5	100	10	80	12	8	10	0
0#125 Mild Steel	1640-1830	10	100	5	100	10	80	10	70	10	0
0#500 24S-T4 Al. Alloy	1640-1830							1	100		

* Obtained concurrently with other targets by having projectile pass through this medium first.

Notes:

1. All functioning was instantaneous (without any noticeable delay).
2. Forty-five (45) rounds as fired on 6 September 1951 and twenty-six (26) rounds as fired on 27 September 1951 are not included above.
3. An additional eleven (11) rounds fired were not included in the above table. Five (5) were disregarded because they missed the target and six (6) were disregarded because of possibility that shear wire did not break as fired at velocities of 2600-2700 ft/sec.
4. Typical impacts as obtained at the various conditions listed above are shown in photographs Figures 1-12 (Incl).

Pilot Production of Point Detonating Fuze
Mk 78 Mod 0 for 20mm Ammunition

(2) As may be noted in Table I the functioning performance of the subject Mk 78-0 fuze against all targets (with the exception of rain, blotter paper, 0"020-3S-H14 aluminum, and targets 2" from gun muzzle) at striking velocities of 2600 to 3300 ft/sec was 100% at 0° and 30° obliquity and 97% at 60° obliquity. The fuze functioned 100% at 70° and 80° obliquity against a thin target, 0"020 24S-T4 aluminum alloy. The performance against heavier targets of 0"125 24S-T4 aluminum alloy and 0"125 mild steel, was 67% at 70° obliquity and 25% at 80° obliquity.

(3) At low striking velocities (1750 ± 100 ft/sec) the functioning performance was 100% against all targets at 0° and 30° obliquity. At 60°, 70°, and 80° obliquity the fuze functioned 100% against a thin target, 0"020 24S-T4 aluminum alloy, but against targets of 0"125 24S-T4 aluminum alloy and heavier functioned 80% at 60° obliquity, 30% at 70° obliquity, and 0% at 80° obliquity.

(4) Table I shows that the minimum limit thickness of 24S-T4 aluminum alloy on which the subject Mk 78-0 fuze would detonate consistently was less than 0"020 for obliquities up to and including 80° at striking velocities from 1650 to 3300 ft/sec. The minimum sensitivity limit thickness at 0° obliquity for striking velocities of 3250 ± 50 ft/sec of soft pure aluminum is considered greater than 0"020 since only 40% functioning occurred on 0"020 3S-H14 aluminum, and the minimum sensitivity limit of paper can be set between 0"020 blotter paper (where no fuze action was obtained) and 0"140 chipboard (where 100% functioning occurred).

(5) The maximum thickness of 24S-T4 which would permit reliable fuze action at 70° and 80° obliquity appeared to be between 0"020 (where 100% functioned) and 0"125 (where unreliable functioning was obtained).

(6) Although Appendix (A) lists results of firings of 45 rounds on 6 September 1951 and 26 rounds on 27 September 1951 these results are not contained in summary, Table I, in view of the fact that these rounds contained fuzes with slightly different design features primarily involving the detonator. As a matter of interest the fuzes tested on 27 September 1951 performed very poorly. These fuzes were reported to have detonators that were loaded by pressing to stops rather than loaded by pressing to a given line pressure such as employed on other detonators used in fuzes tested herein.

c. Arming Distance Test.

The results of arming distance tests are also summarized in Table I. The ten (10) rounds fired against an 0V032 24S-T4 target 2 feet from the gun muzzle exhibited no fuze action whereas the five (5) rounds fired against an 0V032 24S-T4 target 3 feet from the muzzle detonated on the target.

PART D

CONCLUSIONS

11. It is concluded from the results reported herein that the subject point detonating Mk 78 Mod 0 fuze as assembled in the T39E3 tetryl loaded projectile:

a. Gave a functioning performance not appreciably different from that previously exhibited by the experimental model XP-50A fuze.

b. Functioned satisfactorily with striking velocities from 1650 to 3300 ft/sec against 0V020 24S-T4 aluminum alloy at obliquities of 0°, 30°, 60°, 70° and 80° and also against all other heavier targets employed at obliquities up to and including 60°.

c. Functioned unreliably at striking velocities from 1650 to 3300 ft/sec against targets of 0V125 24S-T4 aluminum alloy and 0V125 mild steel at obliquities of 70° and 80°.

d. Showed no fuze action against 0V020 blotter paper at 0° obliquity or when fired through a heavy rain.

e. Detonated instantaneously without delay when fuze action occurred.

f. Was not armed at 2 feet from the gun muzzle but was fully armed at 3 feet, as fired with a muzzle velocity of 3300 ft/sec from a 1/25 caliber twist barrel.

g. Gave no bore or flight premature detonations when fired as single rounds from an accuracy type barrel, although one (1) fuze broke loose from the projectile in the gun barrel.

Pilot Production of Point Detonating Fuze
Mk 78 Mod 0 for 20mm Ammunition

The tests upon which this report is based were conducted by:

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NPG REPORT NO. 951

U. S. NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

Second Partial Report

on

High Performance Aircraft Machine Gun Fuzes

- -

First Partial Report

on

Pilot Production of Point Detonating Fuze

Mk 78 Mod 0 for 20mm Ammunition

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SECURITY INFORMATION

Pilot Production of Point Detonating Fuze
Mk 78 Mod 0 for 20mm Ammunition

Explanation of Symbols Used in Tests

HO - High Order Detonation

NFA - No Fuze Action

B.W. - Back Wall of Steel Butt

H.B. - Large Bulge on Target

TABLE I
FIRING RECORD

Date: 6 September 1951 (Raining Slightly)
Gun: No. 426 Accuracy Barrel 60" length 1/25 twist

Range: 1 - 160'
Projectiles: 20mm T39E3 Tetryl loaded PA-E-4678

Fuzes: Mk 78-0 (Wt. 309 grains) [Square notches] [Low numbers long windshields high numbers short]
All component explosives in detonators loaded by pressing to same line pressure.

Remarks: Total Weight Projectile and Fuze - 1699 grains

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
1	T39E3	13	570	3116	04125 24S-T4 Aluminum Alloy	C°	NO 3-1/2" Hole
2	"	6	600	3250	plus Beaverboard 3" behind	C°	NO 3" Hole
3	"	5	600	3239	"	C°	NFA 1" Hole
4	"	11	600	3250	"	C°	NO 3" Hole
5	"	2	600	3239	"	0°	NO 3" Hole
6	"	22	600	3264	"	0°	NO 3" Hole
7	"	21	600	3264	"	0°	NO 3" Hole
8	"	24	600	3253	"	0°	NO 3" Hole
9	"	1	600	3232	"	0°	NO 3" Hole
10	"	17	600	3260	"	0°	NO 3" Hole
11	"	12	600	3257	02020 24S-T4 Aluminum Alloy	C°	NO 2-3/4" Hole
12	"	15	600	3250	plus Beaverboard 3" behind	0°	NO 2-3/4" Hole
13	"	18	600	3250	"	C°	NO 2-1/2" Hole
14	"	26	600	3279	"	C°	NO 2-1/2" Hole
15	"	3	600	3268	"	0°	NO 2-1/2" Hole

TABLE I (Continued)

Date: 6 September 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
16	T3983	8	600	-	0.032 24S-T4 Aluminum Alloy (Muzzle to target=3')	0°	HO 2-1/2" Hole
17	"	10	600	-	Same target (Muzzle to target 2')	0°	MFA on target (1" Hole) HO on butt wall
18	"	4	600	-	"	0°	"
19	"	23	570	-	"	0°	"
20	"	16	600	-	"	0°	"
21	"	20	600	-	"	0°	"
22	"	25	600	-	Same target (Muzzle to target 3')	0°	HO 2-1/2" Hole
23	"	27	600	-	"	0°	HO 2-3/4" Hole
24	"	14	600	-	"	0°	HO 2-3/4" Hole
25	"	7	600	-	"	0°	MFA on target (1" Hole) HO on beaverboard
26	"	19	600	3253	0.020 Aluminum Alloy (24S-T4)	80°	Missed target
27	"	9	600	3264	plus Beaverboard (160' range)	80°	HO 6"x4" Hole
28	"	28	600	3283	"	80°	HO 6"x2-1/2" Hole
29	"	29	600	3279	"	80°	HO 5"x3-1/2" Hole
30	"	30	600	3250	"	80°	HO 4"x4" Hole
31	"	31	600	3257	0.125 24S-T4 Aluminum Alloy	80°	MFA 4"x1" Hole
32	"	35	600	3271	"	80°	MFA 4-1/2"x1" Hole
33	"	34	600	3250	"	80°	MFA 3-1/2"x1" Hole
34	"	36	600	3253	"	80°	MFA 4"x1" Hole
35	"	37	600	3271	"	80°	MFA 4-1/2"x1" Hole

TABLE I (Continued)

Date: 6 September 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
36	T39E3	39	600	3264	01125 24S-T4 Aluminum Alloy	60°	HO 3"x3" Hole
37	"	40	600	3257	"	60°	HO 3"x3-1/2" Hole
38	"	41	600	3246	"	60°	NFA 1-1/4"x1" Hole
39	"	42	600	3275	"	60°	HO 3-1/2"x2-1/2" Hole
40	"	43	600	3246	"	60°	NFA 1-1/2"x1" Hole
41	"	44	600	3250	"	60°	NFA 1-1/2"x1" Hole
42	"	45	600	3239	"	60°	NFA 2"x1" Hole
43	"	46	600	3246	"	60°	HO 3"x3-1/2" Hole
44	"	49	600	3243	"	60°	HO 4"x4" Hole
45	"	48	600	3246	"	60°	HO 3-1/2" Hole

TABLE II

FIRING RECORD

Date: 27 September 1951
Gun: Barrel No. 426 Accuracy Barrel 60" Length 1/25 Twist

Range: 1 - 160'
Projectiles: 20mm T3983 Tetryl loaded PA-E-4678

Fuzes: Mk 78-0 Pilot lot with Mk 56 detonators loaded to stops rather than pressure

