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MARYLAND

A TEST OF SALVO RIFLE MATERIAL (U)

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(D. A. PROJECT NO. 504-05-022)

DEVELOPMENT AND PROOF SERVICES

40 th Report OCO Project No. TS1-2

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ARMY...OS...ABERDEEN PROVING GROUND, MD...415

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**DEVELOPMENT AND PROOF SERVICES
ABERDEEN PROVING GROUND
MARYLAND**

**AUTHORITY: CRDVS (Carten) Teletype
ORD 3383**

**L.F. Moore/tsp
September 1957**

A TEST OF SALVO RIFLE MATERIAL (U)

FORTIETH REPORT ON ORDNANCE CORPS PROJECT NO. T81-2

DATES OF TEST: 25 APRIL - 9 SEPTEMBER 1957

ABSTRACT

OBJECTIVE

To obtain velocity, accuracy and penetration data on salvo rifle material.

SUMMARY

Four salvo weapons, ten rounds of ammunition, and an additional caliber .22 bullet were subjected to one or more of the following tests; accuracy, velocity, pressure, retardation in the armor vest, time-of-flight, and penetration in the M1 steel helmet and in $\frac{1}{4}$ -inch steel plate.

CONCLUSIONS

Since the purpose of this test was to provide data for use in the study of a broad salvo program which includes both tactical as well as technical considerations, no conclusions are made.

RECOMMENDATIONS

None.

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I. INTRODUCTION

Several items of rifle material have been developed as a means for improving the effectiveness of ground troops in combat. Each of these items produces a number of projectiles with one movement of the trigger. It is desired to determine the velocity, accuracy and penetration characteristics of this material.

II. DESCRIPTION OF MATERIAL

- A. Carbines, Caliber .22, M2 serial numbers 7149237 and 7195081 were used in this test. This weapon is a caliber .30, M2, carbine modified to use Cartridge, Ball, Caliber .22, Carbine. The original barrel has been replaced with one to use the caliber .22 round and the magazine has been altered. Also, a muzzle brake of a special design has been installed.
- B. Carbine, Caliber .30, M2 serial number 7104206 was used as a control in the bench rest and automatic accuracy tests.
- C. Rifles, Caliber .22, T48 serial numbers 1606 and 1909 were used in this test. This weapon is a caliber .30, T48 rifle modified to use Cartridge, Ball, Caliber .22 (unofficially called T48) with 68-grain bullet. The original barrel has been replaced and the magazine has been altered to use the caliber .22 round.
- D. Rifle, Caliber .30, T48 serial number 4085 was used as a control in the benchrest and automatic accuracy tests.
- E. Rifles, U.S., Caliber .30, M1, Modified, serial numbers 5973453 and 5977047 were used in testing the Duplex and Triplex rounds.
- F. The shotgun used with the flechette ammunition was a Code A, 12-gage with a 28-inch modified barrel. The barrel was reinforced by the addition of four V-shaped sections of 1/16-inch material.
- G. The following test weapons were employed:
1. Rifle, Code E, M70, Serial Number 304164 with a caliber .22 carbine test barrel assembled.
 2. Rifle, U.S., M1903, Serial Number 4747051 with a caliber .22 test barrel assembled.
 3. Rifle, U.S., M1903, Serial Number 1521616 with a caliber .30 accuracy test barrel assembled.
 4. Rifle, Code E, M70, Serial Number 367368 with a caliber .27 test barrel assembled.

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6. Rifle, Code E, M70, Serial Number 367844 with a caliber .25 test barrel assembled.

6. Rifle, Code E, M70, Serial Number 364827 with a caliber .22 test barrel assembled.

7. Rifle, U.S., M1903, Serial Number 1515142 with a caliber .30 accuracy test barrel assembled.

H. The following barrels were employed with universal receivers:

1. Barrel, pressure, caliber .22, carbine.
2. Barrel, pressure, caliber .30, number 3830.

I. Cartridge, Ball, Caliber .22, carbine uses a brass case, ball propellant, and a lead-core jacketed bullet. The average weight of five rounds selected at random was 132 grains, the average bullet weight was 41.1 grains, the average weight of the primed case was 75.0 grains, and the average weight of the propellant was 16.2 grains.

J. Cartridge, Ball, Caliber .22 (unofficially identified as T-8) uses a brass case, ball propellant, and a lead-core jacketed bullet. The average weight of five rounds selected at random was 267 grains, the average bullet weight was 68.2 grains, the average weight of the primed case was 174.6 grains, and the average weight of the propellant was 44.2 grains.

K. Cartridge, Ball, Caliber .30, Duplex uses a brass case similar to the standard caliber .30 except that the neck has been lengthened 0.45 inch (overall length of the case is 2.94 inches). Ball propellant is used with two lead-core jacketed bullets. The average weight of five rounds selected at random was 445 grains, the average weight of the front bullet was 95.5 grains, the average weight of the rear bullet was 95.6 grains, the average weight of the propellant was 49.8 grains, and the average weight of the primed case was 204.5 grains. The base of the rear bullet is at an angle of four degrees with the normal to the axis. The base of both bullets is concave. The point of the rear bullet extends within the base of the front bullet when assembled in the case. The following information is printed on each 20-round cartridge box:

Cartridge, Ball, Cal. .30 Duplex
(Controlled Dispersion)
Loading Date - May 1956
Contract No. DA-19-059-907-ORD-2374
Manufacturer: Code D.

L. Cartridge, Ball, Caliber .30, Triplex uses components similar to those in the Duplex round except for the projectiles. Three lead core jacketed bullets are used. The average weight of five rounds selected at random was 434 grains, the average weight of the front bullet was 59.5 grains, the average weight of the center bullet was 59.5 grains,

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The average weight of the rear bullet was 59.7 grains, the average weight of the propellant was 52.4 grains, and the average weight of the primed case was 203.1 grains. The base of each bullet is concave. The point of the two rearmost bullets extends within the base of the forward bullet when assembled in the case. The following information is printed on each 30-round cartridge box:

Cartridge, Ball, Cal. .30 Triplex
Long Neck Case
WRA 1956 ORD 2381

M. Cartridge, AP, Caliber .30, T93E2, Lot LC 12010 was fired in the rifle, caliber .30, T48 which was used as a control.

N. Cartridge, Ball, Carbine, Caliber .30, M1, Lot LC 813769 was fired in the carbine, caliber .30, M2, which was used as a control.

O. The following caliber .30 reference round was fired in the barrel, pressure, caliber .30, Number 3830:

Case: Caliber .30, Lot PAY 30-375 with Code F No. 8 $\frac{1}{2}$ primer
Bullet: AP, M2, Lot PAY 30-374
Propellant: DMR 4895, Lot 2057, 48.5 grains.
Assessed values: Velocity 2716 fps
Pressure 45,900 psi

P. The flechette ammunition used in the 12-gage shotgun was assembled by Code B. It was identified by the Philadelphia Ordnance District as Shotgun Rounds, Type A-11, in accordance with AA Inc Drawing No. 1150-040001. Ten rounds were delivered on 4 June 1957 for the directed test. At a later date fifty rounds were delivered as instructed by Mr. Charles Dickey, Pitman Dunn Laboratory, Frankford Arsenal, for use in testing special target material by representatives of the Code C. Seven rounds of the 50 delivered for use in target testing were not used in that activity and they were made available for the directed test. The ten rounds provided for this test were fired in the velocity pattern and penetration test. One of the rounds from the latter delivery was broken down and the components inspected and weighed. The remaining rounds were fired to test instrumentation and in a penetration test at 200 yards. There was a slight difference in the ammunition in the two shipments. The rounds in the latter shipment had no wad over the front of the projectiles. The weight of the complete round was 717 grains. The weight of the components were as follows:

COMPONENT	WEIGHT (grains)
Flechettes (32 in number)	390.5
Plastic sabots (4)	56.5
Aluminum plug	40.5
First wad	12.7
Second wad	9.9
Propellant (flake type)	30.2
Primed case	176.3

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The diameter of the body of the flechette was 0.087 inch. At a still later date 105 rounds were made available for helmet penetration tests at 300, 400 and 500 yards.

Q. The following additional rounds were used in the retardation test conducted with the armor vest. The rounds were fired with full and reduced charges.

1. Cartridge, Ball, Caliber .22, with 50-Grain Bullet, Lot 10LK4 uses a brass case, ball propellant, and a lead-core jacketed bullet. The average weight of five rounds selected at random was 271 grains, the average bullet weight was 50.3 grains, the average weight of the primed case was 173.2 grains, and the average weight of the propellant was 47.7 grains.

2. Cartridge, Ball, Caliber .25, with 75-Grain Bullet, Lot 74MC31 uses a brass case, ball propellant, and a lead-core jacketed bullet. The average weight of five rounds selected at random was 285 grains, the average bullet weight was 74.9 grains, the average weight of the primed case was 174.3 grains, and the average weight of the propellant was 46.4 grains.

3. Cartridge, Ball, Caliber .27, with 95-Grain Bullet, Lot 66LM62 uses a brass case, ball propellant, and a lead-core jacketed bullet. The average weight of five rounds selected at random was 314 grains, the average bullet weight was 95.2 grains, the average weight of the primed case was 174.0 grains, and the average weight of the propellant was 44.7 grains.

4. Cartridge, Ball, Caliber .30, M2, Lot FA 4310 uses a brass case, tubular propellant and a lead-core jacketed bullet. The average weight of the rounds selected at random was 399 grains, the average bullet weight was 150.1 grains, the average weight of the primed case was 199.0 grains, and the average weight of the propellant was 49.8 grains.

R. A lead-core jacketed bullet identified as a 50-Grain Full Patch Front Bullet for Caliber .22-06 Duplex Cartridge was loaded in the T48 case using the required charge of IMR No. 4895 propellant to give the desired velocities.

S. The body armor employed in the retardation test was identified as follows:

Armor Vest Overdressed

W44 Over

.Att. Date 6 Oct. 1953

Phila. Q.M. Depot

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III. DETAILS OF TEST

A. PROCEDURE

1. The various rounds were subjected to velocity and pressure tests where appropriate test weapons were available. Twenty rounds were fired in each test. The velocity was recorded at 78 feet from the muzzle by means of photoelectric screens and a counter chronograph. The pressure was determined by means of copper pressure cylinders (Drawing Number A-39436) and obturating cups (Drawing Number A-39435) with the appropriate target table.

2. Simultaneous time-of-flight and remaining-velocity tests were conducted.

a. For the single-projectile ammunition, data were taken over ranges of 200, 400 and 500 yards with counter chronographs. Caliber .30, Ball M2, ($C_0 = .227$, 600-yard data) was used as control.

b. For the duplex and triplex ammunition, data were taken over ranges of 100, 300 and 500 yards with the camera chronograph. Individual component velocities were recorded, using the same type of instrumentation as was used in obtaining velocities for multiple "darts", fired from shotgun shells, as described in the 36th Report on Project No. T81-2. In the "Duplex" firing on 22 and 23 May, the instrumental velocities at 25 ft. were not distinguished for the two components. Thereafter, they were distinguished. In the "Triplex" firing the instrumental velocities at 25 ft for the 2nd and 3rd component were not distinguished in any of the firing. In the 500-yard Triplex firing on 17 June a third lumiline screen was used at 60 ft., obtaining a second instrumental velocity at 35 ft. Components No. 2 and No. 3 still gave the same velocity (i.e. the velocity of component No. 3 was not detected). This was the last firing. It appeared that unless the velocity differences were on the order of 200 fps., the lumiline screens did not "load up" rapidly enough to record the velocity of a succeeding component. The times-of-flight and remaining velocities of the "Triplex" were so nearly the same (and over-lapped for some rounds) for the 2nd and 3rd components, that unless data for both components were obtained, it was not known which component was being measured.

Differences in times-of-flight, and similarity of ballistic coefficient, as indicated by shape and weight of the components, were taken as evidence that the velocity at 25 ft for the third component of the "Triplex" was not being detected. An approximate correction factor, to obtain the velocity of the 3rd component from that of the second was obtained as follows: Based on the 100-yard data, C_1 for the 1st component was .100 and for the 2nd, .096. Times were recorded by the camera chronograph, between 10 ft and 40 ft and between 40 ft and 250 ft of range. Velocities V_1 and V_2 , (2614 and 2153 fps) corresponding to these two time intervals, were computed for the first component. V_1 , over the

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short time interval, was, as usual, considered applicable to the mid-point of the range interval (at 25 ft). From the velocities V_1 and V_2 and the ballistic coefficient, the corresponding range (149 ft) was computed. This determined the point of applicability of V_2 as being at 149 / 25 ft. This was taken to closely approximate the point of applicability of the corresponding velocity, V_2 , for the 3rd component. Using the 1st-component ballistic coefficient as an approximation of that of the 3rd., the velocity at 25 ft for the 3rd component ($V_1 = 2334$ fps), was computed from the measured velocity $V_2 = 1920$ fps and the range (149 ft as approximated above). This velocity, $V_1 = 2334$ fps, was 86 fps lower than that of the 2nd component (the mean observed 2nd velocity at 25 ft). The mean observed 2nd velocity at 25 ft was consequently "corrected" to 3rd-component velocity by a reduction of 86 fps in all data. The eleven rounds for which complete data were obtained, on 28 May over the 100-yard range, were used in determining the 86 fps correction factor.

3. The following accuracy tests were conducted:

a. Machine-rest accuracy tests were conducted at 100 and 300 yards. The targets were obtained simultaneously using the A target without backing material at the shorter range.

- (1) Five ten-shot targets were obtained with each of the two types of caliber .22 cartridges with the appropriate accuracy test rifle assembled in a Rest, Recoil, Accuracy, Caliber .30, Carbine and mounted in a Frankford Arsenal machine rest using an appropriate "V" block.
- (2) Four ten-round targets were obtained with each Duplex and Triplex caliber .30 rounds from each of two M1 rifles modified to use these special rounds. The rifle was assembled in Cradle, Universal, for Rifle Accuracy Firing and mounted in a Frankford Arsenal machine rest using an appropriate "V" block.

b. Bench-rest accuracy tests were conducted at 100 and 300 yards using the modified carbine and the modified T48 rifle. The targets at the two ranges were obtained simultaneously as in the machine-rest test. Five ten-round targets were fired from each weapon using the A target (with 10-inch bull's-eye) as an aiming point. One caliber .30 Carbine and one caliber .30 T48 rifle were fired per control.

c. An automatic accuracy test was conducted with the caliber .22 weapons using standard caliber .30 weapons as a control. Three shooters each fired ten three-shot bursts from each type weapon from both the prone and standing positions at 25 yards.

d. In the test described in paragraph 3A (2) above some of the shots failed to hit a 6 x 6-foot target at 100 yards when firing the Triplex round.

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An additional test was conducted at a range of 50 yards to further establish the accuracy characteristics of this round. Four 10-round targets were fired from a bench rest using a 12 x 12-foot target with an A target in its center. The first shot in each round was identified by applying colored ink to the exposed bullet. The three shot holes for each round were also identified.

e. Additional accuracy tests were conducted to determine the cause for the poor accuracy obtained in firing the T48 caliber .22 round. Components of known quality were used as a control.

4. Penetration tests were conducted in steel helmets at 300 and 500 yards with each type of weapon.

5. Retardation tests were conducted on body armor with caliber .22, caliber .25, caliber .27 and caliber .30 rounds. The velocity for each round was calculated for ranges of 0, 140, 300 and 500 yards. Full and reduced charges were used to obtain the desired velocity levels for penetrating the vest at a range of 55 feet.

6. The flechette ammunition was fired in a modified 12 gage shotgun. Ten rounds were fired for velocity, pattern and penetration in M1 helmets. The velocity was recorded at 7 feet from the muzzle of the weapon by means of Lumiline screens and a counter chronograph. The screens were placed at a distance of 2 and 12 feet from the muzzle of the weapon. The pattern was recorded on a 6 x 6-foot Kraft paper target without backing material. Three rows of four M1 steel helmets and liners were placed at 100 yards for observation of penetration. Additional tests were conducted to determine penetration on M1 steel helmets at ranges of 200, 300, 400 and 500 yards.

7. A lead-core jacketed bullet identified as a 50-Grain Full Patch Front Bullet for Caliber .22-06 Duplex Cartridge was loaded in the T48 case using the required charge of DMR No. 4895 propellant to give the desired velocities. The round was subjected to time-of-flight, accuracy and penetration tests.

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D. RESULTS

Function reports are attached as Appendix B and test data are attached as Appendix C. There follows a summary of results.

VELOCITY TEST

The velocity is given in feet per second at 76 feet.

	ROUND			
	CALIBER .22 CARBINE	CALIBER .22 T48	DUPLEX*	TRIPLEX*
Average	2867	3259	2446	2473
Maximum	2941	3303	2491	2564
Minimum	2805	321	2393	2215
Extreme Variation	116	92	98	369
Mean Variation	10.5	24.2	22.7	107.4

PRESSURE TEST

The chamber pressure is given in pounds per square inch.

	ROUND		
	CALIBER .22 CARBINE	DUPLEX	TRIPLEX
Average	36690	52115	55125
Maximum	39500	55800	59000
Minimum	32600	47200	52100
Extreme Variation	6900	2500	6900
Mean Variation	1221	1480	1875

- * Velocity recorded during pressure test (short-piston velocity).
Velocity is for first bullet which passed over screen.