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
1	T3983	150	600	3199	1/8" Chipboard C8140 .5 lbs/ft^2	0°	NFA 1" Hole
2	"	191	600	3206	"	0°	NFA 1" Hole
3	"	139	600	3202	"	0°	NFA 1" Hole
4	"	177	600	3206	"	0°	HO 3" Hole
5	"	13	600	3199	"	0°	NFA 1" Hole
6	"	24	600	3250	"	0°	NFA 1" Hole
7	"	158	600	3253	C8190 Boxarboard .58 lbs/ft^2	0°	NFA 1" Hole
8	"	124	600	3271	"	0°	NFA 1" Hole
9	"	175	600	3257	"	0°	NFA 1" Hole
10	"	134	600	3264	"	0°	NFA 1" Hole
11	"	196	600	3275	C1020 24S-T4 Aluminum Alloy	0°	HO 2-1/2" Hole
12	"	159	600	3279	"	0°	NFA 1"x1-1/2" Hole
13	"	9	600	3268	"	0°	NFA 1"x1-1/4" Hole
14	"	164	600	3250	1/8" Mild Steel	0°	HO 3-1/2" Hole
15	"	184	600	3260	"	0°	NFA 1"x1-1/8" Hole
16	"	15	600	Miss	Blotter plus 1/8" Mild Steel	0°	1" Hole fuze loosed just outside of muzzle
17	"	157	600	3243	"	0°	NFA 1" Hole
18	"	173	600	3264	"	0°	HO 3" Hole

TABLE II (Continued)

Date: 27 September 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
19	739E3	151	600	3268	Blotter plus 1/8" mild steel	0°	NFA 1" Hole
20	"	196*	600	3260	01020 24S-T4 Aluminum Alloy	0°	NO 2-1/2" Hole
21	"	195*	600	3264	"	0°	NO 2-3/4" Hole
22	"	76*	600	3264	"	0°	NO 2-1/2" Hole
23	"	65*	600	3257	"	0°	NO 2-1/2" Hole
24	"	79*	600	3275	"	0°	NO 2-1/2" Hole
25	"	30	600	3271	"	0°	NFA 1" Hole
26	"	176	600	3264	"	0°	NFA 1" Hole

* Fuzes from lot tested on 6 September 1951

TABLE III

FIRING RECORD

Date: 26 October 1951
Gun: Barrel No. 426 Accuracy Barrel 60" length 1/25 Twist

Range: 1 - 160'
Projectiles: 20mm T3983 Tetryl loaded by P.A. Lot Pi-E-4678 Weight 1390 Grains

Fuzes: Mk 78-0 Pilot lot. Weight 309 Grains. Cases T-20 with Electric Primer

Rd. No.	Projectile	Fuze Mk 78-C	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
1	T3983	532	600	3202	Chipboard 0:140 .5 lbs/ft^2	0°	NO 3" Hole
2	"	534	600	3224	"	0°	NO 3" Hole
3	"	559	600	3221	"	0°	NO 3" Hole
4	"	570	600	3224	"	0°	NO 3" Hole
5	"	515	600	3217	"	0°	NO 3" Hole
6	"	531	600	3246	"	0°	NO 3" Hole
7	"	506	600	3243	"	0°	NO 3" Hole
8	"	564	600	3224	"	0°	NO 3" Hole
9	"	509	600	3243	"	0°	NO 3" Hole
10	"	550	600	3237	"	0°	NO 3" Hole
11	"	516	600	3246	0:020 24S-T4 Aluminum Alloy	0°	NO 2-1/2" Hole
12	"	530	600	3246	"	0°	NO 2-1/2" Hole
13	"	539	600	3243	"	0°	NO 2-1/2" Hole
14	"	556	600	3246	"	0°	NO 2-1/2" Hole
15	"	563	600	3243	"	0°	NO 2-1/2" Hole
16	"	505	600	3239	"	0°	NO 2-1/2" Hole
17	"	504	600	3260	"	0°	NO 2-1/2" Hole

TABLE III (Continued)

Date: 25 October 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
18	T3923	507	600	3235	0"020 24S-T4 Aluminum Alloy	0°	HO 2-1/2" Hole
19	"	571	600	3250	"	0°	HO 2-1/2" Hole
20	"	554	600	3232	"	0°	HO 2-1/2" Hole
21	"	573	600	3239	0"125 24S-T4 Aluminum Alloy	0°	HO 3" Hole
22	"	540	600	3224	"	0°	HO 3" Hole (Note: Hole broke into round 21)
23	"	349	600	3[illegible]9	0"125 24S-T4 Aluminum Alloy	0°	HO 3" Hole
24	"	549	600	3232	"	0°	HO 3" Hole
25	"	576	600	3243	"	0°	HO 3" Hole
26	"	511	600	3235	"	0°	HO 3" Hole
27	"	536	600	3257	"	0°	HO 3" Hole
28	"	501	600	3253	"	0°	HO 3" Hole
29	"	543	600	3257	"	0°	HO 3" Hole
30	"	537	600	3271	"	0°	HO 3" Hole
31	"	557	600	3235	0"125 Mild Steel, Blotter in front	0°	HO 3-1/2" Hole, NPA on Blotter
32	"	565	600	3243	"	0°	HO 3-1/2" Hole "
33	"	574	600	3246	"	0°	HO 3-1/2" Hole "
34	"	500	600	3250	"	0°	HO 3-1/2" Hole "
35	"	542	600	3257	"	0°	HO 3-1/2" Hole "
36	"	569	600	3253	"	0°	HO 3-1/2" Hole "
37	"	523	600	3275	"	0°	HO 3-1/2" Hole "
38	"	561	600	3268	"	0°	HO 3-1/2" Hole "
39	"	521	600	3250	"	0°	HO 3-1/2" Hole "

TABLE III (Continued)

Date: 26 October (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
40	T39E3	520	600	3246	0"125 Mild Steel, Blotter in front	0°	NO 3-1/2" Hole, MFA on Blotter
41	"	552	600	3246	0"012 24S-T4 Alclad	0°	NO 2" Hole
42	"	541	600	3243	"	0°	NO 2" Hole
43	"	535	600	3250	"	0°	NO 2" Hole
44	"	562	600	3264	"	0°	NO 2" Hole
45	"	560	600	3239	"	0°	NO 2" Hole
46	"	545	600	3250	0"125 24S-T4 Aluminum Alloy	80°	MFA 1"x5" Hole
47	"	566	600	3239	"	80°	MFA 1"x5" Hole
48	"	513	600	3290	"	80°	MFA 1"x5" Hole
49	"	512	600	3246	"	80°	MFA 1"x5" Hole
50	"	567	600	3257	"	80°	MFA 1"x5" Hole
51	"	508	600	3250	0"020 24S-T4 Aluminum Alloy	80°	NO 5"x5" Hole
52	"	514	600	3250	"	80°	NO 4"x4-1/2" Hole
53	"	519	600	3243	"	80°	NO 3"x5-1/2" Hole
54	"	527	600	3250	"	80°	NO 4"x4" Hole
55	"	572	600	3268	"	80°	NO 4"x6" Hole
56	"	553	600	3257	"	80°	NO 4-1/2"x6" Hole
57	"	502	600	3243	"	80°	NO 5"x5" Hole
58	"	529	600	3224	"	80°	NO 6"x7" Hole
59	"	526	600	3260	"	80°	NO 4-1/2"x6" Hole
60	"	538	600	3239	"	80°	NO 3-1/2"x5" Hole
61	"	518	600	3224	0"125 Mild Steel	80°	MFA 1"x3" Hole
62	"	533	600	3228	"	80°	MFA 1"x3" Hole
63	"	510	600	3246	"	80°	MFA 1"x3" Hole

TABLE XII (Continued)

Date: 26 October (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
64	T39E3	517	600	3221	0.125 Mild Steel	60°	NFA 1"x2-1/2" Hole
65	"	575	600	3246	"	60°	NO 3-1/2"x4" Hole
66	"	568	600	3253	"	60°	NO 3-1/2"x5" Hole
67	"	548	600	3260	"	60°	NFA 1"x1-1/2" Hole
68	"	528	600	3235	"	60°	NO 3"x4-1/2" Hole
69	"	547	600	3243	"	60°	NO 4"x4" Hole
70	"	524	600	3239	"	60°	NO 4"x4" Hole
71	"	525	600	3250	"	60°	NO 4"x5" Hole
72	"	555	600	3260	"	60°	NO 4"x4" Hole
73	"	558	600	3239	"	60°	NO 4"x4" Hole
74	"	522	600	3221	"	60°	NO 4"x4" Hole
75	"	551	600	3224	"	60°	NO 4"x4-1/2" Hole
76	"	544	600	3206	0.020 24S-T4 Aluminum Alloy	60°	NO 7"x9" Hole
77	"	546	600	3199	"	60°	NO 7"x10" Hole
78	"	577	600	3224	"	60°	NO 9"x9" Hole

Date: 27 October 1951

Projectiles: Lot PA-E-5992

79	"	474	600	3257	"	60°	NO 6"x7" Hole
80	"	457	600	3246	"	60°	NO 4"x7" Hole
81	"	451	600	3199	"	60°	NO 5"x9" Hole
82	"	436	600	3257	"	60°	NO 7"x8" Hole
83	"	407	600	3294	"	60°	NO 6"x8" Hole
84	"	463	600	3250	"	60°	NO 9"x12" Hole
85	"	420	600	3264	"	60°	NO 4"x7" Hole

TABLE III (Continued)

Date: 27 October 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
86	T39E3	476	600	3275	0.125 24S-T4 Aluminum Alloy	60°	HO 3-1/2" Hole
87	"	448	600	3283	"	60°	HO 3"x3-1/2" Hole
88	"	410	600	3294	"	60°	HO 3"x4" Hole
89	"	401	600	3298	"	60°	HO 2-1/2" Hole
90	"	407	600	3268	"	60°	HO 3" Hole
91	"	478	600	3260	"	60°	HO 3"x3-1/2" Hole
92	"	347	600	3243	"	60°	HO 3"x4" Hole
93	"	468	600	3250	"	60°	HO 2-1/2"x3" Hole
94	"	495	600	3275	"	60°	HO 2-1/2"x3" Hole
95	"	403	600	3279	"	60°	HO 2-1/2"x3" Hole
96	"	452	600	3257	"	30°	HO 4"x6" Hole
97	"	444	600	3264	"	30°	HO 4"x7" Hole
98	"	405	600	3260	"	30°	HO 4-1/2"x5-1/2" Hole
99	"	441	600	3243	"	30°	HO 4"x5" Hole
100	"	443	600	3298	"	30°	HO 4"x6-1/2" Hole
101	"	408	600	3243	0.020 24S-T4 Aluminum Alloy	30°	HO 3"x4" Hole
102	"	486	600	3275	"	30°	HO 3"x5" Hole
103	"	423	600	3268	"	30°	HO 3"x4-1/2" Hole
104	"	447	600	3250	"	30°	HO 3"x5" Hole
105	"	465	600	3253	"	30°	HO 3"x4-1/2" Hole
106	"	453	600	3250	0.125 Mild Steel	30°	HO 3-1/2"x6" Hole
107	"	471	600	3239	"	30°	HO 3"x7" Hole
108	"	496	600	3206	"	30°	HO 3"x6" Hole