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TIME-OF-FLIGHT AND REMAINING-VELOCITY TESTS

AMMUNITION TYPE	RANGE yds	DRAG FUNCTION	BALLISTIC COEFFICIENT								
			TIME OF FLIGHT DATA	REMAINING VELOCITY DATA		MEAN					
Cal. .22, Gaz-bine	200	GAPT9B4	.136	.132		.134					
	400		.131		.132						
	600		.128		.130						
	Mean:		.132								
Cal. .22, TUS	200	G5	.215	.211		.213					
	400		.236		.230						
	600		.234		.234						
	Mean:		.226								
Cal. .22-06 Duplex (Front Bullet, Single fire)	200	G6	.108	.109		.109					
	400		.116		.115						
	600		.119		.118						
	Mean:		.113								
Cal. .30, Ball, M2 Lot PA-4332 (Control)	200	G6	.226	.221		.224					
	400		.226		.226						
	600		.229		.228						
	Mean:		.226								
Cal. .30 Duplex	100	G1	1st .160	2nd .180	1st .181	2nd .172	1st .150	2nd .180			
	300		.170	.174	.168	.168	.169	.171			
	500		.168	.176	.174	.180	.171	.178			
	Mean:		.167	.176							
Cal. .30, Triplex	100	G1	1st .100	2nd .094	3rd .096	1st .100	2nd .088	3rd .091			
	300		.100	.088	.087	.101	.093	.087	.101	.090	.088
	*500		.112	.110	.095	.103	.093	.093	.108	.102	.094
	Mean:		.101	.091	.091						

*Based on one (1) round only, and excluded from mean.

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Data for Standard Meteorological conditions are tabulated below. Missile velocities are based on mean observed instrumental velocities. For the single-projectile type ammunition, the mean ballistic coefficient obtained from the observed data, was used for the 200, 400, and 600-yard ranges. The 300 and 500 yard values were obtained by linear interpolation. For the duplex and triplex ammunition, the same ballistic coefficient was used for all ranges (the mean of the values obtained from the 100, 300 and 500-yard observed data).

<u>RANGE</u> <u>yds</u>	<u>BALLISTIC</u> <u>COEFFICIENT</u>	<u>REMAINING</u> <u>VELOCITY, fps</u>	<u>MAXIMUM</u> <u>ORDINATE, ft</u>	<u>ELEVATION</u> <u>min</u>
----------------------------	--	--	---------------------------------------	--------------------------------

Cal. .22 Carbine

0	C _{AP-T924} : .134	2981		
100	.134	2831	.1	2.3
200	.134	1939	.3	5.0
300	.133	1505	.7	9.0
400	.132	1157	1.8	14.8
500	.131	989	3.6	23.4
600	.130	882	6.5	35.0

Cal. .22, T48

0	C ₅ : .213	3314		
100	.213	3030	.0	1.7
200	.213	2756	.2	3.4
300	.221	2520	.4	5.4
400	.230	2312	.8	7.8
500	.232	2092	1.3	10.3
600	.234	1885	2.1	13.3

Cal. .22-06 Duplex (From bullet)

0	C ₆ : .109	3543		
100	.109	3086	.0	1.5
200	.109	2630	.2	3.2
300	.112	2213	.4	5.3
400	.115	1837	.9	8.0
500	.116	1483	1.7	11.6
600	.118	1200	3.0	16.2

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<u>RANGE</u> <u>yds</u>	<u>BALLISTIC</u> <u>COEFFICIENT</u>	<u>REMAINING</u> <u>VELOCITY, fps</u>	<u>MAXIMUM</u> <u>ORDINATE, ft</u>	<u>ELEVATION</u> <u>min</u>
Cal. .30 Ball, M2, (Lot No. FA 4332) Control				
0	C6: .224	2702		
100	.224	2479	.1	2.6
200	.224	2259	.2	5.2
300	.225	2047	.6	8.3
400	.226	1845	1.2	11.7
500	.227	1655	2.0	15.8
600	.228	1478	3.3	20.4

Cal. .30 Duplex
1st Component

0	C1: .167	2512		
100	.167	2015	.1	3.0
200	.167	1584	.4	7.2
300	.167	1246	1.1	13.1
400	.167	1039	2.5	21.4
500	.167	925	4.8	32.4
600	.167	843	8.3	46.3

Cal. .30 Duplex
2nd Component

0	C1: .176	2354		
100	.176	1904	.1	3.4
200	.176	1515	.4	8.1
300	.176	1214	1.2	14.6
400	.176	1031	2.7	23.4
500	.176	925	5.1	35.0
600	.176	848	8.6	49.1

Cal. .30 Triplex
1st Component

0	C1: .101	2678		
100	.101	1867	.1	3.0
200	.101	1257	.4	8.0
300	.101	965	1.5	16.8
400	.101	827	3.6	30.0
500	.101	725	7.2	47.7
600	.101	640	12.8	70.1

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<u>RANGE</u> <u>yds</u>	<u>BALLISTIC</u> <u>COEFFICIENT</u>	<u>REMAINING</u> <u>VELOCITY, fps</u>	<u>MAXIMUM</u> <u>ORDINATE, ft</u>	<u>ELEVATION</u> <u>min</u>
(Cal. .30 Triplex)				
2nd Component				
0	C ₁ .091	2556		
100	.091	1693	.1	3.4
200	.091	1117	.5	9.6
300	.091	893	1.8	20.4
400	.091	765	4.3	36.3
500	.091	665	8.6	57.3
600	.091	581	15.2	83.4

3rd Component				
0	C ₁ .091	2495		
100	.091	1646	.1	3.5
200	.091	1095	.6	10.1
300	.091	883	1.9	21.4
400	.091	758	4.5	37.7
500	.091	660	8.8	59.0
600	.091	575	15.7	86.2

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ACCURACY TESTS

MACHINE-REST ACCURACY

The averages for five ten-shot targets from each test weapon are given in inches.

<u>ROUND</u>	<u>MR</u>	<u>MVD</u>	<u>MED</u>	<u>EVD</u>	<u>END</u>	<u>ES</u>
<u>100-Yard Targets</u>						
Caliber .22 Carbine	0.6	0.4	0.3	1.5	1.4	1.8
Caliber .22 T48	2.0	1.0	1.5	4.2	6.4	6.8
<u>300-Yard Targets</u>						
Caliber .22 Carbine	1.8	1.2	1.1	4.8	4.3	5.6
Caliber .22 T48	6.0	3.2	4.4	13.1	19.3	20.4

The averages for four ten-round targets from each rifle are given in inches.

<u>FIRST SHOTS</u>						<u>ALL SHOTS</u>			
<u>MR</u>	<u>MVD</u>	<u>MED</u>	<u>EVD</u>	<u>END</u>	<u>ES</u>	<u>MR*</u>	<u>EVD</u>	<u>END</u>	<u>ES</u>
<u>DUPLEX ROUND</u>									
<u>100-Yard Targets</u>									
Rifle No. 5973453									
1.8	1.2	1.0	5.9	4.1	6.6	10.8	19.3	18.6	20.8
Rifle No. 5977047									
2.0	1.5	1.0	5.3	4.0	6.2	8.4	19.2	15.0	19.7
Average									
1.9	1.35	1.0	5.6	4.05	6.4	9.6	19.25	16.8	20.25
<u>300-Yard Targets</u>									
Rifle No. 5973453									
5.9	4.3	3.1	18.4	12.2	19.8	31.6	56.4	56.9	63.4
Rifle No. 5977047									
6.0	4.6	2.9	17.4	11.8	19.4	25.0	56.8	45.8	59.2
Average									
5.95	4.45	3.0	17.9	12.0	19.6	28.3	56.6	51.35	61.3

* From the center of impact of the first shot in each round.

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FIRST SHOTS						ALL SHOTS			
MR	MVD	MHD	EVD	EHD	ES	MR	EVD	EHD	ES

TRIPLEX ROUND

100-Yard Targets

Rifle No. 5973453
6 Shots missed target* 12 shots missed target*

Rifle No. 5977047
3 shots missed target* 6 shots missed target*

300-Yard Targets

Rifle No. 5973453
5 shots missed target** 13 shots missed target**

Rifle No. 5977047
5 shots missed target** 6 shots missed target**

* A 6 x 6-foot target was used at 100 yards
** A 15 x 15-foot target was used at 300 yards.

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SPECIAL TEST OF CARTRIDGE, BALL, CALIBER .22, T48

TO DETERMINE CAUSE FOR POOR ACCURACY

Average measurements for ten-shot machine-rest targets fired at a range of 100 yards are given in inches.

<u>NO. OF TARGETS</u>	<u>MR</u>	<u>MVD</u>	<u>MED</u>	<u>EVD</u>	<u>EDD</u>	<u>ES</u>
Cartridge, Ball, Caliber .22, T48 with the original bullet replaced with one of 68-grain of the same design but from a different lot.						
4	0.8	0.5	0.5	2.3	1.8	2.4
Cartridge, Ball, Caliber .22, handloaded with bullet removed from T48 round, 42 grains 4350 propellant, and WCC-9 primer.						
4	1.1	0.8	0.6	3.0	2.9	3.7
Cartridge, Ball, Caliber .22, handloaded with a 68-grain bullet, 42 grains 4350 propellant, and WCC-9 primer.						
2	0.5	0.4	0.2	1.4	1.1	1.7
Cartridge, Ball, Caliber .22, handloaded with propellant removed from the T48 round, WCC-9 primer, and a 68-grain bullet.						
2	1.0	0.6	0.8	2.3	2.8	3.2

TEST OF 50-GRAIN FULL PATCH BULLET FOR CALIBER

.22-06 DUPLEX CARTRIDGE AND 37.0 GRAINS OF IMR 4895 PROPELLANT

Average measurements for four ten-shot machine rest groups fired at a range of 100 yards are given in inches.

<u>MR</u>	<u>MVD</u>	<u>MED</u>	<u>EVD</u>	<u>EDD</u>	<u>ES</u>
0.8	0.6	0.6	2.1	2.1	3.4

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BENCH-REST ACCURACY

The averages for five ten-shot targets from each test weapon are given in inches.

<u>WEAPON</u>	<u>MR</u>	<u>MVD</u>	<u>MED</u>	<u>EVD</u>	<u>END</u>	<u>sd</u>
<u>100-Yard Targets</u>						
Caliber .22						
Carbine No. 7149237	1.3	0.9	0.8	3.5	3.0	4.2
Caliber .22						
Carbine No. 7195081	1.5	1.0	1.0	4.1	4.2	5.1
Average	1.4	0.95	0.9	3.8	3.6	4.65
Caliber .30						
Carbine No. 7104206	2.1	1.7	0.9	6.2	4.0	6.6
Caliber .22						
T48 No. 1616	2.5	1.6	1.6	6.4	6.5	7.7
Caliber .22						
T48 No. 1909	7.2	4.9	4.6	15.7	14.4	19.1
Average	4.85	3.25	3.1	11.05	10.45	13.4
Caliber .30						
T48 No. 4085	3.2	1.8	2.2	8.2	8.1	9.7
Caliber .22						
Carbine No. 7149237	4.4	2.7	2.9	11.5	10.9	13.8
Caliber .22						
Carbine No. 7195081	5.0	3.3	3.2	13.0	13.1	16.3
Average	4.7	3.0	3.05	12.25	12.0	15.05
Caliber .30						
Carbine No. 7104206	7.1	5.9	2.9	21.4	13.3	22.0
Caliber .22						
T48 No. 1616	7.5	4.9	4.8	18.6	19.9	23.3
Caliber .22						
T48 No. 1909	21.4	14.0	14.2	44.7	43.9	56.1
	14.45	9.45	9.5	31.65	31.9	39.7
Caliber .30						
T48 No. 4085	9.6	5.1	6.9	23.4	24.6	29.0

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BENCH-REST ACCURACY TEST OF TRIPLEX ROUND

The averages for four ten-round targets fired at a range of 50 yards are given in inches.

<u>FIRST SHOTS</u>						<u>ALL SHOTS</u>			
<u>MR</u>	<u>MVD</u>	<u>MED</u>	<u>EVD</u>	<u>EHD</u>	<u>E3</u>	<u>MR*</u>	<u>EVD</u>	<u>EHD</u>	<u>E3</u>
8.1	6.8	3.5	37.2	17.6	38.6	7.6	40.6	28.3	43.8

* From the center of impact of the first shot in each round.

AUTOMATIC ACCURACY

The mean distance of the two automatically-fired shots in each three-round burst from the center of impact of the first shots is given in inches. Each figure is an average for ten three-round bursts fired by each of three shooters at 25 yards.

<u>WEAPON</u>	<u>POSITION</u>	
	<u>PRONE</u>	<u>STANDING</u>
Caliber .30 Carbine	41.8	70.7
Caliber .22 Carbine	19.9	19.3
Caliber .30 T48	29.9	101.4
Caliber .22 T48	16.0	28.2

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PENETRATION*

CARTRIDGE	RANGE(yds)	NUMBER OF FAIR HITS	RESULTS
Helmet, Soldier, Steel, M2 with Liner			
Caliber .22 Carbine	300	5	All bullets gave complete perforations in one side of helmet and liner.
	400	5	All bullets failed to penetrate helmet.
Caliber .22 T&S	500	5	All bullets gave complete perforations in both sides of helmet and liner.
Caliber .30 Duplex	300	5	Two first bullets which hit helmet gave complete perforations in one side of helmet and both sides of liner.
	400	5	Three second bullets which hit helmet failed to penetrate. Of four first bullets which hit helmet, one gave a complete perforation in one side of helmet and liner, and three failed to penetrate. One second bullet which hit helmet gave a complete penetration in one side of helmet and liner.
Caliber .30 Triplex	100	7	Of six second or third bullets which hit helmet, five gave complete perforations in both sides of helmet and liner and one gave a complete perforation in one side of helmet and both sides of liner. One first bullet which struck helmet gave a complete perforation in both sides of helmet and liner.
	200	5	Two first bullets and three second or third bullets which hit helmet failed to penetrate.
Caliber .22-06 Duplex (front bullet)	600	5	Of five bullets which hit helmet, four failed to penetrate and one gave a complete perforation in one side of the helmet and liner.

*Definitions for various types of penetrations are given in the penetration test data included in Appendix C.

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PENETRATION*

CARTRIDGE	RANGE (yds)	NUMBER OF FAIR HITS	RESULTS
Plate, Steel, Homogeneous, 1/4-inch			
Caliber .22 Carbine	100	5	All bullets failed to penetrate.
Caliber .30 Duplex	100	9	All bullets failed to penetrate.
Caliber .30 Triplex	100	5	All bullets failed to penetrate.
Caliber .12-06 Duplex (front bullet)	200	5	Four bullets gave complete perforations and one bullet failed to penetrate.

* Definitions for various types of penetrations are given in the penetration test data included in Appendix C.

RETARDATION TEST

The retardation in perforating the armor vest is an average for five rounds unless otherwise indicated.

CALCULATED VELOCITY		VELOCITY OBTAINED	RETARDATION
RANGE (yds)	FOR RANGE (fps)		
Cartridge, Ball, Caliber .22, Carbine			
0	2961	2955	18
140	2227	2204	27
300	1523	1561	52
500	985	947	*

* Bullets perforated armor vest but velocity was not recorded.

Cartridge, Ball, Caliber .22, T48

0	3314	3318	6
140	2919	3015	16
300	2550	2777	15
500	2092	2326	20

Cartridge, Ball, Caliber, .22 with 50-Grain Bullet

0	3795	3842	21
140	3205	3382	28
300	2554	2644	35
500	1811	1689	41

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RETARDATION TEST

The retardation in perforating the armor vest is an average for five rounds unless otherwise indicated.

RANGE (yds)	CALCULATED VELOCITY	VELOCITY OBTAINED	RETARDATION
	FOR RANGE		
	(fps)	(fps)	(fps)
Cartridge, Ball, Caliber .22 loaded with 50-Grain Full Patch Front Bullet for the Caliber .22-06 Duplex Cartridge.			
0	3543	3590	42
140	2904	2853	42
300	2213	2058	48
500	1483	1651	61

Cartridge, Ball, Caliber .25 with 75-Grain Bullet:

0	3374	3444	24
140	2850	2935	40
300	2272	2222	32
500	1650	1601	40

Cartridge, Ball, Caliber .27 with 95-Grain Bullet

0	3143	3141	12
140	2699	2774	17
300	2203	2329	18
500	1650	1697	40

Cartridge, Ball, Caliber .30, M2

0	2641	2768	9
140	2336	2359	12
300	1998	2000	17
500	1607	1544	28

Cartridge, Ball, Caliber .30, Duplex
First Bullet

0	2511	2537	46
140	1838	1840	48
300	1266	1255	74
500	941	1022	66*

Second Bullet

0	2354	2340	38
140	1727	1690	54
300	1198	1159	84
500	933	1026	83

* Figures from retest.

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RETARDATION TEST

RANGE (yds)	CALCULATED VELOCITY		VELOCITY OBTAINED	RETARDATION
	FOR RANGE	(fps)		
		(fps)	(fps)	(fps)
Cartridge, Ball, Caliber .30, Triplex				
		First Bullet		
0	2679		2600	64
140	1586		1539	82
300	961		1141	109
500	722		941	135
		Second Bullet		
0	2553		2515	88
140	1445		1420	111
300	909		1165	148
500	682		799*	253*
		Third Bullet		
0	2495		2428	86
140	1381		1293**	105**
300	885		1064*	145*
500	662		--	--

* Figures are for one round only.

** Figures are for three rounds only.

TEST OF FLECHETTE AMMUNITION

VELOCITY

The velocity is given in feet per second at 7 feet.