TABLE III (Continued)

Date: 27 October 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
109	T39E3	438	600	3210	0.125 Mild Steel	30°	HO 4"x6" Hole
110	"	479	600	3232	"	30°	HO 4"x6" Hole
111	"	432	600	3246	"	70°	HO 3" Hole
112	"	493	600	3243	"	70°	HO 4"x4-1/2" Hole
113	"	482	600	3292	"	70°	HO 3"x4-1/2" Hole
114	"	424	600	3271	"	70°	NFA 1"x2" Hole
115	"	469	600	3279	"	70°	NFA 1"x2-1/2" Hole
116	"	472	600	3228	"	70°	HO 3"x4" Hole
117	"	494	600	3224	"	70°	NFA 1"x2" Hole
118	"	473	600	3250	"	70°	HO 3" Hole
119	"	422	600	3228	"	70°	NFA 1"x2-1/2" Hole
120	"	414	600	3239	"	70°	HO 3"x4" Hole
121	"	429	600	3271	0.125 24S-T4 Aluminum Alloy	70°	HO 3" Hole
122	"	455	600	3235	"	70°	HO 3" Hole
123	"	416	600	3221	"	70°	NFA 1"x1-3/4" Hole
124	"	428	600	3268	"	70°	NFA 1"x1-3/4" Hole
125	"	446	600	3260	"	70°	HO 3" Hole
126	"	331	600	3257	"	70°	HO 3" Hole
127	"	450	600	3279	"	70°	HO 3" Hole
128	"	332	600	3257	"	70°	HO 3"x3-1/2" Hole
129	"	413	600	3253	"	70°	HO 3"x3-1/2" Hole
130	"	343	600	3286	"	70°	HO 2-3/4"x3" Hole

TABLE III (Continued)

Date: 27 October 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
131	T39E3	409	600	3243	0"020 24S-T4 Aluminum Alloy	70°	HO 5"x6" Hole
132	"	487	600	3257	"	70°	HO 5"x7" Hole
133	"	485	600	3239	"	70°	HO 6"x7" Hole
134	"	419	600	3232	"	70°	HO 5" Hole
135	"	460	600	3224	"	70°	HO 6"x7" Hole
136	"	360	450	2678	0"125 24S-T4 Aluminum Alloy	0°	HO 4" Hole
137	"	328	400	2400	"	0°	NFA 1" Hole, Wire did not shear
138	"	356	425	2501	"	0°	NFA 1" Hole "
139	"	318	450	2647	"	0°	HO 4" Hole
140	"	371	450	2652	"	0°	HO 4" Hole
141	"	490	450	2652	"	0°	HO 4" Hole
142	"	489	450	2616	"	0°	HO 4" Hole
143	"	426	450	2640	"	0°	HO 4" Hole
144	"	386	450	2620	"	0°	HO 4" Hole
145	"	449	450	2661	"	0°	HO 4" Hole
146	"	309	450	2666	"	0°	HO 4" Hole
147	"	415	450	2611	"	0°	HO 4" Hole
148	"	454	450	2632	0"020 24S-T4 Aluminum Alloy	0°	HO 3-1/2" Hole
149	"	344	450	2640	"	0°	HO 3" Hole
150	"	433	450	2637	"	0°	HO 3" Hole
151	"	481	450	2656	"	0°	HO 3" Hole
152	"	379	450	2640	"	0°	HO 3-1/2" Hole
153	"	445	450	2599	0"012 24S-T4 Alclad	0°	HO 3" Hole
154	"	311	450	2625	"	0°	HO 3" Hole
155	"	421	450	2661	"	0°	HO 2-1/2" Hole

TABLE III (Continued)

Date: 27 October 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
156	T3983	488	450	2652	0.012 24S-T4 Alclad	0°	NFA 1" Hole, Possibly due to wire not shearing
157	"	481	450	2649	"	0°	NO 3" Hole
158	"	417	450	2594	0.125 Mild Steel	0°	NFA 1" Hole, Possibly due to wire not shearing
159	"	366	450	2620	"	0°	NO 5" Hole
160	"	484	465	2707	"	0°	NO 4-1/2"x5-1/2" Hole
161	"	341	465	2712	"	0°	NO 4" Hole
162	"	478	465	2683	"	0°	NO 4-1/2" Hole
163	"	368	465	2681	"	0°	NO 4-1/2" Hole
164	"	391	465	2701	0.012 24S-T4 Alclad	0°	NO 3" Hole
165	"	334	465	2668	0.020 24S-T4 Aluminum Alloy	80°	NFA 2"x3" Hole, Possibly due to wire not breaking
166	"	362	465	2701	"	80°	NO 3-1/2"x7" Hole
167	"	402	465	2683	"	80°	NO 3"x5-1/2" Hole
168	"	499	465	2706	"	80°	NFA 2"x4" Hole, Possibly due to wire not breaking
169	"	372	465	2699	"	80°	NO 5"x5-1/2" Hole
170	"	364	465	2673	"	80°	NO 7"x9" Hole
171	"	435	465	2707	"	80°	NO 5"x6" Hole
172	"	396	465	2704	"	80°	NO 6"x7" Hole
173	"	491	465	2663	"	80°	NO 6"x7" Hole
174	"	430	465	2707	"	80°	NO 3"x8" Hole

TABLE III (Continued)

Date: 27 October 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
175	T3B3	316	465	2686	0.125 24S-T4 Aluminum Alloy	80°	NFA 1"x3" Hole
176	"	342	465	2638	"	80°	NFA 1"x3-1/2" Hole
177	"	350	465	2671	"	80°	NFA 1"x3" Hole
178	"	427	465	2676	"	80°	NFA 1"x3" Hole
Date: 7 November 1951							
179	"	398	600	3177	Hit Plate Frame	?	Hit Plate Frame HO
180	"	315	600	3243	0.020 24S-T4 Aluminum Alloy	70°	HO 6"x9" Hole
181	"	381	600	3250	"	70°	HO 5"x8" Hole
182	"	310	600	3217	"	70°	HO 5"x8" Hole
183	"	324	600	3250	"	70°	HO 5"x7" Hole
184	"	393	600	3250	"	70°	HO 4"x8" Hole
185	"	367	600	3224	0.125 24S-T4 Aluminum Alloy	70°	NFA 1"x1-1/2" Hole
186	"	302	600	3246	"	70°	HO 3" Hole
187	"	317	600	3224	"	70°	HO 3" Hole
188	"	363	600	3250	"	70°	HO 3" Hole
189	"	346	600	3228	"	70°	HO 3" Hole
190	"	377	600	3232	0.125 Mild Steel	70°	NFA 1"x2-1/2" Hole
191	"	383	600	3243	"	70°	HO 4"x6" Hole
192	"	351	600	3250	"	70°	HO 2"x2" Hole
193	"	339	600	3235	"	70°	NFA 1"x2-1/2" Hole
194	"	375	600	3232	"	70°	NFA 1"x2" Hole
195	"	475	600	3250	"	-	Disregard-hit edge of Plate HO

TABLE III (Continued)

Date: 7 November 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
196	T3983	321	600	3224	Missed Target	-	Missed Target, HO on B.W.
197	"	306	600	3217	0.125 Mild Steel	80°	NFA 1"x3" Hole
198	"	378	600	3235	"	80°	NFA 1"x3" Hole
199	"	365	600	3213	"	80°	HO 2"x3" Hole
200	"	320	600	3228	"	80°	HO 3-1/2"x4" Hole
201	"	385	600	3232	"	80°	NFA 1"x3" Hole
202	"	470	600	3228	0.125 24S-T4 Aluminum Alloy	80°	NFA 1"x5" Hole
203	"	442	600	3250	"	80°	NFA 1"x5" Hole
204	"	354	600	3260	"	80°	HO 2-1/2"x2-1/2" Hole
205	"	464	600	3237	"	80°	HO 2"x3-1/2" Hole
206	"	462	600	3253	"	80°	HO 7"x9" Hole

Arming Distance Tests
Date: 7 November 1951 (Continued)
Range: 1 (Various Distances)

207	T3983	438	600	Est. 3300	0.032 24S-T4 Aluminum Alloy at 3' from Muzzle	0°	HO 3" Hole
208	"	404	600	"	"	0°	HO 2-1/2" Hole
209	"	323	600	"	0.032 24S-T4 Aluminum Alloy at 2' from Muzzle	0°	NFA 1" Hole, HO on B.W.
210	"	390	600	"	"	0°	NFA 1" Hole, HO on B.W.
211	"	360	600	"	"	0°	NFA 1" Hole, HO on B.W.
212	"	392	600	"	"	0°	NFA 1" Hole, HO on 1/8" 24S-T4 6' from gun

TABLE III (Continued)

Date: 7 November 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
213	T3923	326	600	Est. 3300	CTC32 24S-T4 Aluminum Alloy at 2' from Muzzle	0°	NFA 1" Hole, HO on 1/8" 24S-T4 6' from gun
214	"	399	600	"	"	0°	NFA 1" Hole, HO on B.W.
215	"	333	600	"	"	0°	NFA 1" Hole, HO on B.W.
216	"	336	600	"	"	0°	NFA 1" Hole, HO on B.W.
217	"	330	600	"	"	0°	NFA 1" Hole, HO on B. W.
218	"	384	600	"	"	0°	NFA 1" Hole, HO on B.W.
219	"	477	600	"	CTC32 24S-T4 Aluminum Alloy at 3' from Muzzle	0°	HO 2-1/2" Hole
220	"	380	600	"		0°	HO 2-1/2" Hole
221	"	353	600	"	"	0°	HO 2-1/2" Hole

TABLE III (Continued)

Date: 28 November 1951
Gun: Barrel No. 426 Accuracy Barrel 60" length 1/25 Twist

Range: 1 - 160'
Projectiles: 20mm T3983 Tetryl Loaded by P.A. Lot PA-E-5992

Fuzes: Mk 78-0 Pilot lot with 0.031 shear wire rather than 0.025 wire

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
222	T3983	B26	250	1824	0.125 24S-T4 Aluminum Alloy	0°	HO 8"x10" Hole
223	"	B21	250	1808	"	0°	HO 10"x13" Hole
224	"	B2	245	1804	"	0°	HO 15"x11" Hole
225	"	B60	245	1730	"	0°	HO 15"x19" Hole
226	"	D46	245	1763	"	0°	HO 13"x19" Hole
227	"	B6	245	1771	0.020 24S-T4 Aluminum Alloy	0°	HO 7"x8-1/2" Hole
228	"	B3	245	1760	"	0°	HO 7"x7" Hole
229	"	B44	245	1772	"	0°	HO 7"x7" Hole
230	"	B7	245	1746	"	0°	HO 7"x7" Hole
231	"	D71	245	1764	"	0°	HO 6"x7" Hole
232	"	B88	245	1785	0.012 24S-T4 Alclad	0°	HO 5"x5" Hole
233	"	B40	245	1754	"	0°	HO 5"x5" Hole
234	"	B90	245	1759	"	0°	HO 4"x4-1/2" Hole
235	"	B48	245	1750	"	0°	HO 5"x5" Hole
236	"	B18	245	1723	"	0°	HO 5"x5" Hole
237	"	B95	245	1772	0.140 Chipboard .5 lbs/ft^2	0°	HO 6"x6" Hole
238	"	B77	245	1771	"	0°	HO 6"x6" Hole
239	"	B85	245	1751	"	0°	HO 6"x6" Hole
240	"	B89	245	1727	"	0°	HO 6"x6" Hole
241	"	B53	245	1734	"	0°	HO 6"x6" Hole

TABLE III (Continued)

Date: 28 November 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
242	T3E3	B81	245	1733	C1125 Mild Steel	0°	HO 3"x3" Hole
243	"	B87	245	1676	"	0°	HO 2"x2-1/2" Hole
244	"	B36	245	1751	"	0°	HO 2-1/2"x4" Hole
245	"	B10	245	1734	"	0°	HO 3"x3" Hole
246	"	B28	245	1760	"	0°	HO 3"x3" Hole
247	"	B92	245	1728	"	0°	HO 2"x2-1/2" Hole
248	"	B38	245	1661	"	0°	HO 2-1/2"x3" Hole
249	"	B79	245	1778	"	0°	HO 3"x3-1/2" Hole
250	"	B16	245	1729	"	0°	HO 3"x3-1/2" Hole
251	"	B27	245	1752	"	0°	HO 3"x3" Hole
252	"	B20	245	1751	C2020 24S-T4 Aluminum Alloy	0°	HO 7"x8" Hole
253	"	B30	245	1734	"	0°	HO 6"x7" Hole
254	"	B75	245	1762	"	0°	HO 6"x8" Hole
255	"	B4	245	1747	"	0°	HO 6"x8" Hole
256	"	B23	245	1706	"	0°	HO 6"x7" Hole
257	"	B24	245	1744	C1125 24S-T4 Aluminum Alloy	0°	HO 8"x16" Hole
258	"	B8	245	1698	"	0°	HO 18"x20" Hole
259	"	B19	245	1673	"	0°	HO 11"x13" Hole
260	"	B13	245	1658	"	0°	HO 15"x16" Hole
261	"	B32	245	1731	"	0°	HO 11"x15" Hole
262	"	B41	245	1678	"	30°	HO 7"x7-1/2" Hole
263	"	B47	245	1686	"	30°	HO 6"x12" Hole
264	"	B34	245	1733	"	30°	HO 9"x9" Hole
265	"	B70	245	1765	"	30°	HO 9"x10" Hole
266	"	B11	245	1720	"	30°	HO 8"x10" Hole

TABLE III (Continued)

Date: 28 November 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 73-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
267	T3963	B37	245	1661	C1020 24S-T4 Aluminum Alloy	30°	HO 14"x19" Hole
268	"	B29	245	1708	"	30°	HO 13"x19" Hole
269	"	B45	245	1687	"	30°	HO 10"x14" Hole
270	"	B74	245	1739	"	30°	HO 11"x16" Hole
271	"	B17	245	1733	"	30°	HO 9"x14" Hole
272	"	B42	245	1742	C1125 Mild Steel	30°	HO 4"x5" Hole
273	"	D15	245	1674	"	30°	HO 3"x5" Hole
274	"	B93	245	1712	"	30°	HO 3"x4" Hole
275	"	B96	245	1704	"	30°	HO 2"x6" Hole
276	"	B72	245	1726	"	30°	HO 4"x6" Hole
277	"	B1	245	1829	C1125 Mild Steel	60°	HO 2-1/2"x5" Hole
278	"	B14	245	1675	"	60°	HO 3-1/2"x6" Hole
279	"	B82	245	1771	"	60°	HPA on plate 1" Hole
280	"	B73	245	1702	"	60°	HPA on plate 1" Hole
281	"	B91	245	1689	"	60°	HO 3"x6" Hole
282	"	B35	245	1715	"	60°	HO 4"x5" Hole

TABLE III (Continued)

Date: 28 November 1951 (Continued) and 29 November 1951

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
283	13983	B31	245	1682	0.125 4114 Steel	60°	HO 5"x5" Hole
284	"	B33	245	1721	"	60°	HO 3"x4" Hole
285	"	B39	245	1708	"	60°	HO 4"x5" Hole
286	"	B12	245	1717	"	60°	HO 4"x6" Hole
287	"	B25	245	1690	0.125 24S-T4 Aluminum Alloy	60°	WPA on plate, 1" Hole
288	"	B84	245	1690	"	60°	HO 5"x10" Hole
289	"	B9	245	1741	"	60°	HO 5"x8" Hole
290	"	B68	245	1772	"	60°	HO 3-1/2"x7" Hole
291	"	B75	245	1731	"	60°	HO 4"x7" Hole
292	"	B94	245	1727	"	60°	HO 4"x8" Hole
293	"	B80	245	1696	"	60°	HO 4"x8" Hole
294	"	B5	245	1669	"	60°	HO 9"x7" Hole
295	"	B22	245	1646	"	60°	WPA on plate, 1" Hole
296	"	B78	245	1695	"	60°	HO 5"x8" Hole
297	"	B146	245	1671	0.020 24S-T4 Aluminum Alloy	60°	HO 8"x10" Hole
298	"	B128	245	1764	"	60°	HO 7"x8" Hole
299	"	B112	245	1774	"	60°	HO 8"x9" Hole
300	"	B43	245	1712	"	60°	HO 7"x13" Hole
301	"	B108	245	1722	"	60°	HO 8"x9" Hole
302	"	B104	245	1688	"	60°	HO 8"x10" Hole
303	"	B102	245	1710	"	60°	HO 10"x11" Hole
304	"	B127	245	1789	"	60°	HO 9"x10" Hole
305	"	B142	245	1698	"	60°	HO 11"x12" Hole

TABLE III (Continued)

Date: 29 November 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
306	T39E3	B119	245	1771	0"C20 24S-T4 Aluminum Alloy	60°	HO 12"x12" Hole
307	"	B150	245	1794	"	80°	HO 5"x8" Hole
308	"	B125	245	1788	"	80°	HO 4"x8" Hole
309	"	B114	245	1736	"	80°	HO 3"x5" Hole
310	"	B49	245	1687	"	80°	HO 5"x5" Hole
311	"	B156	245	1714	"	80°	HO 5"x6" Hole
312	"	B105	245	1667	"	80°	HO 5"x7" Hole
313	"	B62	245	1708	"	80°	Missed Target, HO on B.W.
314	"	B137	245	1810	"	80°	HO 7"x7" Hole
315	"	B64	245	1770	"	80°	HO 5"x9" Hole
316	"	B147	245	1749	"	80°	HO 5"x7" Hole
317	"	B65	245	1779	0"125 24S-T4 Aluminum Alloy	80°	NFA 1"x3" Hole
318	"	B140	245	1817	"	80°	NFA 1"x4" Hole
319	"	B117	245	1729	"	80°	NFA 1"x3-1/2" Hole
320	"	B116	245	1743	"	80°	NFA 1"x3-1/2" Hole
321	"	B99	245	1748	"	80°	NFA 1"x3-1/2" Hole
322	"	B123	245	1742	"	80°	NFA 1"x2-1/2" Hole
323	"	P132	245	1712	"	80°	NFA 1"x3" Hole
324	"	B143	245	1706	"	80°	NFA 1"x3-1/2" Hole
325	"	B55	245	1702	"	80°	NFA 1"x3-1/2" Hole
326	"	B57	245	1655	"	80°	NFA 1"x5" Hole
327	"	B61	245	1676	0"125 Mild Steel	80°	NFA 2"x5" Hole
328	"	B118	245	1701	"	80°	NFA 2"x4" Hole
329	"	B50	245	1709	"	80°	NFA 1"x3-1/2" Hole

TABLE III (Continued)

Date: 29 November 1951 (Continued)

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
330	T39B3	B98	245	1691	0.125 Mild Steel	80°	NFA 1"x4" Hole
331	"	B145	245	1684	"	80°	NFA 1"x3-1/2" Hole
332	"	B107	245	1694	"	80°	NFA 1"x5" Hole
333	"	B113	245	1707	"	80°	NFA 1"x5" Hole
334	"	B133	245	1777	"	80°	NFA 1"x5" Hole
335	"	B100	245	1656	"	80°	NFA 1"x4" Hole
336	"	B138	245	1694	"	80°	NFA 1"x5" Hole
337	"	B106	245	1722	0.020 24S-T4 Aluminum Alloy	70°	HO 9"x10" Hole
338	"	B121	245	1754	"	70°	HO 8"x9" Hole
339	"	B54	245	1783	"	70°	HO 7"x9" Hole
340	"	B131	245	1743	"	70°	HO 7"x8" Hole
341	"	B97	245	1778	"	70°	Disregard-hit plate frame
342	"	B63	245	1751	"	70°	HO 9"x9" Hole
343	"	B130	245	1806	"	70°	HO 8"x9" Hole
344	"	B115	245	1733	"	70°	HO 7"x9" Hole
345	"	B149	245	1770	"	70°	HO 7"x9" Hole
346	"	B148	245	1727	"	70°	HO 6"x8" Hole
347	"	B56	245	1759	"	70°	HO 8"x10" Hole
348	"	B111	245	1708	0.125 24S-T4 Aluminum Alloy	70°	NFA 1"x1-1/2" Hole
349	"	B59	245	1780	"	70°	HO 5"x7" Hole
350	"	B109	245	1829	"	70°	NFA 1" Hole
351	"	B53	245	1796	"	70°	NFA 1"x1-1/4" Hole
352	"	B103	245	1802	"	70°	NFA 1"x1-1/2" Hole
353	"	B124	245	1743	"	70°	NFA 1"x1-1/2" Hole
354	"	B69	245	1723	"	70°	NFA 1" Hole