AVERAGE	1258
MAXIMUM	1316
MINIMUM	1205
EXTREME VARIATION	111
MEAN VARIATION	28.3

PATTERN

Fifty-two percent of the projectiles impacted in a 30-inch circle at 40 yards.

PENETRATION*

The projectile perforated one side of the M1 steel helmet and liner at 300 yards and it gave a complete penetration in one side of the helmet and liner at 500 yards.

* Definitions for various types of penetrations are given in the penetration test data included in Appendix C.

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IV. OBSERVATIONS

A. ORDTB Carten TT ORD 3383 gave general test requirements. More detailed requirements were given in a telephone conversation on 26 February 1957 by Mr. Bonkemeyer. He requested that the following tests be conducted using a minimum number of weapons of each type:

1. Pressure.
2. Velocity at muzzle, 300 and 500 yards.
3. Maximum ordinate at 300 and 500 yards.
4. Accuracy at 100 and 300 yards.
5. Penetration in steel helmets at 300 and 500 yards.

B. In a telephone conversation on 10 May 1957 Mr. Bonkemeyer advised that additional test data were required by the Ballistic Research Laboratories and that authorization to conduct this work is contained in ORDTB Bonkemeyer TT ORD 7771. Mr. Donald Hall, BRL, on 10 May 1957, directed that the following additional tests be conducted:

1. Determine the velocity of each projectile in a Duplex and Triplex round at ranges of 0, 140, 300 and 500 yards.

2. Determine the remaining velocity as well as the initial velocity of caliber .22, caliber .25, caliber .27 and caliber .30 rounds, as well as Duplex and Triplex rounds, in the penetration of body armor at ranges of 0, 140, 300 and 500 yards.

3. Determine the point at which the Duplex and Triplex rounds will perforate the steel helmet and 1/4-inch steel plate.

C. Mr. W. C. Benjamin, Jr., BRL, on 9 July requested that tests be conducted using a caliber .22, 50-grain bullet. It was requested that the bullet be loaded in an appropriate case to give a muzzle velocity of 3500 feet per second, and that time-of-flight, accuracy, penetration and retardation (in armor vests) tests be conducted.

D. Several tests were limited by the availability of appropriate test weapons and ammunition.

E. Experienced riflemen were employed in this test.

1. Davis, age 30 is five feet nine inches in height and weighs 180 pounds. He has had five years of experience at this station as a civilian gunner. He holds the rating of "master" in National Rifle Association small-bore rifle competitions.

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2. Kirkout, age 59, is six feet in height and weighs 200 pounds. He has had 34 years of experience in competitive rifle and pistol shooting. He is a master sergeant on active duty in the Army. He holds the rating of "expert" in National Rifle Association high-power rifle competitions.

3. Moore, age 43, is six feet one inch in height and weighs 180 pounds. He has had considerable experience in firing various types of weapons and holds the rating of "master" in various types of National Rifle Association rifle competitions.

4. Valentini, age 28, is five feet nine inches in height and weighs 140 pounds. He has had two years of experience in high-power rifle competitions and holds the rating of "master" in National Rifle Association high-power rifle competitions.

F. Cartridge, Ball, Caliber .22, T48 gave poor accuracy in this test. In a previous test (results are contained in the Fifty-Second Report on Ordnance Corps Project No. T32-2015) handloaded rounds using resized cases, 42 grains of M350 propellant, and a 68-grain bullet gave an average mean radius and extreme spread of 0.29 and 0.90 inch respectively when fired at a range of 100 yards from a test weapon mounted in a machine rest. In this test the T48 round gave an average mean radius and extreme spread of 2.0 and 6.8 inches, respectively, when fired under similar conditions. Additional firing was conducted to determine, if possible, which component was responsible for the low level of accuracy. The test results show that the bullet contributed largely to the poor accuracy although the propellant also appeared to affect the accuracy adversely. When removed from the case with an inertia-type bullet puller, it was observed that the T48 bullet was deformed somewhat at the rear of the cannelure.

G. It was expected that considerable retardation would occur when the various bullets perforated the armor vest. Therefore, the screens for recording the bullet's velocity on the far side of the vest were placed close to the vest and ten feet apart in order to obtain a high probability of the bullet passing over the screens. This arrangement was desirable from the viewpoint of recording a large percentage of the velocities after the bullet passed through the vest. However, an appreciable error was introduced in the velocities recorded because of the short distance between the screens. For this reason, the retardation figures are somewhat inconsistent. Since five rounds were fired for each condition the average figure approximates the retardation. A retest was fired using the first Duplex bullet and a charge of 7.0 grains of propellant since the retardation figure in the original test was several times that obtained with the second Duplex bullet at a similar velocity. The retest gave a retardation figure comparable with that for the second bullet. Therefore, an error in instrumentation is suspected in the original test.

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H. The caliber .30 Duplex round gave a pattern which had several well-defined characteristics. In the accuracy tests the exposed bullet on each round was coated with ink having a distinctive color so that its impact on the target could be identified. It was observed that the first bullets in each round made a group which is comparable in size to that obtained from a standard M1 rifle when using ammunition of average quality. The second bullet in each round generally impacted above the first bullets as shown in photograph B25262 included in Appendix D.

I. The caliber .30 Triplex round had no well-defined accuracy characteristics as did the Duplex. In firing the Triplex at a range of 100 yards a number of shots missed a 6 x 6-foot target. An additional test was conducted at 50 yards in order to determine the accuracy. In the 50-yard test, which was fired from a bench rest by an expert rifleman, the first bullet was identified as described previously. Also, the holes made by the three bullets in a single round were identified by marking after firing each round. Therefore, the location of the impact of the first bullet, as well as the pattern of each round, could be observed. Photograph B26047 demonstrates that the first bullet may be an extreme shot in the group. The size of the pattern made with each round varies greatly.

V. CONCLUSIONS

Since the purpose of this test was to provide data for use in the study of a broad salvo program which includes both tactical as well as technical considerations, no conclusions are made.

VI. RECOMMENDATIONS

None

SUBMITTED:

L. F. Moore

L. F. MOORE
Ordnance Engineer

REVIEWED:

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Chief, Infantry and Aircraft
Weapons Division

APPROVED:

H. A. Noble
H. A. NOBLE
Assistant to the Deputy Director
for Engineering Testing
Development and Proof Services

REFERENCES

1. Firing Record No. S-46256, To Conduct Velocity, Pressure, Accuracy and Penetration Tests on Caliber .22, .25 and .27 Ammunition.
2. Fifty-Second Report on Project No. T32-201; titled "A Test of Rifle, Caliber 30, Armalite".
3. Thirty-Sixth Report on Project No. TEL-2 titled "A Test of Flechette-Loaded Small Arms Ammunition".

APPENDICES

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APPENDIX A

FILE -----474.1/
472/
DATE-----14 FEB. 57
ACTION-----D & PS
INFO-----

ET011

1957 FEB 14

EUA335

PP RUSTGH

DE RUMPC 86H

P 1321300Z

FM COMNAV DA WASHDC

TO CG AMERIKEN PG MD

DA GRNC

BT

FROM ORDEB CARTEN T' ORD3383

FORNOON CARTEN-DAVIS, REQUEST EVALUATION TEST BE CONDUCTED
EMPLOYING SALVO RIFLE MATERIEL FORWARDED YOUR STATION FROM PORT
BENNING. TESTS SHOULD INCLUDE VELOCITY, ACCURACY, AS WELL AS HELMET
PENETRATION AT 300 AND 500 YARDS. COST CHARGEABLE TO PROJECT TEL-2.

BT

CPW ORD3383 300 500 TEL-2

13/2202Z

NNNN

FILE-----001/

DATE-----13 MAY 57

ACTION-----D & P

INFO-----D/C

info-----p--MOD

1957 MAY 13

BT

BT

BT

BT

BT

BT

BT

BT

FOR CRDP D&P MOORE FROM ORDIE

BONKMEYER TT ORD771

FORBOW BONKMEYER-MOORE RE TT 3383 DTD 13 FEB 57 FIRING PROGRAM SHOULD
NOT BE RESTRICTED TO SALVO MATERIEL ONLY. OTHER WEAPONS AND
AMMUNITION AS NECESSARY TO SUPPLY COMPLETE INFORMATION SHOULD BE
INCLUDED IN THIS PROGRAM

BT

CFM ORD771 3383 13 57

18/2829Z

APPENDIX B

LEGEND

A - Automatic.

S - Semiautomatic.

FF - Failure to feed.

FJ - Failure to eject.

FX - Failure to extract.

SS - Single shot.

BOB - Bolt over-rode base of round in feeding from magazine.

BUB - Bolt under-rode base of round in feeding from magazine.

CRS - Complete round ejected.

RCS - Round caught on rear of barrel.

SAT - Satisfactory.

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
------	------------------	--------------------------------------	--------------	----------	---------

Carbine, Caliber .22, M2, Serial Number 7149237.
Weight of carbine with empty magazine 5.78 lbs.
Average trigger pull 6.6 lbs.

Cartridge, Ball, Caliber .22, Carbine.

AUTOMATIC ACCURACY TEST

Procedure called for firing in three-round bursts.

30 April 1957

TIME	Rifleman	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
	Davis					Position: Prone
		3	3	S	SAT	Sighting shots.
1310		45	48	A	1 - CRE	Ten interrupted bursts
					2 - FJ	due to malfunctions.
					3 - BOB	
					4 - FF	
		10	58	A	SAT	Functioning burst.
	Moore					Position: Prone
1436		6	64	A	1 - BOB	
					2 - RCB	

Seven magazines were used in an effort to obtain satisfactory functioning. The weapon was removed from this test due to excessive malfunctions.

BENCH-REST ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.

7 May 1957

TIME	Rifleman	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
	Davis					
		3	67	S	SAT	Fouling shots.
0950		10	77	S	SAT	
1008		10	87	S	SAT	
1027		10	97	S	2 - FX	
	Valentini					
1056		10	107	S	SAT	
1112		10	117	S	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF		TYPE	FUNCTION	REMARKS
		RDS FIRED	ON TEST			

Carbine, Caliber .22, M2, Serial Number 7195001
 Weight of carbine with empty magazine 5.75lbs
 Average trigger pull 5.9 lbs

Cartridge, Ball, Caliber .22, Carbine

AUTOMATIC ACCURACY TEST

Procedure called for firing in three-round bursts.

30 April 1957

	10	10	A	SAT	Functioning burst.
	3	13	SS	SAT	Sighting shots fired by Davis.
Rifleman: Moore					Position: Prone
1507	30	43	A	SAT	

1 May 1957

Rifleman: Girkout					Position: Prone
	3	46	A	SAT	Fouling shots.
0911	31	77	A	1-FX	One interrupted burst due to malfunction.
Rifleman: Girkout					Position: Standing
1100	30	107	A	SAT	
Rifleman: Moore					Position: Standing
1240	31	136	A	1-FX	One interrupted burst due to malfunction.
Rifleman: Davis					Position: Standing
1325	32	170	A	2-FX	Two interrupted bursts due to malfunctions.

RENCH-REST ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.

7 May 1957

Rifleman: Valentini					Fouling shots
	3	173	S	SAT	
1003	10	183	S	SAT	
1015	10	193	S	SAT	
1030	10	205	S	1-FX	
Rifleman: Davis					
1045	10	213	S	1-FX	
1105	10	223	S	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF		TYPE FIRE	FUNCTION	REMARKS
		RDS FIRED	ON TEST			

Carbine, Caliber .30, M2, Serial Number 7204206
Weight of carbine with empty magazine 5.72 lbs
Average trigger pull 7.1 lbs

Cartridge, Ball, Carbine, Caliber .30, M1, Lot LC-813769

AUTOMATIC ACCURACY TEST

Procedure called for firing in three-round bursts.

30 April 1957

	3	3	B	SAT	Sighting shots fired by Davis.
	Rifleman: Girkout				
1355	45	48	A	1-RGB	Position: Prone
				2-RUB	Nine interrupted bursts due to malfunctions.
				3-BOB	Ten magazines were used before satisfactory functioning was obtained.
	Rifleman: Moore				
1536	30	78	A	SAT	Position: Prone

1 May 1957

	Rifleman: Davis				
	3	81	A	SAT	Position: Prone
0923	31	112	A	1-FJ	Fouling shots One interrupted burst due to malfunction.
	Rifleman: Davis				
1010	31	143	A	1-FJ	Position: Standing
				1-FX	One interrupted burst due to malfunction.
	Rifleman: Moore				
1130	3	146	A	SAT	Position: Standing
					One shot missed target due to improper position of aiming point. Aiming point was relocated.
1140	30	176	A	1-FJ	

B-4

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TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	FUNCTION REPORT		REMARKS
			TYPE FIRE	FUNCTION	
Rifleman: Girkout					
Position: Standing					
1306	30	206	A	SAT	

BENCH REST ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.

9 May 1957

Rifleman: Davis

0942	3	209	S	SAT	Fouling shots.
1004	10	219	S	1-PJ	
	9	278	S	SAT	Only mine shots were fired. Target was disregarded.
1026	10	238	S	SAT	
1045	10	248	S	SAT	

Rifleman: Valentini

1107	10	258	S	SAT	Two shots missed target at 300 yards due to improper location of aiming point. Target was disregarded.
1123	10	268	S	SAT	
1155	10	278	S	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
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Rifle, Caliber .22, T48, Serial Number 1616
 Weight of rifle with empty magazine 9.80 lbs
 Average trigger pull 5.7 lbs

Cartridge, Ball, Caliber .22, T48

AUTOMATIC ACCURACY TEST

Procedure called for firing in three-round bursts.

1 May 1957

	3	3	S	SAT	Sighting shots fired by Davis
	Rifleman: Moore				
1410	33	36	A	SAT	Position: Prone One interrupted burst due to gunner releasing trigger prematurely.

	Rifleman: Davis				
1530	30	66	A	SAT	Position: Prone

2 May 1957

	Rifleman: Girkout				
	3	69	A	SAT	Position: Prone
0907	30	99	A	SAT	Fouling shots.
	Rifleman: Girkout				
0940	30	129	A	SAT	Position: Standing
	Rifleman: Davis				
1345	30	159	A	SAT	Position: Standing
	Rifleman: Moore				
1445	30	189	A	SAT	Position: Standing

BENCH-REST ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.

7 May 1957

	Rifleman: Valentini				
	3	192	S	SAT	Fouling shots.

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
					Rifleman: Valentini
1235	10	202	S	1-FF	
1255	10	212	S	SAT	
1317	10	222	S	SAT	
					Rifleman: Davis
1354	10	232	S	SAT	
1420	10	242	S	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
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Rifle, Caliber .22, T48, Serial Number 1909
Weight of rifle with empty magazine 9.68 lbs
Average trigger pull 6.9 lbs

Cartridge, Ball, Caliber .22, T48

BENCH-REST ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.

7 May 1957

Rifleman: Davis					
	3	3	S	SAT	Sighting shots.
1218	10	13	S	SAT	One sheared rim observed while inspecting cases.
1242	10	23	S	1-CRE 1-FF 1-RCB	
1310	10	33	S	SAT	
Rifleman: Valentini					
1332	10	43	S	SAT	One shot hit frame at 100 yards due to improper location of aiming point.
1403	10	53	S	SAT	Target was disregarded. Four shots hit frame at 100 yards due to improper location of aiming point.
1432	10	63	S	SAT	Target was disregarded.
1441	10	73	S	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF	TYPE	FUNCTION	REMARKS
		RDS FIRED ON TEST			

Rifle, Caliber .30, T48, Serial Number 4085
Weight of rifle with empty magazine 9.77 lbs
Average trigger pull 9.5 lbs

Cartridge, AP, Caliber .30, T93E2
Lot LCL2010

AUTOMATIC ACCURACY TEST

Procedure called for firing in three-round bursts.

30 April 1957

3	3	SS	SAT	Sighting shots fired by Davis.
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1 May 1957

	Rifleman:	Girkout		Position:	Prone
	3	6	SS	SAT	Fouling shots
1500	32	38	A	SAT	One large and one small leak in primer joint. One interrupted burst, due to gunner releasing trigger prematurely.

2 May 1957

	Rifleman:	Girkout		Position:	Standing
	3	41	A	SAT	Fouling shots.
1005	30	71	A	SAT	
	Rifleman:	Davis		Position:	Prone
	30	101	A	SAT	Three small leaks in primer joint.
1100					
	Rifleman:	Moore		Position:	Prone
	33	134	A	SAT	Four small leaks in primer joint. One interrupted burst due to gunner releasing trigger prematurely.
1135					
	Rifleman:	Moore		Position:	Standing
	30	164	A	SAT	Two small leaks in primer joint.
1240					

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
	Rifleman: Davis 3	167	A	Position: Standing SAT	One shot missed the target due to improper location of aiming point. Aiming point was relocated.
1330	30	197	A	SAT	One large and four small leaks in primer joint.

BENCH-REST ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.