TABLE III (Continued)

Date: 29 November 1951 (Continued)

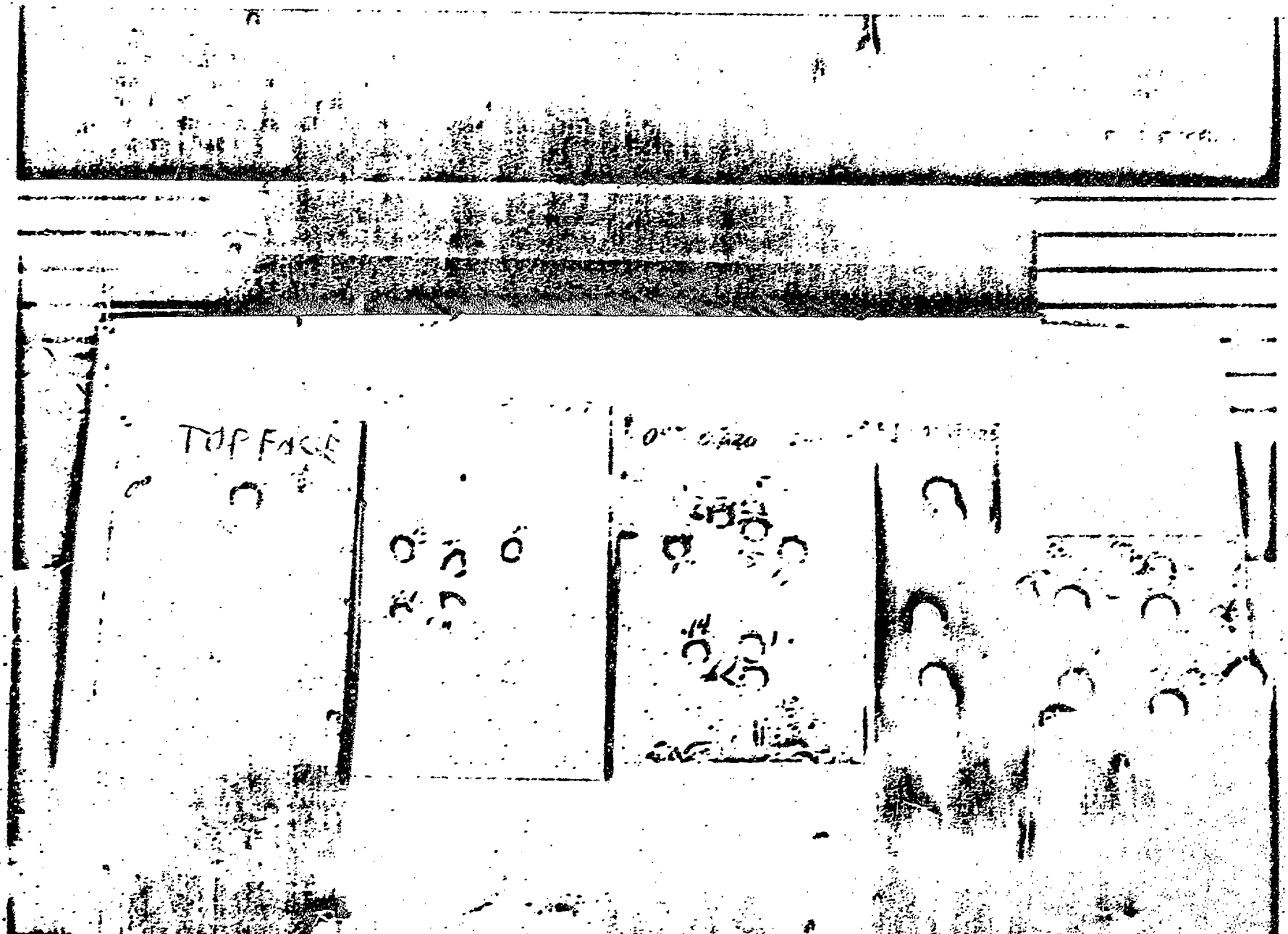
Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
355	T39E3	B135	245	1771	C#125 24S-T4 Aluminum Alloy	70°	NFA 1" Hole
356	"	B110	245	1727	"	70°	NFA 1"x1-1/2" Hole
357	"	B52	245	1722	"	70°	NFA 1" Hole
358	"	B66	245	1782	C#125 Mild Steel	70°	HO 3"x6" Hole
359	"	B141	245	1771	"	70°	HO 3"x4" Hole
360	"	B101	245	1723	"	70°	HO 5"x5" Hole
361	"	B67	245	1672	"	70°	NFA 1"x3" Hole
362	"	B51	245	1754	"	70°	HO 3"x5" Hole
363	"	B58	245	1760	"	70°	HO 3"x5" Hole
364	"	B136	245	1777	"	70°	HO 3"x5" Hole
365	"	B134	245	1741	"	70°	HO 3"x5" Hole
366	"	B120	245	1803	C#125 24S-T4 Aluminum Alloy	70°	NFA 1"x1-1/2" Hole
367	"	B144	245	1754	C#125 Mild Steel	70°	NFA 1"x3" Hole
368	"	B86	245	1775	"	70°	NFA 1"x3" Hole

TABLE III (Continued)

Date: 29 November 1951 (Continued) and 8, 18, December 1951
Fuzes: Mk 78-0 with 0.031 shear wire up through round 371, Mk 78-0 with 0.051 shear wire on rounds 371 through 381

Rd. No.	Projectile	Fuze Mk 78-0	Charge	Striking Velocity	Target	Obl.	Fuze Action and Remarks
369	T39E3	B139	245	1748	0.125 24S-T4 Aluminum Alloy	70°	NFA 1"x1-1/2" Hole
370	"	B122	245	1689	0.020 24S-T4 Aluminum Alloy	80°	HO 8"x11" Hole
371	"	B129	245	1634	0.500 24S-T4 Aluminum Alloy	70°	HO Heavy Bulge
Firing through slight rain on 8 December 1951							
372	"	314	600	Est 3250	0.020 3S H14 Aluminum	0°	NFA 1" Hole
373	"	351	600	Est 3250	0.020 3S H14 Aluminum plus	0°	HO 2-1/2" Hole
374	"	319	600	"	0.020 24S-T4 Aluminum Alloy	0°	HO 2-1/2" Hole
375	"	406	600	"	2' behind	0°	NFA 1" Hole, HO 3" Hole on 24S-T4
376	"	382	600	"	"	0°	NFA 1" Hole, HO 3" Hole on 24S-T4
18 December 1951 - Firing through rain plus simulated rain comprising fine stream from two hose nozzles							
377	"	467	600	Est 3250	0.020 3S H14 Aluminum plus	0°	HO 2-1/2" Hole
378	"	345	600	Est 3250	0.020 24S-T4 Aluminum Alloy 2' behind	0°	NFA 1" Hole, HO 3" Hole on 24S-T4
379	"	388	600	"	"	0°	HO 2-1/2" Hole
380	"	412	600	"	"	0°	NFA 1" Hole, HO 3" Hole on 24S-T4
381	"	378	600	"	"	0°	NFA 1" Hole, HO 3" Hole on 24S-T4