9 May 1957

	Rifleman: Valentini 3	200	S	SAT	Fouling shots
0556	10	210	S	SAT	One shot hit frame at 100 yards due to improper location of aiming point. Target was disregarded.
1018	10	220	S	SAT	Two small leaks in primer joint.
1037	10	230	S	SAT	Five small leaks in primer joint.
1056	10	240	S	SAT	Three small leaks in primer joint.
	Rifleman: Davis 10	250	S	SAT	One large and two small leaks in primer joint.
1110	10	260	S	SAT	
1128	10		S	SAT	

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FUNCTION REPORT

TIME	LG. RDS FIRED	TOTAL NO. OF	TYPE		REMARKS
		RDS FIRED ON TEST	FIRE	FUNCTION	

Rifle, U.S., Caliber .30, M1, Modified,
Serial Number 5973453

PLATE PENETRATION TEST

14 May 1957

Range: 100 yards

Cartridge, Ball, Caliber .30, Duplex

1341-	4	1	SS	SAT	Fouling and locating shots.
1413	6	10	SS	SAT	

Cartridge, Ball, Caliber .30, Triplex

1417-	5	15	SS	SAT	
1445					

HELMET PENETRATION TEST

Range : 300 yards

15 May 1957

Cartridge, Ball, Caliber .30, Duplex

1327-	2	17	SS	SAT	Fouling shots
1500	27	44	SS	SAT	

Cartridge, Ball, Caliber .30, Triplex

1540-	2	46	SS	SAT	Locating shots
1545	5	51	SS	SAT	

16 May 1957

0928-	2	53	SS	SAT	Fouling shots
1029	22	75	SS	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
Range: 200 yards					
1104- 1129	12	87	SS	SAT	
Range: 100 yards					
1242- 1304	13	100	SS	SAT	
Cartridge, Ball, Caliber .30, Duplex					
Range: 400 yards					
1406- 1445	2 26	102 128	SS SS	SAT SAT	Locating shots

ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.
Fired from heavy-model accuracy cradle.

23 May 1957

Cartridge, Ball, Caliber .30, Triplex

	3	131	SS	SAT	Locating shots.
27 May 1957					
	1	132	SS	SAT	Fouling shot
	10	142	S	SAT	Locating shots.
1010	10	152	S	SAT	
1025	10	162	S	SAT	
1051	10	172	S	SAT	
1112	10	182	S	SAT	
Cartridge, Ball, Caliber .30, Duplex					
1124	10	192	S	SAT	
1145	10	202	S	SAT	
1156	10	212	S	SAT	
1203	10	222	S	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF		TYPE	FUNCTION	REMARKS
		RDS FIRED ON TEST	FIRE			
<u>TIME-OF-FLIGHT AND REMAINING VELOCITY TEST</u>						
Fired From Heavy-Model Accuracy Cradle						
Range: 100 yards						
21 May 1957						
		Cartridge, Ball, Caliber .30, Duplex				
	1	223	SS	SAT	Sighting shot	
		Cartridge, Ball, Caliber .30, Triplex				
	1	224	SS	SAT	Sighting shot	
		Cartridge, Ball, Caliber .30, Duplex				
1732- 1943	4	228	SS	SAT	Fired to check instruments	
22 May 1957						
1800- 2105	23	251	SS	SAT	1- split in neck of case.	
23 May 1957						
		Cartridge, Ball, Caliber .30, Triplex				
1700- 2111	19	270	SS	SAT		
27 May 1957						
1505- 1550	5	275	SS	SAT		
28 May 1957						
0940- 1140 1243- 1553	21	296	SS	SAT		
	18	314	SS	SAT	1- split in neck of case.	

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE PIPE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
					Cartridge, Ball, Caliber .30, Duplex
1400- 1503	12	326	SS	SAT	7 June 1957
					Range: 300 yards
1700- 2156	75	401	SS	SAT	10 June 1957
					Cartridge, Ball, Caliber .30, Triplex
1642- 2130	72	473	SS	SAT	Range: 500 yards
					12 June 1957
					Cartridge, Ball, Caliber .30, Duplex
1813- 2143	34	507	SS	SAT	17 June 1957
1819- 2002	18	525	SS	SAT	
					Cartridge, Ball, Caliber .30, Triplex
2012- 2154	29	554	SS	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF		TYPE FIRE	FUNCTION	REMARKS
		RDS FIRED ON TEST				

Rifle, U.S., Caliber .30, M1, Modified,
Serial Number 5977047

ACCURACY TEST

Fired from Heavy-Model Accuracy Cradle.

Targets were obtained at 100 and 300 yards simultaneously.

27 May 1957

Cartridge, Ball, Caliber .30, Duplex

	1	1	SS	SAT	Fouling shot
1301	10	11	S	SAT	
1311	10	21	S	SAT	
1322	10	31	S	SAT	
1332	10	41	S	SAT	

Cartridge, Ball, Caliber .30, Triplex

	10	51	S	SAT	Loosening shots
1400	10	61	S	SAT	
1415	10	71	S	SAT	
1427	10	81	S	SAT	
1445	10	91	S	SAT	

50-YARD BENCH-REST ACCURACY TEST

11 June 1957

					The rear sight was set at 10 clicks elevation and 0 windage.
1031	10	101	S	SAT	Preliminary target.
1046	10	111	S	SAT	
1059	10	121	S	SAT	
1112	10	131	S	SAT	
1131	10	141	S	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF	TYPE	FUNCTION	REMARKS
		RDS FIRED ON TEST			

Rifle, U.S., M1903, Serial Number 4747051
 With Caliber .22 Accuracy Barrel Assembled.
 Barrel Manufactured by Code H 8/4/54
 Cartridge, Ball, Caliber .22, T48

VELOCITY TEST

25 April 1957

1528-	3	3	SS	SAT	Fouling shots
1547	20	23	SS	SAT	

26 April 1957

MACHINE-REST ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.

	3	26	SS	SAT	Fouling shots
1433	10	36	SS	SAT	
1446	10	46	SS	SAT	
1499	10	56	SS	SAT	
1503	10	66	SS	SAT	
1518	10	76	SS	SAT	

HELMET PENETRATION TEST

Range: 500 yards

3 May 1957

1250-	3	79	SS	SAT	Fouling shots
1319	20	99	SS	SAT	

TIME OF FLIGHT AND REMAINING VELOCITY TEST

Range: 600 yards

	2	101	SS	SAT	Fouling shots.
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FUNCTION REPORT

TIME	NO RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE PIPE	FUNCTION	REMARKS
1430- 1514	29	130	SS	SAT	
Range: 400 yards					
21 May 1957					
	2	132	SS	SAT	Fouling shots.
1250- 1318	24	156	SS	SAT	
Range 200 yards					
22 May 1957					
	2	158	SS	SAT	Fouling shots.
1044- 1136	32	190	SS	SAT	

100-YARD MACHINE REST ACCURACY TEST

10 June 1957					
	3	193	SS	SAT	Metal fouling removed from bore. Sighting shots.
Cartridge, Ball, Caliber .22, T48, with original bullet replaced with 68-grain bullet					
1513	10	203	SS	SAT	
1516	10	213	SS	SAT	
Cartridge, Ball, Caliber .22, handloaded with bullet removed from the T48 round, 42 grains 4350 propellant, and WCC-9 primer.					
1521	10	223	SS	SAT	
1526	10	233	SS	SAT	
12 June 1957					
	3	236	SS	SAT	Cartridge, Ball, Caliber .22, T48 Sighting shots.

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
Cartridge, Ball, Caliber .22, handloaded with bullet removed from the T48 round, 42 grains 4350 propellant and WCC-9 primer					
1512	10	246	SS	SAT	
1517	10	256	SS	SAT	
Cartridge, Ball, Caliber .22, T48, with original bullet replaced with 68-grain bullet.					
1521	10	266	SS	SAT	
1525	10	276	SS	SAT	
13 June 1957					
Cartridge, Ball, Caliber .22, T48					
	3	279	SS	SAT	Sighting shots.
Cartridge, Ball, Caliber .22, handloaded with WCC-9 primer, 68-grain bullet, and 42 grains 4350 propellant.					
1352	10	289	SS	SAT	
1355	10	299	SS	SAT	
Cartridge, Ball, Caliber .22, handloaded with propellant removed from T48 round, WCC-9 primer, and 68-grain bullet.					
1421	10	309	SS	SAT	
1425	10	319	SS	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF	TYPE	FUNCTION	REMARKS
		RDS FIRED ON TEST			
<u>VELOCITY TEST</u>					
Cartridge, Ball, Caliber .22, T48 Fired with full and reduced charges.					
25 June 1957					
0849	3	322	SS	SAT	Fouling shots.
0852	5	327	SS	SAT	Full charge (44.3 grains).
0858	5	332	SS	SAT	39.0 grains propellant.
0905	5	337	SS	SAT	34.0 grains propellant.
0910	5	342	SS	SAT	24.0 grains propellant with Kapok wad.
0917	4	346	SS	SAT	14.0 grains propellant with Kapok wad.
1000	2	348	SS	SAT	Full charge used to check instrumentation.
1005	6	354	SS	SAT	14.0 grains propellant with Kapok wad.

ARMOR-VEST RETARDATION TEST

5 July 1957

1433-					
1438	3	357	SS	SAT	Fouling shots.
1440-					
1440	6	363	SS	SAT	Full charge. (44.3 grains).
1453-					
1501	5	368	SS	SAT	39.5 grains propellant.
1503-					
1511	5	373	SS	SAT	35.0 grains propellant.
1513-					
1548	11	384	SS	SAT	29.5 grains propellant with Kapok wad.

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
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Rifle, Code E, M70, Serial Number 304164 with
Caliber .22 Carbine Accuracy Barrel Assembled. Barrel
Manufactured by Code G, 19 August 54

Cartridge, Ball Caliber .22, Carbine

VELOCITY TEST

25 April 1957

1439-	3	3	SS	SAT	Fouling shots
1518	22	25	SS	SAT	Velocity was not recorded on two rounds.

MACHINE-REST ACCURACY TEST

Targets were obtained at 100 and 300 yards simultaneously.

26 April 1957

	3	28	SS	SAT	Fouling shots.
1327	10	38	SS	SAT	
1341	10	48	SS	SAT	
1350	10	58	SS	SAT	
1400	10	68	SS	SAT	
1415	10	78	SS	SAT	

HELMET PENETRATION TEST

Range: 500 yards

3 May 1957

	6	84	SS	SAT	Fouling and locating shots.
1349-					
1502	45	129	SS	1 - FX	

Range: 300 yards

1550-					
1607	17	146	SS	3 - FX	

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
	3	149	SS	6 May 1957 SAT	Fouling shots.
1125- 1140	21	170	SS	SAT	
				Range: 400 yards	
1235- 1335	43	213	SS	SAT	

PLATE-PENETRATION TEST

15 May 1957
Range: 100 yards

0920- 0922	5	218	SS	SAT	
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TIME-OF-FLIGHT AND REMAINING-VELOCITY TEST

Range: 600 yards

20 May 1957

1350- 1415	2 28	220 248	SS SS	SAT SAT	Fouling shots.
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Range: 400 yards

21 May 1957

1135- 1150	4 22	252 274	SS SS	SAT SAT	Fouling and locating shots.
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Range: 200 yards

22 May 1957

1235- 1315	4 28	278 306	SS SS	SAT SAT	Fouling and locating shots.
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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF		TYPE FIRE	FUNCTION	REMARKS
		RDS FIRED ON TEST	RDS			
VELOCITY TEST						
Fired with FULL RDS Reduced charges						
			24 June 1957			
1333	3	309	SS	SAT		Fouling shots.
1337	5	314	SS	SAT		Full charge (16.2 grains).
1342	5	319	SS	SAT		13.0 grains propellant.
1347	5	324	SS	SAT		10.0 grains propellant with Kapok wad.
1353	5	329	SS	SAT		7.0 grains propellant with Kapok wad.

ARMOR-VEST REFIARATION TEST

5 July 1957

0905	3	332	SS	SAT		Fouling shots.
0910	1	333	SS	SAT		Full charge. (16.2 grains).
0922-						
1215	4	337	SS	SAT		Checking out velocity counters and initiators.
1250-						
1308	5	346	SS	SAT		
1315-						
1323	5	351	SS	SAT		11.0 grains propellant with Kapok wad.
1325-						
1359	8	359	SS	SAT		6.5 grains propellant with Kapok wad.
1401-						
1409	5	364	SS	SAT		2.5 grain propellant with Kapok wad. Rd. 362- bullet did not leave bore. Rd. 363 - bullet did not leave bore. Rd. 364- bullet did not leave bore.

10 July 1957

1053-						
1112	5	369	SS	SAT		3.5 grains propellant with Kapok wad.

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FUNCTION REPORT

<u>TIME</u>	<u>NO. R'S FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
26 July 1957					
0910-					
0915	3	372	SS	SAT	Locating shots.
0940-					
1020	7	379	SS	SAT	Checking velocity initiators.
1030-					
1048	5	384	SS	SAT	3.5 grains propellant with Kapak wad.

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>

Rifle, Code E, M70, Serial No. 364827 with Caliber .22
Test Barrel Manufactured by Code G 29 December 55

Cartridge, Ball, Caliber .22 with 50-Grain Bullet,
Lot 10EX4 with full and reduced charges.

24 June 1957

VELOCITY TEST

0945	6	6	SS	SAT	Checking instrumentation.
1037	3	9	SS	SAT	Fouling shots.
1044	5	14	SS	SAT	Full charge. (44.7 grains).
1049	5	19	SS	SAT	43.0 grains propellant.
1056	5	24	SS	SAT	38.0 grains propellant.
1102	5	29	SS	SAT	28.0 grains propellant with Kapok wad.
1107	5	34	SS	SAT	18.0 grains propellant with Kapok wad.

Cartridge, Ball, Caliber .22, T48 with full and reduced charges.

1527	3	37	SS	SAT	Fouling shots.
1530	5	42	SS	SAT	Full charge (44.3 grains).
1535	5	47	SS	SAT	39.0 grains propellant.

ARMOR VEST RETARDATION TEST

3 July 1957

Cartridge, Ball, Caliber .22 with 50-Grain Bullet,
Lot 10EX4 with full and reduced charges.

0855	3	50	SS	SAT	Fouling shots.
0904	5	55	SS	SAT	Full charge. (44.7 grains).
0914	6	61	SS	SAT	41.0 grains propellant.
1006	10	71	SS	SAT	31.5 grains propellant.
1022-					
1330	13	84	SS	SAT	21.0 grains propellant with Kapok wad.

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FUNCTION REPORT

<u>TIME</u>	<u>PG. NOS FIRED</u>	<u>TOTAL NO. OF RDC FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
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Cartridge, Caliber .22, Loaded with
50-Grain Full Patch Front Bullets for
Caliber .22-06 Duplex Cartridge
and DMR No. 4895 Propellant,
Lot ALA. 2423

VELOCITY TEST

10 July 1957

1430-					
1435	3	87	SS	SAT	Fouling shots.
1447	1	88	SS	SAT	25.0 grains propellant.
1453	1	89	SS	SAT	30.0 grains propellant.
1457	1	90	SS	SAT	35.0 grains propellant.
1500	1	91	SS	SAT	30.0 grains propellant.
1505	1	92	SS	SAT	37.5 grains propellant.
1516-					
1521	5	97	RS	SAT	37.0 grains propellant.

11 July 1957

0955-					
0958	3	100	SS	SAT	Fouling shots.
1002-					
1010	6	106	SS	SAT	32.0 grains propellant.
1012-					
1016	5	111	SS	SAT	27.0 grains propellant.
1017-					
1022	5	116	SS	SAT	17.0 grains propell. with Kapok wad.

ARMOR-VEST RETARDATION TEST

1345-					
1402	3	119	SS	SAT	Fouling shots.
1408-					
1422	6	125	SS	SAT	37.0 grains propellant.
1428-					
1446	6	131	SS	SAT	28.5 grains propellant.
1443-					
1456	5	136	SS	SAT	20.0 grains propellant with Kapok wad.
1458-					
1505	5	141	SS	SAT	12.0 grains propellant with Kapok wad.

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FUNCTION REPORT

TIME	NO. RDS	TOTAL NO. OF	TYPE	FUNCTION	REMARKS
	FIRING	RDS FIRED ON TEST			
					Cartridge, Caliber .22, Loaded with 50-Grain Full Patch Front Bullet for Caliber .22-06 Duplex Cartridge and 37.0 Grains of DMR No. 4895 Propellant Lot ALA. 8423.

TIME-OF-FLIGHT TEST

16 July 1957

Range: 600 yards

1109-					
1111	3	144	SS	SAT	Fouling shots.
1116-					
1215	39	183	SS	SAT	

Range: 400 yards

1449-					
1452	3	186	SS	SAT	Sighting shots.
1508-					
1600	36	222	SS	SAT	

17 July 1957

1057-					
1059	3	225	SS	SAT	Fouling shots.
1100-	17	242	SS	SAT	
1129					

18 July 1957

Range: 200 yards

1000-					
1017	3	245	SS	SAT	Fouling shots.
1020-					
1102	31	276	SS	SAT	

100-YARD MATCHES BEST ACCURACY TEST

7 August 1957

1315	3	279	SS	SAT	Fouling shots.
1326	10	289	SS	SAT	
1336	10	299	SS	SAT	
1346	10	309	SS	SAT	
1356	10	319	SS	SAT	

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
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PLATE PENETRATION TEST

5 September 1957

Range: 200 yards

1407	3	322	SS	SAT	Fouling shots.
1410-					
1415	5	327	SS	SAT	

BULLET PENETRATION TEST

Range: 600 yards

1432	4	331	SS	SAT	Sighting shots.
1436-					
1452	17	348	SS	SAT	

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED		TYPE FIRE	FUNCTION	REMARKS
		ON TEST				

Rifle, Code E, M70, Serial No. 367844 with
Caliber .25 Test Barrel Manufactured by Code G 26 Apr 56

Cartridge, Bull, Caliber .25 with 75-Grain Bullet,
Lot 74MC31 with full and reduced charges.

21 June 1957

VELOCITY TEST

1307	4	4	SS	SAT	Fouling shots.
1312	6	10	SS	SAT	Full charge
1316	5	15	SS	SAT	41.4 grains propellant.
1325	5	20	SS	SAT	36.0 grains propellant.
1328	5	25	SS	SAT	26.0 grains propellant.

ANALYZE-TEST RETARDATION TEST

10 July 1957

0844-					
0846	3	28	SS	SAT	Fouling shots.
0854-					
0906	6	34	SS	SAT	Full charge.
0916-					
0947	6	40	SS	SAT	38.0 grains propellant.
0950-					
1004	6	46	SS	SAT	25.5 grains propellant.
1007-					
1018	6	52	SS	SAT	21.5 grains propellant.

26 July 1957

0820-					
0835	4	56	SS	SAT	Fired to foul the bore and to check the instrumenta- tion.
0848-					
0857	5	61	SS	SAT	30.5 grains propellant.

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF</u>		<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
		<u>RDS FIRED</u>	<u>ON TEST</u>			

Rifle, Code E, M70, Serial No. 367368 with
Caliber .27 Test Barrel Manufactured by Code G 2 May 56

Cartridge, Ball, Caliber .27 with 95-Grain Bullet,
Lot 66LM62 with full and reduced charges.

24 June 1957

VELOCITY TEST

1445	3	3	SS	SAT	Fouling shots.
1448	5	8	SS	SAT	Full charge. (44.7 Grains).
1453	5	13	SS	SAT	40.0 grains propellant.
1458	5	18	SS	SAT	35.0 grains propellant.
1504	5	23	SS	SAT	25.0 grains propellant.

ARMOR-VEST PENETRATION TEST

2 July 1957

1259	2	25	SS	SAT	Fouling shots.
1304	6	31	SS	SAT	Full charge.
1317	7	38	SS	SAT	37.5 grains propellant.
1359	7	45	SS	SAT	31.0 grains propellant.
1420	9	54	SS	SAT	23.0 grains propellant.

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF		TYPE FIRE	FUNCTION	REMARKS
		RDS FIRED ON TEST	ON TEST			

Rifle, U.S., M1903, Serial Number 1515142 with
Caliber .30 Accuracy Test Barrel
Cartridge, Ball, Caliber .30, M2, Lot PA 4310 with
full and reduced charges.

VELOCITY TEST

21 June 1957

1102	3	3	SS	SAT	Fouling shots.
1108	5	8	SS	SAT	Full charge.
1110	5	13	SS	SAT	45.0 grains propellant.
1129	5	18	SS	SAT	40.0 grains propellant.
1134	5	23	SS	SAT	30.0 grains propellant.
1517	3	26	SS	SAT	Fouling shots.
1520	5	31	SS	SAT	43.0 grains propellant.
1525	5	36	SS	SAT	36.5 grains propellant.
1530	5	41	SS	SAT	29.5 grains propellant.

ARMOR TEST RETARDATION TEST

2 July 1957

0940	4	45	SS	SAT	Fouling shots.
0954	5	50	SS	SAT	Full charge.
1015	5	55	SS	SAT	43.0 grains propellant.
1028	7	62	SS	SAT	35.5 grains propellant.
1056	7	69	SS	SAT	28.0 grains propellant.

Cartridge, Caliber .30 Loaded with 1st Duplex Bullet
and Western Ball-Type Propellant, Lot AL-2796-45

9 July 1957

VELOCITY TEST

1110	1	70	SS	SAT	25.0 grains propellant with Kapok wad.
1131- 1135 1244-	4	74	SS	SAT	
1248	5	79	SS	SAT	20.0 grains propellant with Kapok wad.
1251- 1255	5	84	SS	SAT	15.0 grains propellant with Kapok wad.

B-30

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
1311- 1316	5	89	SS	SAT	10.0 grains propellant with Kapok wd.

Cartridge, Caliber .30, Loaded with 1st Triplex
Bullet and Western Ball-Type Propellant, Lot AL-2796-45.

9 July 1957

VELOCITY TEST

1333	1	90	SS	SAT	25.0 grains propellant with Kapok wd.
1355- 1359	5	95	SS	SAT	22.0 grains propellant with Kapok wd.
1414- 1418	5	100	SS	SAT	17.0 grains propellant with Kapok wd.
1423- 1427	5	105	SS	SAT	12.0 grains propellant with Kapok wd.
1433- 1437	5	110	SS	SAT	7.0 grains prop. with Kapok wd.

ARMOR-VEST RETARDATION TEST

12 July 1957

Cartridge, Caliber .30, Loaded with 1st Duplex
Bullet and Western Ball-Type Propellant, Lot AL-2796-45.

1121- 1319	3	113	SS	SAT	Fired to foul the bore and to check the instrumenta- tion.
1324- 1402	8	121	SS	SAT	25.0 grains propellant with Kapok wd.
1418- 1426	5	126	SS	SAT	16.0 grains propellant with Kapok wd.
1428- 1436	5	131	SS	SAT	10.0 grains propellant with Kapok wd.
1440- 1535	10	141	SS	SAT	7.0 grains propellant with Kapok wd.

CONFIDENTIAL

FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
Cartridge, Ball, Caliber .30, M2, Lot FA 4332 (Control)					
<u>TIME-OF-FLIGHT TEST</u>					
15 July 1957			<u>Range: 600 Yards</u>		
1443- 1449	3	144	SS	SAT	Sighting shots.
16 July 1957					
1037- 1039 1040- 1101	3 22	147 169	SS SS	SAT SAT	Fouling shots.
			<u>Range: 400 Yards</u>		
1411- 1412 1413- 1440	3 26	172 198	SS SS	SAT SAT	Sighting shots.
18 July 1957			<u>Range: 200 Yards</u>		
0859- 0927 0928- 0946	4 19	202 221	SS SS	SAT SAT	Sighting shots.

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
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26 July 1957

ARMOR VEST RETARDATION TEST

Cartridge, Caliber .30, Loaded with 2nd Duplex Bullet
and Western Ball-Type Propellant,
Lot AL-2796-45

1232-					
1245	5	226	SS	SAT	Fouling shots.
1251-					
1259	5	231	SS	SAT	22.5 grains propellant with Kapok wad.
1303-					
1308	5	236	SS	SAT	14.5 grains propellant with Kapok wad.
1327-					
1312	11	247	SS	SAT	9.5 grains propellant with Kapok wad.
1318-					
1349	8	255	SS	SAT	7.0 grains propellant with Kapok wad.

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
29 July 1957					
Cartridge, Caliber .30, Loaded with 1st Triplex Bullet and Western Ball-Type Propellant, Lot AL-2756-45					
0930- 0935	3	258	SS	SAT	Foaling shots.
0943- 1022	6	264	SS	SAT	22.0 grains propellant with Kapak wd.
1030- 1038	5	369	SS	SAT	11.0 grains propellant with Kapak wd.
1042- 1146	11	280	SS	SAT	6.0 grains propellant with Kapak wd.
1238- 1322	11	291	SS	SAT	4.5 grains propellant with Kapak wd.

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS</u>	<u>TOTAL NO. OF</u>	<u>TYPE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
	<u>FIRE</u>	<u>RDS FIRED</u> <u>ON TEST</u>	<u>FIRE</u>		
Cartridge, Caliber .30, Loaded with 2nd Triplex Bullet and Western Ball-Type Propellant, Lot AL-2796-45					
1355- 1400	5	296	SS	SAT	21.0 grains propellant with Kapok wad.
1403- 1533	9	305	SS	SAT	13.0 grains propellant with Kapok wad.
1537- 1558	6	311	SS	SAT	6.0 grains propellant with Kapok wad.
31 July 1957					
0850- 0856	3	314	SS	SAT	Fouling shots.
0914- 0917	2	316	SS	SAT	6.0 grains propellant with Kapok wad.
0922- 1107	18	334	SS	SAT	4.0 grains propellant with Kapok wad.
1318- 1347	7	341	SS	SAT	3.0 grains propellant with Kapok wad M4. 335- bullet did not leave bore.
1413- 1445	5	346	SS	SAT	3.5 grains propellant with Kapok wad.

CONFIDENTIAL

FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS</u>	<u>TOTAL NO. OF</u>	<u>TYPE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
	<u>FIRED</u>	<u>RDS FIRED</u> <u>ON TEST</u>			
Cartridge, Caliber .30, Loaded with 3rd Triplex Bullet and Western Ball-Type Propellant, Lot AL-2796-45					
1450- 1501	5	351	SS	SAT	20.0 grains propellant with Kapak wd.
1504- 1512	5	356	SS	SAT	9.5 grains propellant with Kapak wd.
1514- 1520	5	361	SS	SAT	9.5 grains propellant with Kapak wd.

9 September 1957

Cartridge, Caliber .30, Loaded with 1st Duplex Bullet and
Western Ball-Type Propellant, Lot AL-2796-45.

1040- 1045 1331- 1336 1344- 1406	2 3 10	363 366 376	SS SS SS	SAT SAT SAT	Checking instrumentation. Fouling shots. 7.0 grains propellant.
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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF		TYPE	FUNCTION	REMARKS
		RDS FIRED ON TEST				
Rifle, U.S., M1903, Serial No. 1521616 with Cal..30, Accuracy Test Barrel Cartridge, Ball, Caliber .30, M2, Lot FA4407 <u>TIME-OF-FLIGHT AND REMAINING VELOCITY TEST</u>						
		20 May 1957			Range: 600 Yards	
1311-	3	3	SS	SAT	Fouling shots.	
1327	20	23	SS	SAT		
		21 May 1957			Range: 400 Yards	
	2	25	SS	SAT	Fouling shots.	
1330-	22	47	SS	SAT		
1345						
		22 May 1957			Range: 200 Yards	
	2	49	SS	SAT	Fouling shots.	
1000-						
1017	26	75	SS	SAT		

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>FUNCTION</u>	<u>REMARKS</u>
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Barrel, Pressure, Caliber .30, No. 3630
Manufactured by Springfield Armory, July 1954 with
Special Duplex Chamber.
Assembled to Universal Receiver No. 197
Barrel length: 24 inches
Twist: 1 in 10 inches.

17 June 1957

PRESSURE TEST

Cartridge, Ball, Caliber .30, Duplex

1150	2	2	SAT	Fouling shots.
1242-				
1429	26	30	SAT	Velocities were not recorded on eight rounds.

Cartridge, Ball, Caliber .30, Triplex

1445-				
1520	20	50	SAT	

Cartridge, Caliber .30, Lead-loaded with:
Case: Caliber .30, Lot FA Y30-375
Bullet: AP, M2, Lot FA Y30-374
Propellant: DMR 4895 Lot 2057
Charge: 48.5 Grains

1529-				
1606	20	70	SAT	

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>	<u>REMARKS</u>
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Barrel, Pressure, Caliber .22 Carbine,
Manufactured by Code G. 16 August 1954
Receiver, Universal, Number 127
Firing Pin Protrusion: 0.050 inch
Cartridge, Ball, Caliber .22, Carbine

PRESSURE TEST

25 April 1957

1311-	3	3		SAT	Fouling shots.
1355	21	24		SAT	Velocity was not recorded on one round.

Shotgun, Code A, 12 gauge
Shell, Flechette, Type L-11 (AA-32)

2 August 1957

VELOCITY, PATTERN AND PENETRATION TEST

RANGE: Velocity, 7 ft
Pattern, 40 yds
Penetration, 100 yds

1327	1	1	85	SAT	Fired to check instrumen- tation.
1340- 1505	10	11	88	SAT	

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FUNCTION REPORT

<u>TIME</u>	<u>NO. RDS FIRED</u>	<u>TOTAL NO. OF RDS FIRED ON TEST</u>	<u>TYPE FIRE</u>	<u>FUNCTION</u>
13 August 1957				
<u>PENETRATION TEST</u>				
RANGE: 200 yds				
0903- 0950	5	16	SS	SAT
5 September 1957				
RANGE: 300 yds				
1515- 1522	10	26	SS	SAT
RANGE: 400 yds				
1531- 1541	20	46	SS	SAT
6 September 1957				
RANGE: 500 yds				
1007- 1050	75	121	SS	SAT

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AUTOMATIC ACCURACY TEST

APPENDIX C TEST DATA

DATE: 30 April 1957

RANGE: 100 yards

CARBINE, U.S., Caliber .22, M2, Serial Number 7149237

CARTRIDGE Ball, Caliber .22, Carbine

FIRING POSITION: Prone

RIFLEMAN: Davis

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER TO FIRST SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO SECOND SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO THIRD SHOT</u>	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	0.2A	0.1L	7.5A	6.7L	1.2A	8.9L
2	0.2A	0.3R	8.0A	6.8L	14.5A	13.9L
3	0.1R	0.8L	5.4A	5.9L	3.9A	5.4L
4	0.3A	0.5R	10.2A	11.5L	12.3A	15.9L
5	0.8A	0.4R	12.0A	8.7L	13.6A	8.8L
6	0.1A	0.4R	13.9A	9.4L	16.5A	16.0L
7	0.2A	0.1R	8.0A	8.4L	10.2A	13.3L
8	0.6A	0.5R	11.3A	3.5L	10.7A	6.0L
9	0.1A	0.3R	8.5A	4.6L	4.6A	0.2R
10	0.3A	0.1L	8.6A	6.2L	8.3A	6.8L
Average	0.3A	0.2R	9.3A	7.2L	9.6A	9.5L

Score on A target with 10-inch bull's-eye 123

30-SHOT GROUP	MEAN FROM CENTER OF TARGET	EV	EH	ES
	8.8	15.6	16.5	23.3

Mean for shots fired automatically (from center of impact of first shot in each burst) 12.9

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 1 May 1957

RANGE: 100 yards

CARTRIDGE, U.S., Caliber .22, NR, Serial Number 7195081

CARTRIDGE: Ball, Caliber .22, Carbine

FIRING POSITION: Prone

RIFLEMAN: Girkont

Fired in three-round bursts. Measurements are given in inches.

SHOT NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	0.68	1.48	11.6A	4.8L	10.9A	3.9L
2	0.48	0.98	13.2A	4.6L	12.8A	9.6L
3	0.0	0.88	11.8A	3.8L	11.4A	7.9L
4	0.88	1.68	13.2A	2.5L	11.7A	6.8L
5	1.48	1.38	14.2A	2.6L	15.3A	4.5L
6	0.1A	0.68	11.2A	4.2L	11.7A	9.2L
7	1.38	2.08	9.9A	2.0L	10.6A	5.6L
8	0.88	1.88	12.7A	2.9L	12.1A	4.3L
9	0.0	0.68	13.0A	2.1L	15.9A	2.8L
10	0.48	0.88	11.5A	1.2L	11.6A	3.9L
Average	0.68	1.18	12.2A	3.0L	12.4A	5.8L

Score on A target with 10-inch bull's-eye 120

<u>20-SHOT GROUP</u>	MEAN FROM <u>CENTER OF TARGET</u>			<u>EV</u>	<u>EM</u>	<u>ES</u>
	9.3					
				17.3	11.6	18.3

Mean for shots fired automatically (from center of impact of first shot in each burst) 14.2

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE 30 April 1957

RANGE: 100 yards

CARBINE, U.S., Caliber .22, ac, Serial Number 7195081

CARTRIDGE Ball, Caliber .22, Carbine

FIRING POSITION: Prone

RIFLEMAN: Moore

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	1.1A	0.3H	23.2A	9.9R	30.4A	16.2R
2	0.7A	0.4R	27.6A	8.8R	36.3A	14.7R
3	0.6A	0.9R	27.8A	13.4R	34.7A	16.8R
4	1.6A	0.3R	25.6A	13.6R	36.6A	19.8R
5	1.1A	1.1R	24.5A	15.8R	34.6A	20.3R
6	0.5A	0.3R	23.2A	14.8R	25.7A	24.0R
7	1.1A	0.3R	24.5A	14.1R	30.9A	21.3R
8	0.4A	0.0R	21.7A	16.1R	25.5A	25.3R
9	0.4A	0.1R	24.2A	13.6R	34.7A	20.3R
10	0.7A	0.3R	25.7A	13.2R	35.3A	23.7R
Average	0.8A	0.4R	24.8A	13.3R	32.5A	20.2R

Score on A target with 10-inch bull's-eye 56

30-SHOT GROUP	MEAN FROM CENTER OF TARGET		EV	EH	ES
	Vertical	Horizontal			
	22.6		36.2	25.3	42.1

Mean for shots fired automatically (from center of impact of first shot in each burst) 32.5

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 1 May 1957

RANGE: 100 yards

CARBINE, U.S., Caliber .22, M2, Serial Number 7195081

CARTRIDGE: Ball, Caliber 22, Carbine

FIRING POSITION: Standing

RIFLEMAN: Davis

Fired in three-round bursts. Measurements are given in inches.