On rounds 372 through 381 no fuze action resulted in firing through rain or simulated rain.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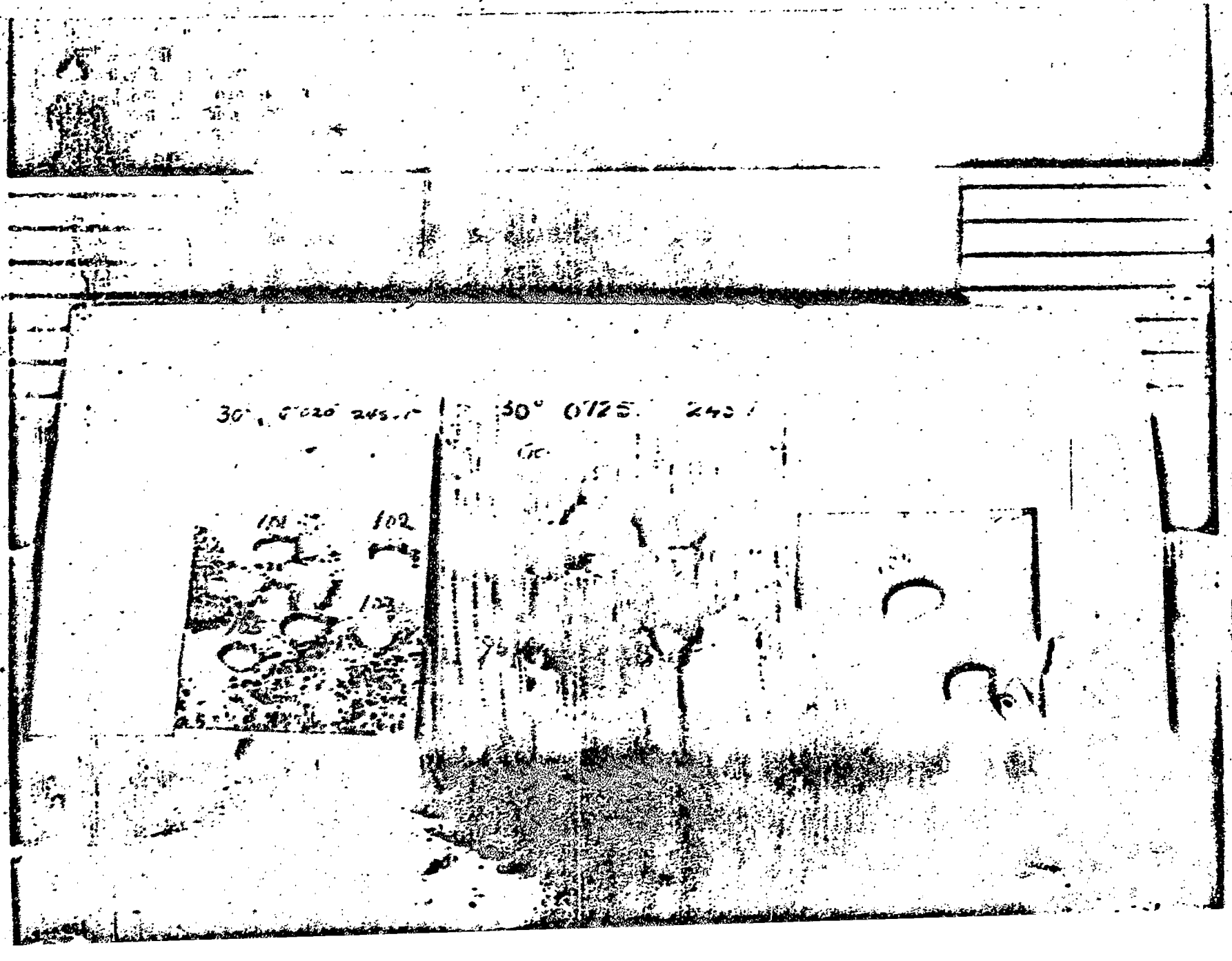
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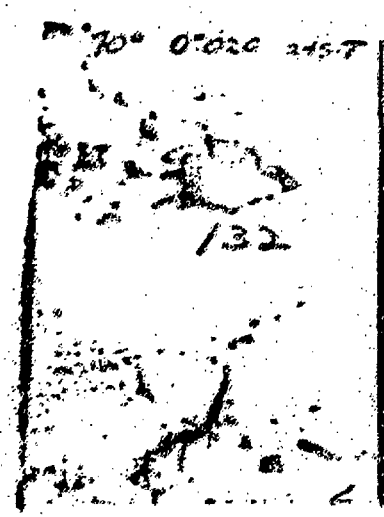
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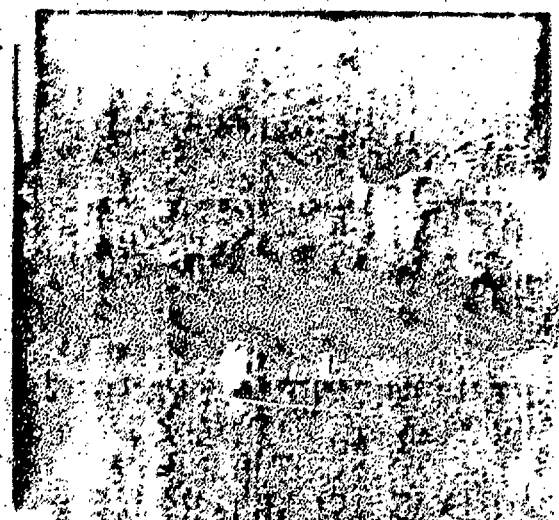
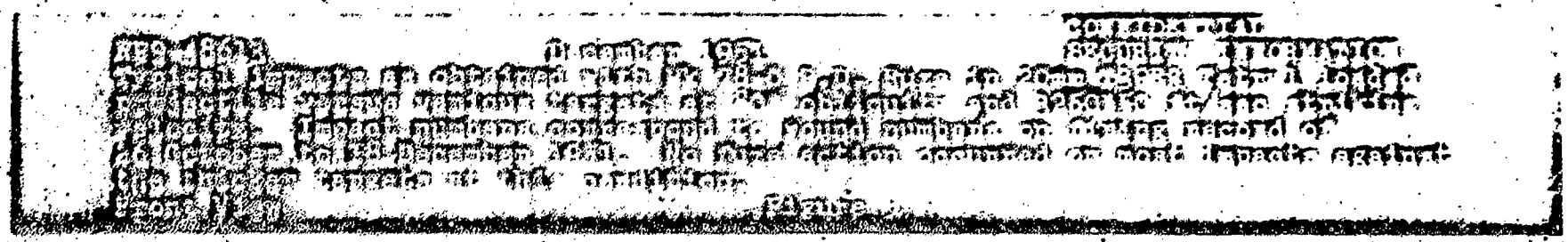
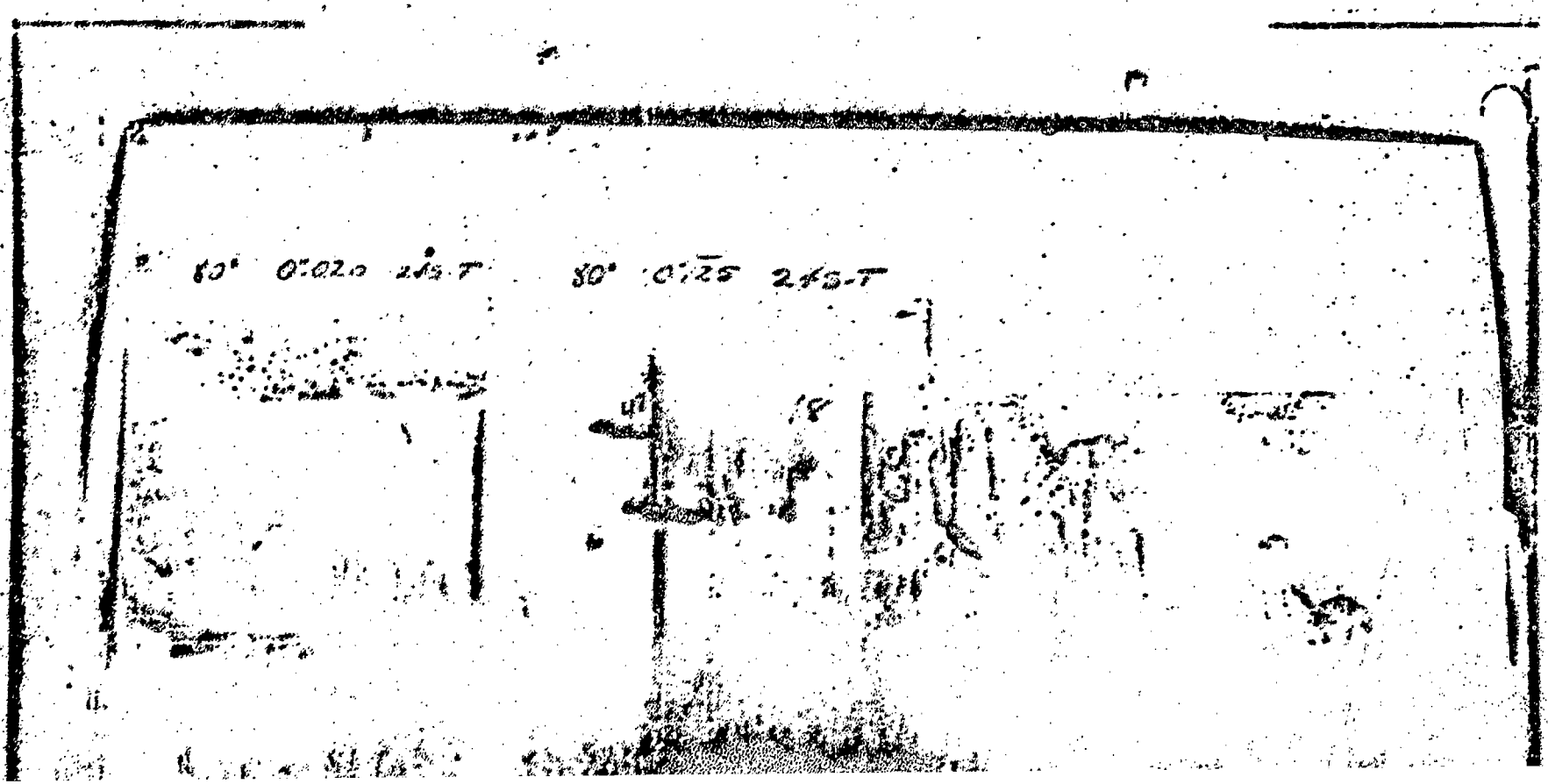
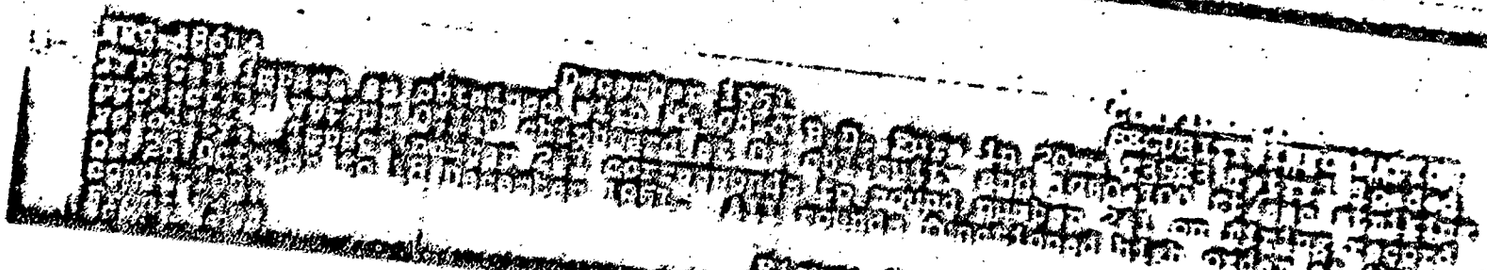