SHOT NO.	REMARKS FROM TARGET CENTER		DISTANCE FROM TARGET CENTER		DISTANCE FROM TARGET CENTER	
	TO FIRST SHOT		TO SECOND SHOT		TO THIRD SHOT	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	1.5A	1.4R	7.5A	2.6R	1A.0A	13.4R
2	4.2A	2.2R	15.0A	10.5R	31.3A	20.7R
3	1.0A	2.6R	12.2A	3.0R	36.6A	5.9R
4	2.5A	2.1R	9.1A	5.2R	29.9A	10.9R
5	2.5A	2.5R	13.9A	1.5R	31.3A	17.1R
6	3.5A	2.8R	11.5A	4.0R	34.2A	23.4R
7	2.8A	2.3R	13.2A	8.3R	32.2A	23.5R
8	2.2A	2.2R	12.2A	4.6R	34.2A	24.9R
9	2.1A	3.8R	11.5A	1.6R	30.8A	18.7R
10	1.9A	2.1R	10.5A	10.5R	30.0A	23.9R
Average	2.4A	2.4R	11.7A	3.5R	30.4A	18.2R

Score on A target with 10-inch bull's-eye 89

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>			<u>EV</u>	<u>SE</u>	<u>MS</u>
	<u>Vertical</u>	<u>Horizontal</u>	<u>Angle</u>			
	17.5	35.6	30.1	40.3		

Mean for shots fired automatically (from center of impact of first shot in each burst) 21.6

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 1 May 1957

RANGE: 100 yards

CARBINE, U.S., Caliber .22, M2, Serial Number 7195081

CARTRIDGE: Ball, Caliber .22, Carbine

FIRING POSITION: Standing

RIFLEMAN: Girkout

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER TO FIRST SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO SECOND SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO THIRD SHOT</u>	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	0.6E	0.6R	8.4A	10.0L	22.1A	5.6L
2	1.6A	1.5R	8.7A	5.5L	22.6A	0.7L
3	0.6A	0.8R	5.5A	6.0L	22.2A	3.7L
4	1.0A	0.8R	5.5A	5.3L	20.3A	4.7L
5	1.7A	2.1R	8.6A	4.5L	24.2A	3.2L
6	2.7A	1.8R	6.2A	6.4L	22.1A	8.2L
7	0.2A	1.7R	6.8A	5.5L	22.9A	2.0L
8	1.5A	0.9R	7.5A	7.8L	24.4A	4.8L
9	2.6A	1.1R	8.3A	5.3L	23.6A	2.6L
10	1.3A	1.5R	7.6A	4.0L	24.9A	1.8L
Average	1.3A	1.2R	7.3A	6.0L	22.9A	3.7L

Score on A target with 10-inch bull's-eye 109

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>EV</u>	<u>EH</u>	<u>ES</u>
	11.6	25.5	12.1	25.6

Mean for shots fired automatically (from center of impact of first shot in each burst) 15.9

CONFIDENTIAL

APPROXIMATE ACCURACY TEST

DATE 1 May 1957

RANGE: 100 yards

CARTRIDGE, U.S., Caliber .22, MP, Serial Number 7195081

CARTRIDGE: Ball, Caliber .22, Carbine

FIRING POSITION: Standing

RIFLEMAN: Moore

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER TO FIRST SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO SECOND SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO THIRD SHOT</u>	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	2.2A	0.5R	9.8A	16.7R	23.4A	14.8R
2	1.1A	1.0R	7.1A	10.8R	19.9A	10.2R
3	1.7A	0.7R	8.3A	8.3R	24.7A	9.8R
4	1.4A	0.6R	6.5A	14.6R	21.9A	15.8R
5	2.0A	0.8R	9.2A	11.9R	25.8A	12.8R
6	2.2A	1.4R	10.6A	15.0R	27.9A	16.9R
7	1.7A	0.8R	11.1A	12.5R	25.7A	11.2R
8	1.5A	0.3L	9.2A	14.0R	25.8A	14.8R
9	1.4A	0.3R	7.7A	15.1R	21.7A	18.5R
10	1.2A	0.1R	7.3A	10.7R	23.6A	8.5R
Average	1.6A	0.5R	8.7A	13.0R	24.0A	13.3R

Score on A target with 10-inch bull's-eye 94

<u>10-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>EV</u>	<u>EM</u>	<u>ES</u>
	15.0	26.8	18.8	31.6

Mean for shots fired automatically (from center of impact of first shot in each burst)

20.3

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE 1 May 1957

RANGE: 100 yards

CARBINE, U.S., Caliber .30, M2, Serial Number 7104206

CARTRIDGE: Ball, Carbine, Caliber .30, M1, Lot LC-813769

FIRING POSITION: Prone

RIFLEMAN: Davis

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	0.1A	1.1R	36.9A	4.3L	44.4A	8.8L
2	0.0	0.7R	36.2A	3.6R	48.5A	5.2R
3	0.2A	0.9R	38.2A	2.6R	48.5A	8.0R
4	0.5B	0.7R	33.8A	2.4L	44.2A	6.4R
5	0.2A	0.5R	42.0A	1.9R	58.5A	12.2R
6	0.0	1.0R	38.9A	8.8R	48.4A	17.8R
7	0.6B	0.4R	32.3A	5.0R	52.5A	6.5R
8	0.3A	0.4R	40.3A	1.5L	60.7A	8.2R
9	0.2A	0.6L	38.2A	0.8L	47.0A	15.1R
10	0.1A	0.2R	38.3A	3.0R	49.7A	14.2R
Average	0.0	0.5R	37.5A	1.6R	50.2A	8.5R

Score on A target with 10-inch bull's-eye 50

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>			<u>EV</u>	<u>ME</u>	<u>RS</u>
	30.0			61.3	26.6	62.0

Mean for shots fired automatically (from center of impact of first shot in each burst) 44.5

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 30 April 1957

RANGE: 100 yards

CARBINE, U.S., Caliber .30, M2, Serial Number 7104206

CARTRIDGE: Ball, Carbine, Caliber .30, M1, Lot LC-813769

FIRING POSITION: PRONE

RIFLEMAN: Girkout

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER TO FIRST SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO SECOND SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO THIRD SHOT</u>	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	2.73	0.32	15.04	12.91	22.34	22.81
2	1.42	0.12	15.94	8.41	21.74	14.41
3	1.73	0.11	17.04	11.01	20.24	17.81
4	1.83	0.31	21.74	5.91	22.74	10.81
5	1.63	0.31	20.34	6.91	22.34	11.01
6	1.73	0.0	24.64	8.21	27.34	12.41
7	1.63	1.01	23.34	6.21	33.74	16.41
8	1.53	0.42	22.54	12.31	27.74	16.31
9	1.43	0.61	22.24	8.11	24.14	18.61
10	1.93	0.41	22.44	8.01	25.24	15.41
Average	1.73	0.21	21.34	8.81	24.74	15.51

Score on A target with 10-inch bull's-eye 81

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>EV</u>	<u>EH</u>	<u>ES</u>
	18.2	36.4	23.2	40.1

Mean for shots fired automatically (from center of impact of first shot in each burst)

27.8

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE 30 April 1957

RANGE: 100 yards

CARTRIDGE, U.S., Caliber .30, M2, Serial Number 7104206

CARTRIDGE. Ball, Carbine, Caliber .30, M1, Lot LC-813769

FIRING POSITION. Prone

RIFLEMAN: Moore

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	0.8A	0.3R	47.8A	8.4R	64.8A	9.2R
2	0.3B	0.4R	42.4A	9.2R	64.5A	5.9R
3	0.2A	0.4L	42.2A	9.8R	60.1A	5.9R
4	0.3A	0.3L	41.1A	8.3R	61.3A	8.9R
5	0.1A	0.4L	43.3A	12.6R	61.9A	13.6R
6	C.O	0.7L	43.0A	9.7R	62.1A	10.4R
7	0.2B	0.4L	41.8A	8.3R	58.2A	10.2R
8	0.1B	0.4L	41.8A	6.9R	61.7A	11.9R
9	0.0	0.5L	44.0A	8.4R	64.7A	10.2R
10	0.1B	0.2L	41.9A	7.1R	59.8A	8.4R
Average	0.1A	0.3L	42.9A	8.9R	61.9A	9.5R

Score on A target with 10-inch bull's-eye 50

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>		<u>EV</u>	<u>EH</u>	<u>ED</u>
	35.7		65.0	14.3	65.9

Mean for shots fired automatically (from center of impact of first shot in each burst) 53.2

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AUTOMATIC ACCURACY TEST

DATE: 1 May 1957

RANGE: 100 yards

CARTRIDGE, U.S., Caliber .30, M2, Serial Number 7104206

CARTRIDGE: Ball, Carbine, Caliber .30, M1, Lot LC-613769

FIRING POSITION: Standing

RIFLEMAN: Davis

Fired in three-round bursts. Measurements are given in inches.

SHOT NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	0.4A	1.6R	41.1A	19.1R	95.4A	50.4R
2	0.1B	0.9R	40.2A	16.6R	99.6A	45.7R
3	0.5B	1.0R	37.3A	17.7R	95.4A	51.4R
4	0.9A	0.9R	38.9A	23.9R	85.4A	68.6R
5	2.0A	1.9R	40.5A	14.6R	88.8A	56.4R
6	0.2B	0.9R	38.2A	16.6R	87.6A	51.6R
7	1.6A	2.0R	41.0A	17.8R	98.4A	57.8R
8	0.4B	0.5R	39.2A	21.3R	93.2A	57.4R
9	0.9A	0.2R	41.8A	13.9R	95.6A	49.6R
10	1.1A	0.7R	39.7A	14.3R	99.5A	61.8R
Average	0.6A	1.1R	39.8A	17.6R	93.9A	54.5R

Score on A target with 10-inch bull's-eye 50

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>		<u>EV</u>	<u>EH</u>	<u>ES</u>
	51.2		100.1	62.4	117.2

Means for shots fired automatically (from center of impact of first shot in each burst)

75.3

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE 1 May 1957

RANGE: 100 yards

CARBINE, U.S., Caliber .30, M2, Serial No. 7104206

CARTRIDGE: Ball, Carbine, Caliber .30, M1, Lot LC-413769

FIRING POSITION: Standing

RIFLEMAN: Oirkout

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER TO FIRST SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO SECOND SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO THIRD SHOT</u>	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	0.2B	0.5R	36.0A	3.1L	88.4A	12.8R
2	0.6A	1.1R	33.8A	4.1L	86.9A	14.6R
3	0.0	0.4L	14.5A	5.5L	85.5A	14.2R
4	1.0A	1.1L	33.9A	4.4L	91.7A	15.9R
5	0.4A	0.2R	32.8A	6.0L	86.5A	12.2R
6	0.3B	0.6R	32.7A	2.6L	86.0A	17.8R
7	0.8B	0.4L	31.0A	3.8L	89.4A	18.4R
8	0.3B	0.3R	31.2A	3.0L	87.8A	20.4R
9	0.6A	0.6R	34.2A	0.0	90.6A	21.0R
10	0.3A	0.5R	30.6A	0.6L	87.3A	21.0R
Average	0.1A	0.2R	31.1A	3.3L	88.0A	16.8R

Scores on A target with 16-inch bull's-eye 50

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>EV</u>	<u>RE</u>	<u>RS</u>
	41.2	92.5	27.0	93.9

Mean for shots fired automatically (from center of impact of first shot in each burst) 61.4

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CONFIDENTIAL

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AUTOMATIC ACCURACY TEST

DATE: 1 May 1957

RANGE: 100 yards

CARBINE, U.S., Caliber .30, M2, Serial Number 7104806

CARTRIDGE: Ball, Carbine, Caliber .30, M1, Lot LC-813769

FIRING POSITION: Standing

RIFLEMAN: Moore

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	1.3A	1.2B	49.1A	8.5B	114.7A	5.3B
2	0.4A	0.6B	46.4A	2.7B	105.5A	12.2B
3	0.6A	0.3B	44.2A	3.6B	102.8A	12.0B
4	0.1B	0.4L	43.0A	0.5L	102.5A	13.6B
5	0.5A	0.0	43.8A	1.3B	102.7A	13.7B
6	0.3A	0.1L	44.1A	5.3B	104.2A	10.7B
7	0.1B	0.2L	43.9A	2.5B	105.5A	9.3B
8	0.1A	0.2B	44.0A	2.1B	104.7A	13.9B
9	0.0	0.2B	47.6A	2.2B	106.0A	12.3B
10	0.8B	0.1B	43.9A	8.0B	109.3A	8.0B
Average	0.2A	0.2B	45.0A	3.6B	105.6A	11.4B

Score on A target with 10-inch bull's-eye 50

<u>10-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>		
	<u>EV</u>	<u>HH</u>	<u>HH</u>
	50.7	115.5	24.2 115.8

Mean for shots fired automatically (from center of impact of first shot in each burst)

75.5

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE 1 May 1957

RANGE: 100 yards

RIFLE: Caliber .22, T48, Serial Number 1616

CARTRIDGE: Ball, Caliber .22, T48

FIRING POSITION: Prone

RIFLEMAN: Davis

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	0.9B	0.0	9.7A	7.5R	22.9A	7.2R
2	1.0B	0.3R	6.1A	8.6R	13.0A	14.3R
3	1.2B	0.5R	10.4A	8.6R	23.3A	10.3R
4	1.2B	0.8L	8.3A	8.7R	17.4A	9.8R
5	1.0B	0.7L	9.4A	7.1R	22.2A	9.7R
6	1.1B	1.2L	10.0A	7.7R	20.1A	12.9R
7	0.4B	0.1R	10.0A	9.1R	21.3A	15.9R
8	0.5B	0.0	11.2A	7.6R	23.4A	5.6R
9	1.3B	1.9L	8.9A	5.6R	24.7A	3.8R
10	1.2B	0.5R	9.3A	11.2R	20.2A	13.9R
Average	1.0B	0.3L	9.3A	8.2R	20.8A	10.3R

Score on A target with 10-inch bull's-eye 104

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>			
	<u>EV</u>	<u>RR</u>	<u>RS</u>	
	12.5	25.0	17.8	28.8

Mean for shots fired automatically (from center of impact of first shot in each burst) 19.1

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 2 May 1957

RANGE: 100 yards

RIFLE: Caliber .22, T48, Serial Number 1616

CARTRIDGE: Ball, Caliber .22, T48

FIRING POSITION: Prone

RIFLEMAN: Girkout

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	0.4B	0.0	8.2A	8.5R	5.0B	20.6R
2	0.2A	1.4L	8.0A	6.6R	3.9A	10.0R
3	0.3A	1.6L	8.4A	4.4R	2.4A	6.3R
4	0.3A	0.9L	3.1A	4.0R	0.2B	5.0R
5	0.0	0.8L	11.2A	6.8R	9.8A	11.7R
6	0.7A	0.4L	10.5A	4.0R	4.6A	7.9R
7	0.1B	0.1R	6.9A	8.3R	1.6A	9.4R
8	0.1A	0.7L	9.4A	8.1R	6.5A	12.6R
9	0.4A	1.4L	7.8A	6.3R	9.7A	8.2R
10	1.5B	1.1L	5.7A	7.2R	4.3A	14.1R
Average	0.0	0.8L	7.9A	6.5R	3.8A	10.6R

Score on A target with 10-inch bull's-eye 128

<u>30-SHOT GROUP</u>	MEAN FROM CENTER OF TARGET		
	EV	EH	ES
	7.8	15.2	22.2 22.8

Mean for shots fired automatically (from center of impact of first shot in each burst) 11.8

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 1 May 1957

RANGE: 100 yards

RIFLE Caliber .22, T48, Serial Number 1616

CARTRIDGE Ball, Caliber .22, T48

FIRING POSITION: Prone

RIFLEMAN: Moore

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER TO FIRST SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO SECOND SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO THIRD SHOT</u>	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	0.4A	0.5R	13.2A	6.4L	10.5A	8.6L
2	1.8A	0.8R	8.7A	10.2L	13.9A	7.2L
3	0.3B	0.1L	14.2A	6.3L	17.0A	11.8L
4	1.8A	1.3L	14.5A	6.5L	17.4A	7.6L
5	0.0	1.6L	16.1A	8.2L	20.2A	11.5L
6	0.2A	0.4L	15.6A	10.6L	18.2A	11.7L
7	0.5A	0.1L	13.1A	9.1L	16.3A	12.7L
8	0.3A	2.0L	13.4A	7.4L	16.3A	8.4L
9	0.4B	0.2R	14.3A	6.9L	20.6A	4.7L
10	0.2B	0.9R	14.3A	7.5L	18.0A	8.8L
Average	0.4A	0.5L	13.7A	7.9L	16.8A	9.3L

Score on A target with 10-inch bull's-eye 109

<u>3-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>EV</u>	<u>EM</u>	<u>ES</u>
	12.2	21.0	13.6	23.3

Mean for shots fired automatically (from center of impact of first shot in each burst) 17.1

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 2 May 1957

RANGE: 100 yards

RIFLE: Caliber .22, T48, Serial Number 1616

CARTRIDGE: Ball, Caliber .22, T48

FIRING POSITION: Standing

RIFLEMAN: Davis

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER</u>		<u>DISTANCE FROM TARGET CENTER</u>		<u>DISTANCE FROM TARGET CENTER</u>	
	<u>TO FIRST SHOT</u>	<u>TO SECOND SHOT</u>	<u>TO SECOND SHOT</u>	<u>TO THIRD SHOT</u>	<u>TO THIRD SHOT</u>	<u>TO THIRD SHOT</u>
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	1.5A	0.2R	15.7A	9.5R	25.0A	23.2R
2	0.6A	0.6R	11.8A	10.0R	25.1A	20.7R
3	3.0A	1.1L	15.9A	8.5R	36.5A	24.6R
4	3.0A	0.7L	18.5A	14.1R	44.9A	36.9R
5	0.3A	0.2R	18.5A	11.4R	44.4A	33.1R
6	1.9A	0.2L	14.3A	11.4R	36.0A	30.9R
7	3.4A	1.3L	17.1A	8.8R	49.8A	28.8R
8	2.3A	1.0R	24.9A	5.5R	49.4A	29.2R
9	0.7A	0.1R	21.7A	12.3R	46.6A	29.3R
10	0.5A	0.0	20.9A	14.6R	51.6A	32.7R
Average	1.7A	0.1L	17.9A	10.6R	40.5A	29.7R

Score on A target with 10-inch bull's-eye 75

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>RY</u>	<u>RR</u>	<u>RS</u>
	24.5	51.3	38.0	60.7

Mean for shots fired automatically (from center of impact of first shot in each burst) 34.4

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 2 May 1957

RANGE: 100 yards

RIFLE: Caliber .22, T48, Serial Number 1816

CARTRIDGE: Ball, Caliber .22, T48

FIRING POSITION: Standing

RIFLEMAN: Girtout

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	1.0A	0.6L	5.6A	8.5R	21.7A	18.7R
2	1.8A	0.3L	7.4A	6.6R	13.5A	12.9R
3	1.1A	0.3R	4.5A	5.5R	20.9A	14.5R
4	0.8A	0.1R	13.2A	5.7R	43.1A	16.2R
5	1.4A	0.1L	12.2A	4.9R	35.4A	22.1R
6	1.2R	1.0L	11.3A	5.7R	43.0A	22.7R
7	2.0A	1.3L	10.9A	0.4R	36.4A	14.6R
8	2.4A	0.3L	12.4A	4.8R	38.6A	15.5R
9	2.0A	2.4L	11.9A	2.1R	38.4A	18.7R
10	0.4A	0.2L	10.7A	4.8R	39.9A	22.5R
Average	1.2A	0.6L	10.0A	4.9R	33.1A	17.8A

Score on A target with 10-inch bull's-eye 94

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>		<u>EV</u>	<u>EH</u>	<u>ES</u>
	17.0		44.3	25.2	50.2

Mean for shots fired automatically (from center of impact of first shot in each burst) 23.9

CONFIDENTIAL

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 2 May 1957

RANGE: 100 yards

RIFLE: Caliber .22, T48, Serial Number 1616

CARTRIDGE: Ball, Caliber .22, T48

FIRING POSITION: Standing

RIFLEMAN: Moore

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	1.5A	1.3L	16.4A	1.6L	40.6A	9.9L
2	0.4A	0.1L	12.9A	0.8L	35.7A	4.0L
3	0.4B	1.2L	15.0A	1.4L	34.6A	6.2L
4	1.0A	0.0	15.6A	2.5L	40.4A	12.5L
5	0.1A	0.4R	14.6A	2.1L	39.9A	14.2L
6	1.3A	0.3L	16.5A	1.2L	37.5A	5.5L
7	0.1B	0.3L	15.5A	1.6L	40.7A	10.9L
8	0.4B	0.6L	14.5A	0.8L	35.4A	11.2L
9	0.7A	0.2L	16.1A	0.1L	35.0A	10.4L
10	0.0	0.6L	13.5A	1.9L	32.4A	7.7L
Average	0.4A	0.4L	15.1A	1.4L	37.0A	9.2L

Score on A target with 10-inch bull's-eye 82

<u>30-SHOT GROUP</u>	MEAN FROM CENTER OF TARGET		<u>EV</u>	<u>EH</u>	<u>ES</u>
	<u>Vertical</u>	<u>Horizontal</u>			
	18.1	11.1	14.6	48.5	

Mean for shots fired automatically (from center of impact of first shot in each burst) 26.2

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 2 May 1957

RANGE: 100 yards

RIFLE: Caliber .30, T48, Serial Number 4085

CARTRIDGE: A.P., Caliber .30, T93M2, Lot LC12010

FIRING POSITION: Prone

RIFLEMAN: Moore

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER		DISTANCE FROM TARGET CENTER		DISTANCE FROM TARGET CENTER	
	TO FIRST SHOT		TO SECOND SHOT		TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	1.4A	0.5R	19.5A	15.0L	15.1A	24.5L
2	1.7A	0.9R	6.4A	33.4L	17.0A	39.1L
3	1.2A	1.0R	18.8A	18.2L	14.1A	33.6L
4	1.3A	0.5R	10.6A	13.6L	10.9A	18.4L
5	1.9A	0.6R	10.0A	13.2L	0.5A	26.3L
6	2.9A	2.1R	14.8A	14.2L	5.9A	28.2L
7	0.7A	0.3L	10.0A	12.1L	6.0A	18.6L
8	1.4A	1.0R	12.1A	14.2L	1.7A	30.4L
9	1.3A	0.8L	10.2A	13.5L	8.0A	24.1L
10	1.9A	0.5L	24.2A	15.4L	28.4A	19.5L
Average	1.6A	0.5R	13.6A	16.3L	10.8A	26.3L

Score on A target with 10-inch bull's-eye 95

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>EV</u>	<u>RE</u>	<u>RS</u>
	17.5	27.7	41.2	43.3

Mean for shots fired automatically (from center of impact of first shot in each burst)
25.0

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 2 May 1957

RANGE: 100 yards

RIFLE: Caliber .30, T48, Serial Number 4085

CARTRIDGE: A.P., Caliber .30, T93B2, Lot LCL2010

FIRING POSITION: Standing

RIFLEMAN: Davis

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER TO FIRST SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO SECOND SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO THIRD SHOT</u>	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	5.6A	1.0R	54.3A	33.7R	156.3A	82.4R
2	0.8A	0.9R	49.6A	23.0R	148.6A	63.6R
3	4.9A	0.0	54.9A	28.1R	124.8A	66.6R
4	0.6A	2.4L	48.9A	23.9R	124.0A	62.8R
5	2.9A	0.4R	58.8A	25.8R	161.2A	63.0R
6	3.9A	0.5R	63.1A	28.8R	156.5A	69.4R
7	3.0A	0.5L	67.9A	32.6R	141.8A	72.8R
8	2.4A	1.1R	63.4A	30.1R	141.2A	73.2R
9	4.6A	1.7L	61.4A	35.7R	135.4A	82.5R
10	2.1A	0.3L	63.4A	34.1R	140.3A	76.0R
Average	3.1A	0.1L	58.6A	29.6R	143.0A	71.3R

Score on A target with 10-inch bull's-eye 49

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>EV</u>	<u>EH</u>	<u>ES</u>
	76.3	160.6	85.9	177.4

Mean for shots fired automatically (from center of impact of first shot in each burst) 110.1

CONFIDENTIAL

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AUTOMATIC ACCURACY TEST

DATE: 2 May 1957

RANGE: 100 yards

RIFLE: Caliber .30, T48, Serial No. 4085

CARTRIDGE: A.P., Caliber .30, T93M2, Lot L412010

FIRING POSITION: Standing

RIFLEMAN: Girkout

Fired in three-round bursts. Measurements are given in inches.

<u>BURST NO.</u>	<u>DISTANCE FROM TARGET CENTER TO FIRST SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO SECOND SHOT</u>		<u>DISTANCE FROM TARGET CENTER TO THIRD SHOT</u>	
	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>	<u>Vertical</u>	<u>Horizontal</u>
1	2.7A	0.2R	45.8A	23.8L	115.1A	60.7L
2	2.5A	4.1L	47.0A	23.3L	122.6A	53.6L
3	3.9A	1.2L	43.2A	14.3L	109.7A	30.2L
4	2.6A	1.2L	50.4A	24.3L	114.6A	50.3L
5	4.0A	2.3L	46.8A	21.1L	108.9A	48.5L
6	2.6A	0.1L	55.2A	29.3L	137.9A	51.9L
7	1.0A	0.5L	51.5A	25.0L	134.5A	54.1L
8	2.3A	0.7R	51.2A	20.7L	121.6A	40.1L
9	1.5A	2.1L	49.8A	25.2L	117.0A	44.9L
10	2.9A	0.8L	42.5A	26.1L	109.7A	41.9L
Average	2.6A	1.1L	48.3A	23.4L	118.5A	47.6L

Score on A target with 10-inch bull's-eye 50

<u>30-SHOT GROUP</u>	<u>MEAN FROM CENTER OF TARGET</u>	<u>SV</u>	<u>EM</u>	<u>ES</u>
	61.6	136.9	61.4	147.0

Mean for shots fired automatically (from center of impact of first shot in each burst)

87.9

CONFIDENTIAL

AUTOMATIC ACCURACY TEST

DATE: 2 May 1957

RANGE: 100 yards

RIFLE: Caliber .30, 748, Serial Number 4085

CARTRIDGE: A.P., Caliber .30, T93E2, Lot LCL2010

FIRING POSITION: Standing

RIFLEMAN: Moore

Fired in three-round bursts. Measurements are given in inches.

BURST NO.	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO SECOND SHOT		DISTANCE FROM TARGET CENTER TO THIRD SHOT	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
1	2.9A	2.0R	64.8A	21.8L	163.0A	59.9L
2	1.8A	0.5L	57.8A	19.2L	148.6A	48.4L
3	3.3A	1.2R	56.5A	18.2L	146.2A	45.4L
4	4.3A	0.4R	61.8A	14.9L	158.3A	33.1L
5	2.4A	0.5L	53.6A	14.2L	139.2A	42.9L
6	3.0A	2.2L	58.2A	15.9L	147.7A	36.5L
7	3.2A	0.8L	61.2A	16.2L	157.5A	33.9L
8	2.5A	2.1R	63.2A	14.0L	157.7A	33.1L
9	3.9A	0.2L	55.8A	17.4L	137.0A	36.2L
10	3.3A	1.6R	59.8A	14.1L	152.7A	27.6L
Average	3.1A	0.3R	59.3A	16.6L	150.8A	39.7L

Score on A target with 10-inch bull's-eye 50

30-SHOT GROUP	MEAN FROM CENTER OF TARGET		EV	EE	ES
	Vertical	Horizontal			
	73.7	100.2	62.0	172.1	

Mean for shots fired automatically (from center of impact of first shot in each burst) 106.1

CONFIDENTIAL

ACCURACY TEST

DATE: 26 April 1957

DIRECTION OF FIRE: SW

FIRE FROM: Machine rest

RIFLE: Springfield, M1903, Serial Number 4747051, with Caliber .22

Accuracy Barrel Assembled.

CARTRIDGE: Ball, Caliber .22, T48

*WIND: NNE to S, 0 to 4 mph

SKY CONDITION: Scattered

TEMPERATURE: 75° to 76° F.

Target Measurements are Given in Inches.

Targets were obtained at 100 and 300 yards simultaneously.

GROUP CENTER TARGET FROM TARGET							
NO.	CENTER	MR	MVD	MED	EVD	RSD	ES
RANGE: 100 yards							
1		1.8	0.8	1.4	3.6	7.3	7.3
2		1.3	0.6	1.0	2.1	4.8	5.0
3		1.6	1.2	0.9	4.0	5.5	6.3
4		2.4	1.1	2.0	5.2	7.6	8.6
5		2.7	1.5	2.0	5.1	6.8	6.8
Average		2.0	1.0	1.5	4.2	6.4	6.8
RANGE: 300 yards							
1		5.6	2.6	4.5	11.5	21.8	21.8
2		4.0	1.9	3.0	6.6	14.6	15.1
3		5.0	3.8	2.6	12.4	16.8	18.9
4		7.1	3.2	5.9	16.0	22.6	25.5
5		8.2	4.6	6.2	19.1	20.5	20.6
Average		6.0	3.2	4.4	13.1	19.3	20.4

* Recorded at firing point.

CONFIDENTIAL

ACCURACY TEST

DATE: 26 April 1957

DIRECTION OF FIRE: SW

FIRE FROM: Machine rest.

RIFLE: Code E, M70, Serial Number 304164, with Caliber .22 Carbine
Accuracy Barrel Assembled.

CARTRIDGE: Ball, Caliber .22, Carbine.

*WIND: SE to SSW, 6 to 4 mph

SKY CONDITION: Scattered

TEMPERATURE: 74° to 76°F.

Target Measurements are Given in Inches.

Targets were obtained at 100 and 300 yards simultaneously.

TARGET NO.	MR	NVD	MED	FVD	RED	RS
RANGE: 100 yards						
1	0.6	0.4	0.4	1.8	1.4	2.0
2	0.6	0.4	0.4	2.0	1.4	2.3
3	0.6	0.4	0.3	1.3	1.3	1.8
4	0.6	0.4	0.4	1.3	1.4	1.5
5	0.5	0.4	0.2	1.1	1.6	1.6
Average	0.6	0.4	0.3	1.5	1.4	1.8
RANGE: 300 yards						
1	2.0	1.4	1.1	5.8	4.8	6.1
2	1.8	1.1	1.2	5.8	4.3	6.6
3	1.8	1.4	1.0	4.8	3.2	5.2
4	1.7	0.9	1.2	3.6	4.6	4.8
5	1.8	1.4	0.8	4.2	4.6	5.4
Average	1.8	1.2	1.1	4.8	4.3	5.6

* Recorded at firing point.

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ACCURACY TEST

DATE: 7 May 1957

*WIND: E to SW, 0 to 10 mph

DIRECTION OF FIRE: SW

SKY CONDITION: Scattered

FIRING FROM: Bench rest

TEMPERATURE: 74° to 77°F.

RIFLE: Caliber .22, T48, Serial Number 1616.

CARTRIDGE: Ball, Caliber .22, T48

Target Measurements are Given in Inches

Targets were obtained at 100 and 300 yards simultaneously

<u>RIFLEMAN</u>	<u>TARGET NO.</u>	<u>MR</u>	<u>MVD</u>	<u>MHD</u>	<u>EVD</u>	<u>ERD</u>	<u>ES</u>
RANGE: 100 yards							
Valentini	1	2.4	1.8	1.4	6.8	4.6	7.1
Valentini	2	2.9	1.7	2.1	7.8	9.0	9.6
Valentini	3	2.2	1.2	1.8	4.9	6.5	7.1
Davis	4	2.2	1.2	1.4	4.8	6.7	6.7
Davis	5	2.8	2.2	1.1	7.9	5.6	8.0
Average		2.5	1.6	1.6	6.4	6.5	7.7
RANGE: 300 yards							
Valentini	1	7.2	5.4	4.1	19.8	13.5	20.9
Valentini	2	9.9	5.0	6.3	21.0	28.7	30.2
Valentini	3	6.8	3.8	5.5	14.4	19.7	20.8
Davis	4	6.5	3.6	4.4	14.3	20.7	20.7
Davis	5	8.3	6.6	3.6	23.6	16.9	23.8
Average		7.5	4.9	4.3	18.6	19.9	23.3

* Recorded at firing point.

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FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF RDS FIRED ON TEST	TYPE FIRE	FUNCTION	REMARKS
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Rifle, Code E, M70, Serial No. 367844 with
Caliber .25 Test Barrel Manufactured by Code G 26 Apr 56

Cartridge, Ball, Caliber .25, with 75-Grain Bullet,
Lot 74MC31 with full and reduced charges.

21 June 1957

VELOCITY TEST

1307	4	4	SS	SAT	Fouling shots.
1312	6	10	SS	SAT	Full charge
1316	5	15	SS	SAT	41.0 grains propellant.
1325	5	20	SS	SAT	36.0 grains propellant.
1328	5	25	SS	SAT	26.0 grains propellant.

ARMOR-VEST RETARDATION TEST

10 July 1957

0844-					
0846	3	28	SS	SAT	Fouling shots.
0854-					
0906	6	34	SS	SAT	Full charge.
0916-					
0947	6	40	SS	SAT	38.0 grains propellant.
0950-					
1004	6	46	SS	SAT	25.5 grains propellant.
1007-					
1018	6	52	SS	SAT	21.5 grains propellant.

26 July 1957

0820-					
0835	4	56	SS	SAT	Fired to foul the bore and to check the instrumentation.
0848-					
0857	5	61	SS	SAT	30.5 grains propellant.

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ACCURACY TEST

DATE: 7 May 1957 *WIND: SSE to WNW, 1 to 10 mph
 DIRECTION OF FIRE: SW SKY CONDITION: Clear
 FIRED FROM: Bench rest TEMPERATURE: 68° to 71°.
 CARBINE, Caliber .22, M2, Serial Number 7149237
 CARTRIDGE: Ball, Caliber .22, Carbine

Target Measurements are Given in Inches.

Targets were obtained at 100 and 300 yards simultaneously.

<u>RIFLEMAN</u>	<u>TARGET NO.</u>	<u>MR</u>	<u>MVE</u>	<u>MED</u>	<u>EVD</u>	<u>EDD</u>	<u>ES</u>
RANGE: 100 yards							
Davis	1	1.3	1.6	0.6	3.2	2.5	3.8
Davis	2	1.2	0.7	0.9	2.4	3.8	4.0
Davis	3	1.6	1.0	1.2	3.7	3.6	4.4
Valentini	4	1.5	1.1	0.7	4.9	2.6	4.9
Valentini	5	1.1	0.7	0.6	3.4	2.7	3.8
Average		1.3	0.9	0.8	3.5	3.0	4.2
RANGE: 300 yards							
Davis	1	4.0	3.1	2.1	10.8	8.8	12.4
Davis	2	3.8	2.1	2.8	8.2	11.9	12.4
Davis	3	6.1	2.9	5.1	13.6	16.4	17.2
Valentini	4	4.5	3.4	2.1	15.9	7.9	16.0
Valentini	5	3.5	2.0	2.3	8.9	9.6	10.8
Average		4.4	2.7	2.9	11.5	10.9	13.8

* Recorded at firing point.

CONFIDENTIAL

FUNCTION REPORT

TIME	NO. RDS FIRED	TOTAL NO. OF		TYPE FIRE	FUNCTION	REMARKS
		RDS FIRED ON TEST				

Rifle, U.S., M1903, Serial Number 1515142 with
Caliber .30 Accuracy Test Barrel
Cartridge, Ball, Caliber .30, M2, Lot FA 4310 with
full and reduced charges.