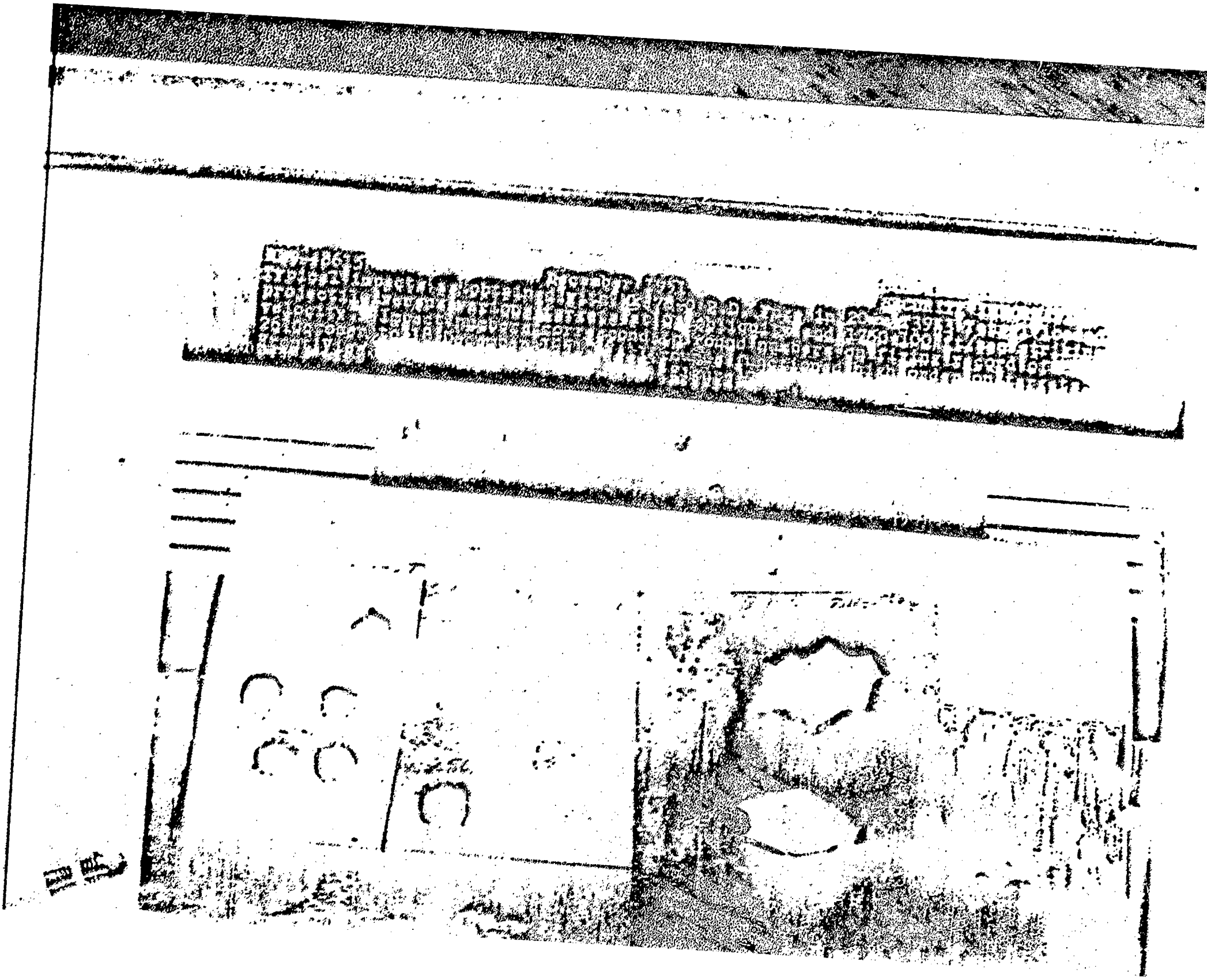

80° 0.020 245-T
80° 0.125 245-T

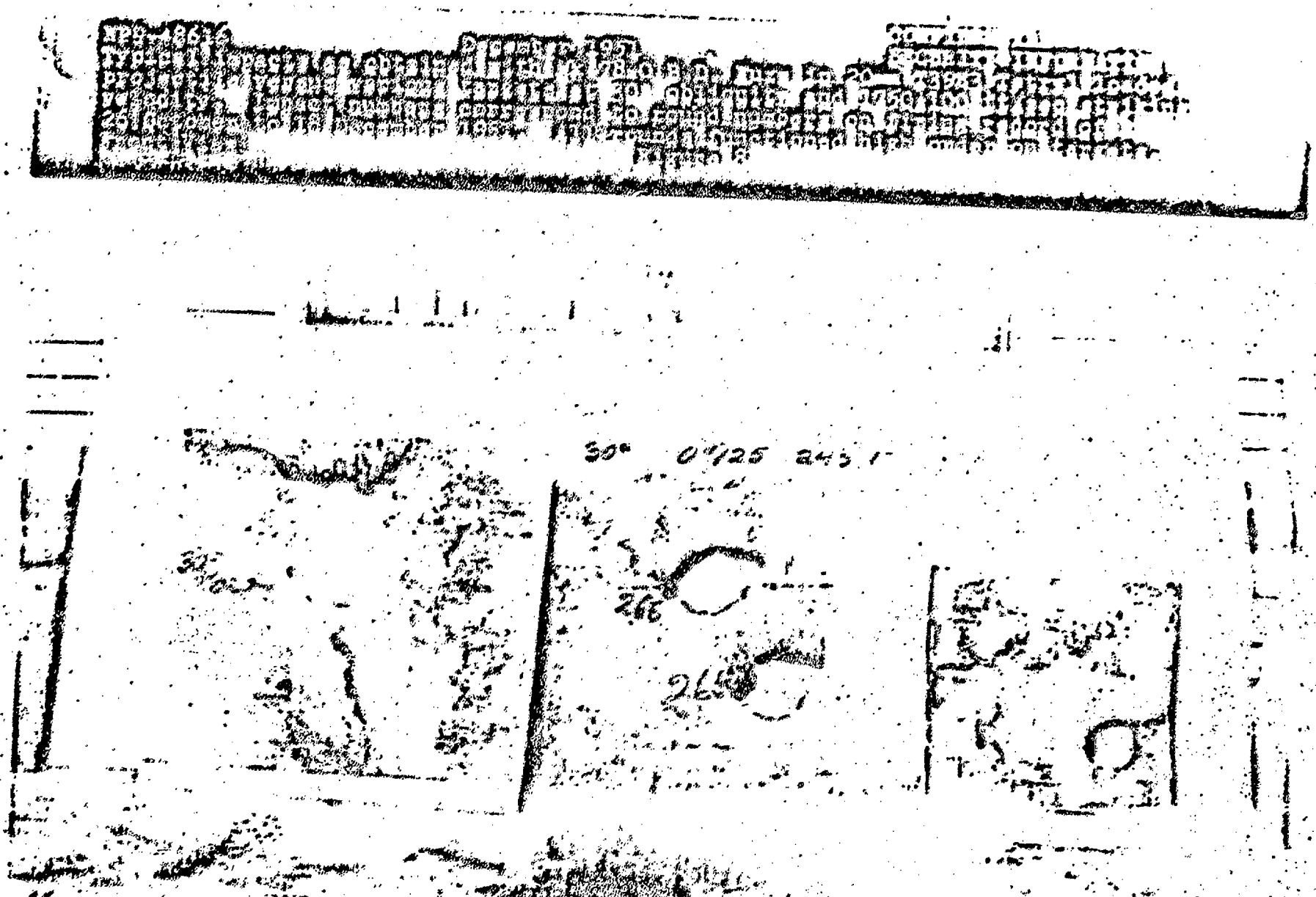


[illegible]

Figure 6

TOP 212
90° Explosive





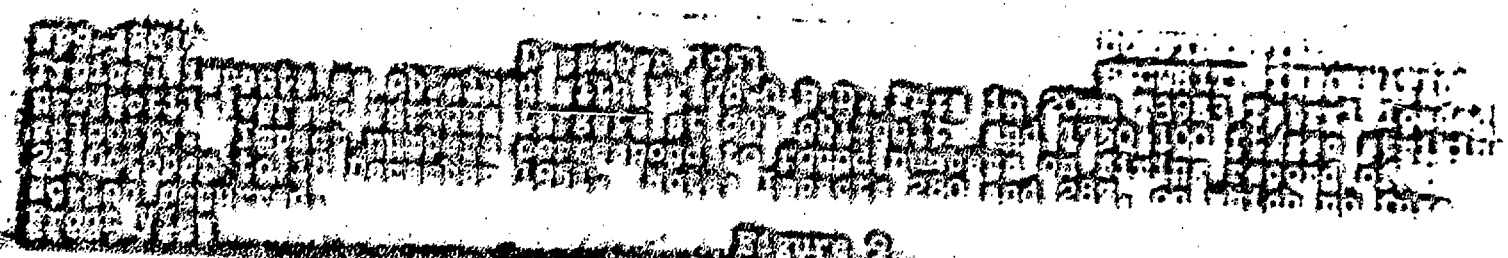
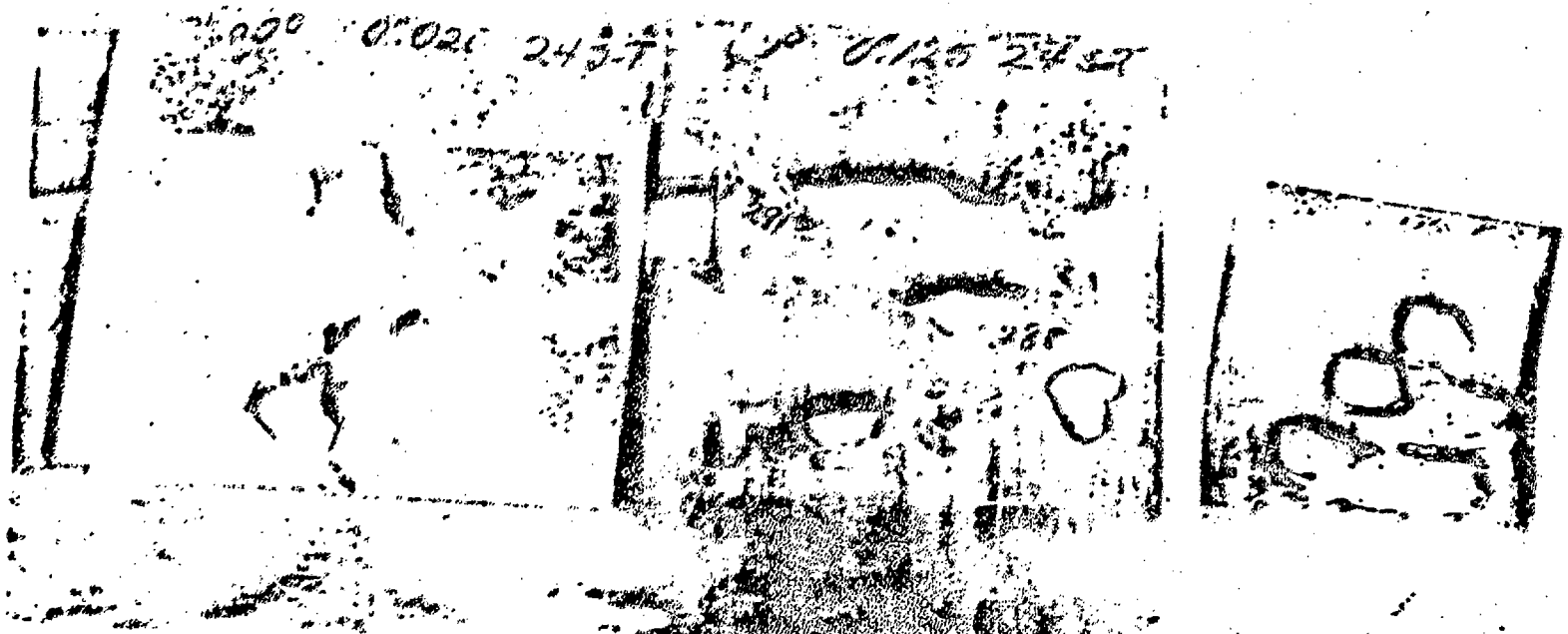
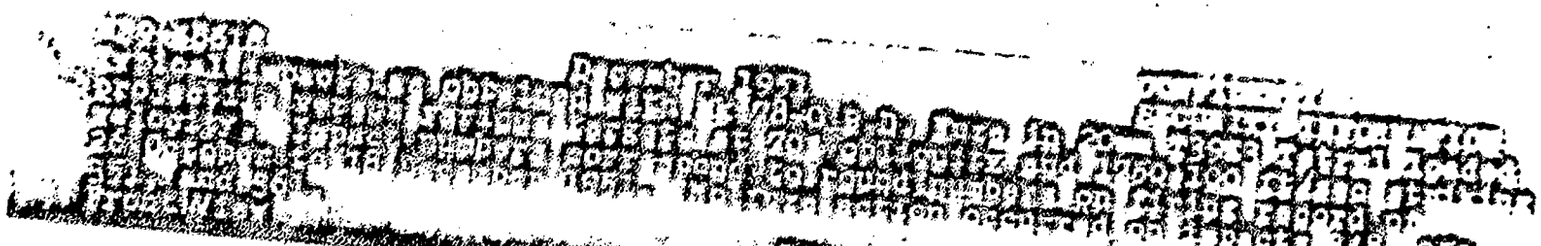


Figure 2





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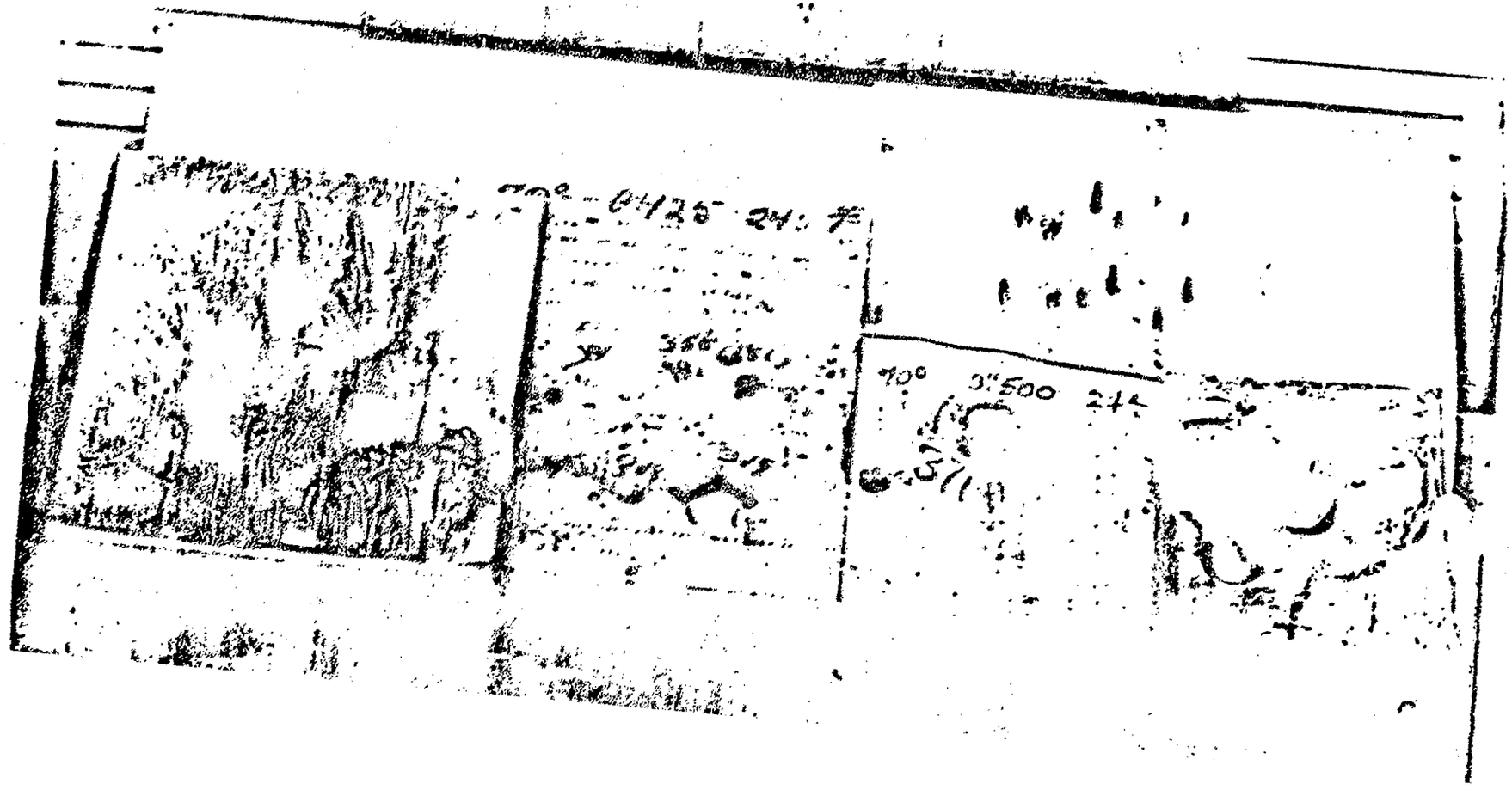

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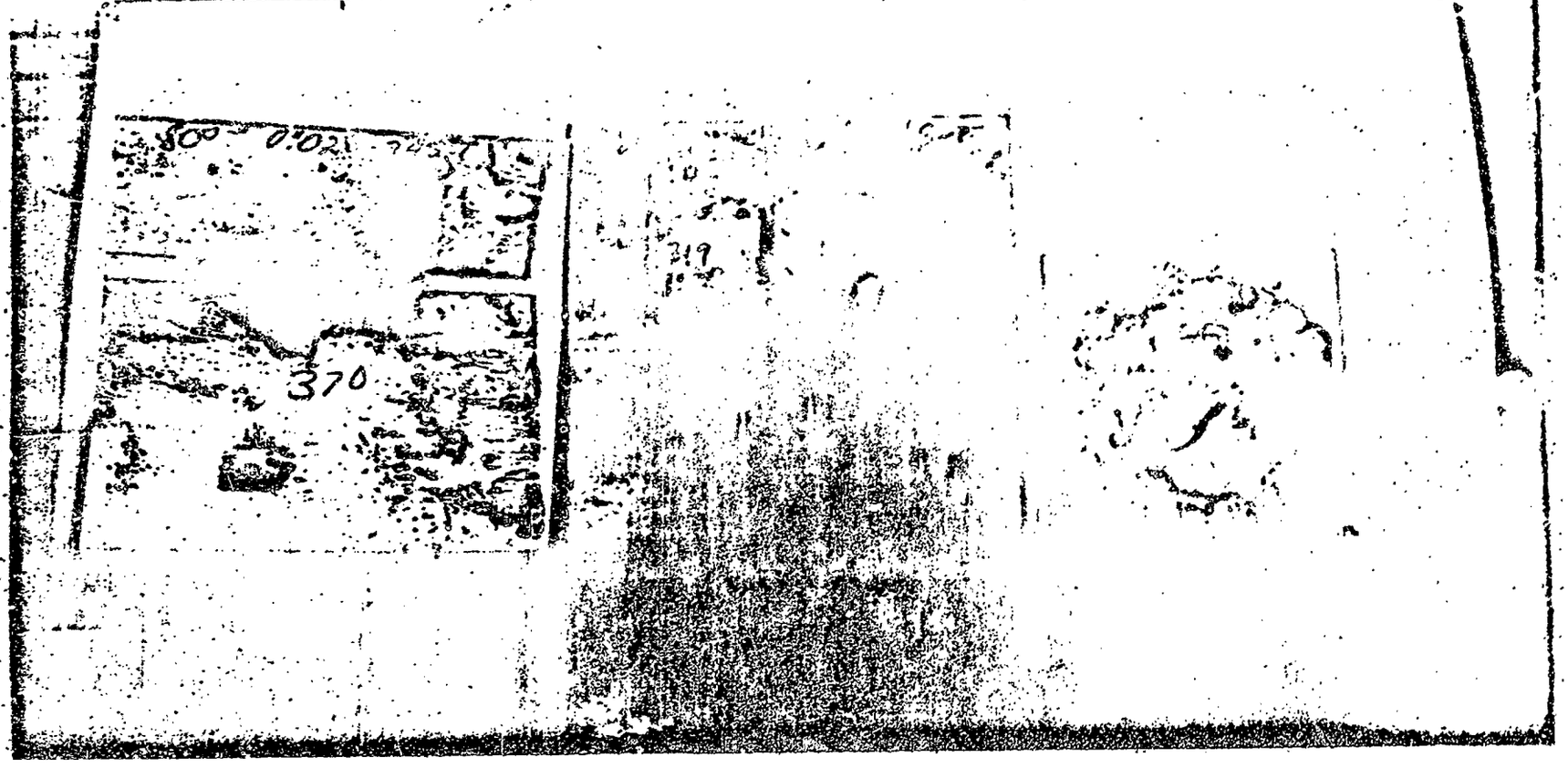
[illegible] December 1951

Typical impacts as obtained with [illegible] R.D. fuze in 20mm [illegible] tested [illegible] projectile versus various targets at [illegible] obliquity and [illegible] velocity. Impact numbers correspond to round numbers on firing record of 26 October to 18 December 1951. No fuze action [illegible] at this condition on the [illegible] plates.

Front View

Figure 11



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December 1951

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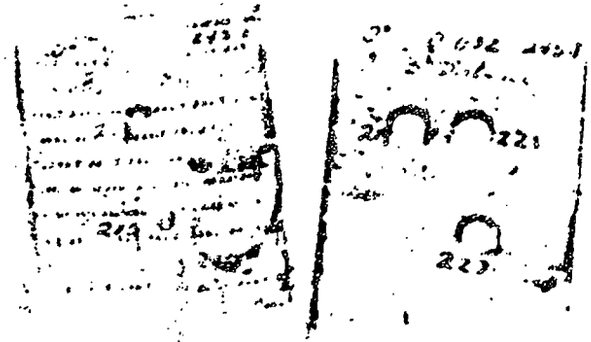
Figure 12



Pilot Production of Point Detonating Fuze
Mk 78 Mod 0 for 20mm Ammunition

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Second Partial Report on High Performance Aircraft Machine Gun Fuzes - First Partial Report on Pilot Production of Point Detonating Fuze Mk 78 Mod O for 20MM Ammunition - and Appendixes A thru C (OVER)

IMPACT FUZES

Glancy, J. J. 7 April'52 50pp. photos, tables

Fuzes, Percussion
Ammunition, Small arms

Ordnance and Armament (22)
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