VELOCITY TEST

21 June 1957

1102	3	3	SS	SAT	Fouling shots.
1108	5	8	SS	SAT	Full charge.
1110	5	13	SS	SAT	45.0 grains propellant.
1129	5	18	SS	SAT	40.0 grains propellant.
1134	5	23	SS	SAT	30.0 grains propellant.
1517	3	26	SS	SAT	Fouling shots.
1520	5	31	SS	SAT	43.0 grains propellant.
1525	5	36	SS	SAT	36.5 grains propellant.
1530	5	41	SS	SAT	29.5 grains propellant.

ARMOR VEST RETARDATION TEST

2 July 1957

0940	4	45	SS	SAT	Fouling shots.
0954	5	50	SS	SAT	Full charge.
1015	5	55	SS	SAT	43.0 grains propellant.
1028	7	62	SS	SAT	35.5 grains propellant.
1056	7	69	SS	SAT	28.0 grains propellant.

Cartridge, Caliber .30 Loaded with 1st Duplex Bullet
and Western Ball-Type Propellant, Lot AL-2796-45

9 July 1957

VELOCITY TEST

1110	1	70	SS	SAT	25.0 grains propellant with Kapok wad.
1131-					
1135	4	74	SS	SAT	
1244-					
1248	5	79	SS	SAT	20.0 grains propellant with Kapok wad.
1251-					
1255	5	84	SS	SAT	15.0 grains propellant with Kapok wad.

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CONFIDENTIAL

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ACCURACY TEST

DATE 9 May 1957 "WIND": ESE to SW, 2 to 10 mph
 DIRECTION OF FIRE: SW SKY CONDITION: Scattered
 FIRED FROM: Bench rest TEMPERATURE: 78° to 83°F.
 RIFLE: Caliber .30, T48, Serial Number 4085
 CARTRIDGE: A.P., Caliber .30 T93E2, Lot LCL2010

Target Measurements are Given in Inches

Targets were fired at 100 and 300 yards simultaneously.

RIFLEMAN	TARGET						
	PO.	MR	NVD	MED	SYD	END	RS
RANGE: 100 yards							
Valentini	1	2.6	2.0	1.3	9.3	6.2	9.8
Valentini	2	3.3	1.7	2.1	9.1	7.3	9.1
Valentini	3	2.4	1.3	1.6	5.4	6.0	6.8
Davis	4	3.9	2.4	2.7	9.1	9.5	11.3
Davis	5	3.7	1.7	2.9	8.3	11.0	11.3
Average		3.2	1.6	2.2	6.2	8.1	9.7
RANGE: 300 yards							
Valentini	1	7.9	6.3	4.1	27.8	16.8	29.4
Valentini	2	9.9	4.6	6.6	26.9	24.2	27.6
Valentini	3	7.4	4.0	5.3	16.1	18.6	20.7
Davis	4	11.4	6.2	8.7	24.1	29.4	33.2
Davis	5	11.2	4.3	9.4	22.0	33.9	34.0
Average		9.6	5.1	6.9	23.4	24.6	29.0

* Recorded at firing point.

CONFIDENTIAL

ACCURACY TEST

DATE: 9 May 1957
 DIRECTION OF FIRE: SW
 FUSED FROM: Bench rest
 CARTRIDGE: Ball, Carbine, Caliber .30, M1, Serial Number 7104306.
 CARTRIDGE: Ball, Carbine, Caliber .30, M1, Lot LC-813769

WIND: SE to SSW, 1 to 10 mph
 SKY CONDITION: Clear to scattered
 TEMPERATURE: 75° to 83° F.

Target Measurements are Given in Inches.

Targets were fired at 100 and 300 yards simultaneously.

RIFLEMAN	TARGET NO.	MR	MVD	MWD	RVD	RWD	RS
RANGE: 100 yards							
Davis	1	2.0	1.8	0.5	7.1	2.1	7.1
Davis	2	2.3	1.9	1.0	6.9	5.2	7.6
Davis	3	2.0	1.5	1.0	5.8	4.0	6.2
Valentini	4	2.1	1.8	0.8	6.2	3.5	6.4
Valentini	5	2.2	1.4	1.4	4.8	5.1	5.7
Average		2.1	1.7	0.9	6.2	4.0	6.6
RANGE: 300 yards							
Davis	1	7.1	6.4	1.8	22.5	9.2	22.8
Davis	2	7.2	6.6	2.4	24.8	12.4	25.1
Davis	3	6.6	5.1	3.2	18.9	15.2	20.1
Valentini	4	7.6	6.5	2.8	21.6	11.6	22.2
Valentini	5	7.2	4.9	4.4	19.1	18.2	19.7
Average		7.1	5.9	2.9	21.4	13.3	22.0

*Recorded at firing point.

CONFIDENTIAL

ACCURACY TEST

DATE: 7 August 1957 RANGE: 100 yards on Enclosed Range
 FIRED FROM: Machine rest
 CARTRIDGE: Caliber .22, Loaded with 50-Grain Full Patch Front Bullet for
 Caliber .22-06 Duplex Cartridge and 37.0 Grains of IMR 4895,
 Lot ALA24K3 Propellant
 RIFLE: Code B, M70, Serial Number 364827 with Caliber .22 Test Barrel.

Target Measurements are Given in Inches

SHOOTER: Davis

TARGET NO.	CENTER OF IMPACT FROM INDEX POINT	MR	MVD	MED	EVD	END	ES
1	3.5A 3.1R 3.8A	0.9	0.5	0.6	2.5	1.9	2.9
2	3.2R 3.8A	0.9	0.5	0.6	1.8	2.2	2.3
3	3.5R 3.7A	0.7	0.4	0.6	1.3	2.2	2.5
4	3.9R	0.9	0.8	0.4	2.7	2.1	2.7
Average	3.8A						
40-Shot composite group	3.4R	0.8	0.6	0.6	2.1	2.1	2.6
					3.2	2.7	3.4

DATE: 10 and 12 June 1957 RANGE: 100 yards (Enclosed Range)
 FIRED FROM: Machine rest
 RIFLE: U.S., M1903, Serial Number 4747051 with Caliber .22 Accuracy Barrel
 CARTRIDGE: Ball, Caliber .22, T48, with original bullet replaced with a
 similar bullet of a different lot.

Target Measurements are Given in Inches

TARGET NO.	MR	MVD	MED	EVD	END	ES
1	0.5	0.4	0.2	1.9	1.0	2.0
2	0.8	0.4	0.6	2.8	1.7	2.9
3	0.8	0.6	0.4	2.1	1.8	2.1
4	1.0	0.6	0.7	2.3	2.5	2.8
Average	0.8	0.5	0.5	2.3	1.8	2.4

CONFIDENTIAL

ACCURACY TEST

DATE: 10 and 12 June 1957 RANGE: 100 yards (Inclosed Range)
 FIRED FROM: Machine rest
 RIFLE: U.S., M1903, Serial Number 4747051 with Caliber .22 Accuracy Barrel
 CARTRIDGE: Ball, Caliber .22, handloaded with bullet removed from the
 748 round, 42 grains 4350 propellant, and WCC-9 primer.

Target Measurements are Given in Inches

TARGET NO.	MR	MYD	MMD	EVD	EMD	ES
	1.0	0.7	0.7	2.6	2.7	3.6
	1.5	1.1	0.7	4.7	4.0	5.0
	0.9	0.7	0.4	2.6	1.5	2.7
	0.9	0.5	0.7	2.0	3.3	3.6
Average	1.1	0.8	0.6	3.0	2.9	3.7

DATE: 13 June 1957 RANGE: 100 yards (Inclosed Range)
 FIRED FROM: Machine rest
 RIFLE: U.S., M1903, Serial Number 4747051 with Caliber .22 Accuracy Barrel.

Target Measurements are Given in Inches

TARGET NO.	MR	MYD	MMD	EVD	EMD	ES
	0.5	0.3	0.3	1.2	1.7	1.7
	0.5	0.4	0.1	1.7	0.5	1.7
Average	0.5	0.4	0.2	1.4	1.1	1.7

Cartridge, Ball, Caliber .22, handloaded with WCC-9 primer, 68-grain bullet and 42 grains 4350 propellant.

Cartridge, Ball, Caliber .22, handloaded with propellant removed from 748 round, WCC-9 primer, and 68-grain bullet.

	0.8	0.4	0.6	1.5	1.8	1.0
	1.3	0.9	0.9	3.1	3.7	2.7
Average	1.0	0.6	0.8	2.3	2.8	3.2

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DATE: 27 May 1957
 DIRECTION OF FIRE: SW
 RIFLE: U.S., Caliber .30, M1, Modified
 CARTRIDGE: Ball, Caliber .30, Duplex
 FIRED FROM: Machine rest

*WIND: SSE to SSW, 0 to 8 mph
 SKY CONDITION: Overcast
 TEMPERATURE: 71 to 74°F

All Target Data are Given in Inches

TARGET NUMBER	FIRST SHOTS						ALL SHOTS			
	MR	MVD	RHD	EVD	RHD	ES	MR**	MVD	RHD	ES
Rifle No. 5973453										
100-Yard Targets										
1	1.8	1.1	1.2	5.3	3.8	6.2	12.6	20.5	18.7	21.2
2	2.2	1.6	1.3	8.9	4.8	10.1	10.2	19.2	21.2	22.7
3	1.4	1.0	0.7	4.3	3.9	4.8	11.2	20.0	16.9	20.4
4	1.8	1.3	1.0	5.1	4.0	5.1	9.1	17.5	17.5	19.1
Average	1.8	1.2	1.0	5.9	4.1	6.6	10.8	19.3	18.6	20.8
300-Yard Targets										
1	5.6	3.7	3.4	17.6	11.6	18.8	36.4	59.8	54.1	63.7
2	7.1	5.0	3.9	25.3	14.7	20.5	30.7	54.6	67.2	69.7
3	4.9	3.8	2.2	13.8	11.6	15.0	32.0	57.4	52.2	61.1
4	5.9	4.6	3.0	16.9	10.8	17.1	27.3	53.6	54.1	58.9
Average	5.9	4.3	3.1	18.4	12.2	19.8	31.6	56.4	56.9	63.4
Rifle No. 5977047										
100-Yard Targets										
1	2.4	2.2	0.7	7.9	3.3	8.3	7.3	15.7	13.6	16.8
2	1.6	1.1	1.0	3.9	5.2	5.9	8.9	18.3	17.8	19.1
3	2.0	1.6	1.1	4.6	3.4	5.3	9.0	21.9	14.3	22.0
4	1.9	1.1	1.2	4.9	4.3	5.2	8.2	20.9	14.1	21.0
Average	2.0	1.5	1.0	5.3	4.0	6.2	8.4	19.2	15.0	19.7
300-Yard Targets										
1	7.0	6.5	2.0	24.5	8.2	25.0	22.4	47.3	41.5	53.2
2	4.6	3.0	2.8	11.8	16.4	18.1	26.9	56.3	55.1	57.7
3	6.8	5.4	3.4	15.2	10.8	16.4	26.6	61.3	43.8	62.8
4	5.8	3.7	3.4	17.6	12.0	18.0	24.2	62.2	42.9	63.2
Average	6.0	4.6	2.9	17.4	11.8	19.4	25.0	56.8	45.8	59.2

* Recorded at firing point.

** From the center of impact of the first shot in each round.

CONFIDENTIAL

DATE: 27 May 1957
 DIRECTION OF WIND: SW
 RIFLE: U.S., Caliber .30, M1, Modified
 CARTRIDGE: Ball, Caliber .30, Triplex
 FIRED FROM: Machine rest

WIND: NE to SEW, 0 to 11 mph
 SKY CONDITION: Overcast
 TEMPERATURE: 71 to 74°F

All Target Data are Given in Inches

When one or more shots missed the target, the measurements given are for the shots which hit the target.

TARGET NUMBER	FIRST SHOTS					ALL SHOTS			
	MR	EVD	END	ES		MR	EVD	END	ES
Rifle No. 5973453									
100-Yard Targets					27 shots				
1	8 shots hit target	9.3	9.8	11.2	hit target	24.1	44.7	45.0	
2	8 shots hit target	10.4	25.7	25.8	27 shots				
					hit target	22.8	41.3	41.3	
3	9 shots hit target	11.0	21.4	21.8	27 shots				
					hit target	45.4	34.1	47.2	
4	9 shots hit target	13.7	22.2	24.9	27 shots				
					hit target	41.8	26.5	42.3	
300-Yard Targets					27 shots				
1	8 shots hit target	31.4	31.0	39.3	hit target	76.5	98.2	98.4	
2	9 shots hit target	33.2	82.5	82.6	26 shots				
					hit target	142.7	101.5	145.5	
3	9 shots hit target	36.0	69.6	71.0	27 shots				
					hit target	119.0	106.2	152.8	
4	9 shots hit target	67.4	44.2	76.9	27 shots				
					hit target	121.6	121.8	169.0	
Rifle No. 5977047									
100-Yard Targets					28 shots				
1	9 shots hit target	11.7	10.1	13.3	hit target	38.5	22.0	38.6	
2	9 shots hit target	13.6	12.9	15.5	28 shots				
					hit target	36.3	35.7	36.4	
3	9 shots hit target	34.3	33.7	39.5	29 shots				
					hit target	34.3	45.6	50.7	
4	8.0 4.8 5.4	23.2	34.1	36.6	29 shots				
					hit target	37.6	39.6	53.9	

= Recorded at Firing Point.

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DATE: 27 May 1957
 DIRECTION OF FIRE: SW
 RIFLE: U.S., Caliber .30, M1, Modified
 CARTRIDGE: Ball, Caliber .30, Triplex
 FIRED FROM: Machine rest

*WIND: NE to SSW, 0 to 11 mph
 SKY CONDITION: Overcast
 TEMPERATURE: 71 to 74°

All Target Data are Given in Inches

When two or more shot missed the target, the measurements given are for the shots which hit the target.

TARGET NUMBER	FIRST SHOTS						ALL SHOTS			
	MR	MVD	MD	EVD	ED	ES	MR	EVD	ED	ES
Rifle No. 5977047										
300-Yard Targets										
1	8 shots hit target			37.7	32.7	41.7	28 shots hit target	94.7	117.4	119.1
2	9 shots hit target			27.7	40.7	43.8	29 shots hit target	128.1	100.6	137.8
3	9 shots hit target			36.3	119.1	123.2	29 shots hit target	114.3	135.6	156.2
4	9 shots hit target			39.1	35.0	44.3	28 shots hit target	73.2	63.5	85.2

6 x 6-foot target at 100 yards.
 15 x 15-foot target at 300 yards.

* Recorded at firing point.

DATE: 11 June 1957
 DIRECTION OF FIRE: S
 RIFLE: U.S., Caliber .30, M1, Modified, Serial No. 5977047
 CARTRIDGE: Ball, Caliber .30, Triplex
 FIRED FROM: Bench rest

RANGE: 50 yards
 RIFLEMAN: Davis

All Target Data are Given in Inches

TARGET NUMBER	FIRST SHOTS						ALL SHOTS			
	MR	MVD	MD	EVD	ED	ES	MR*	EVD	MD	ES
1	7.5	6.5	3.1	43.0	18.0	44.1	7.0	43.0	30.5	50.3
2	7.7	7.0	2.7	24.7	14.6	24.7	9.2	32.2	21.7	32.6
3	6.8	4.7	3.7	33.7	13.4	36.3	6.5	33.7	28.3	36.3
4	10.5	8.8	4.4	47.5	24.5	49.4	7.8	53.4	32.6	56.2
Average	8.1	6.8	3.5	37.2	17.6	39.6	7.6	40.6	28.3	43.8

* From the center of impact of the first shot in each round.

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ACCURACY TEST

DATE: 11 June 1957 RANGE: 50 Yards
 RIFLE: U.S., Caliber .30, M1, Modified, Serial Number 5077047
 CARTRIDGE: Ball, Caliber .30, Triplex
 FIRING POSITION: Bench rest RIFLEMAN: Davis
 TARGET NO.: 2

Measurements are Given in Inches

ROUND NUMBER	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER TO TRAILING SHOT*		DISTANCE FROM TARGET CENTER TO TRAILING SHOT*	
	VERTICAL	HORIZONTAL	VERTICAL	HORIZONTAL	VERTICAL	HORIZONTAL
1	13.2A	5.0R	10.4A	15.4L	7.5B	0.8R
2	6.0B	2.2R	7.8B	0.3L	8.6B	1.3L
3	0.8B	0.5L	4.1B	3.1L	5.4B	2.9R
4	9.7B	3.0L	6.3B	0.6L	5.4B	0.7R
5	5.3B	1.6R	1.3B	0.0	7.2B	4.9R
6	8.9B	1.1R	3.0B	4.0L	0.8A	0.6R
7	10.4B	0.8R	1.4B	1.4L	3.2A	0.2L
8	29.8B	15.0R	12.7B	13.1R	2.0B	0.3L
9	8.0R	1.6R	8.8B	0.3L	14.0B	5.4L
10	12.6B	1.3L	1.0B	2.0L	0.3B	2.7R
Average	7.8B	2.2R	3.6B	1.4L	4.6B	0.5R

* The second and third shots in each round were not identified.

TARGET NO.: 3

1	7.6B	1.8L	5.6B	1.2R	7.0B	13.5L
2	5.0B	2.5R	2.2B	5.0R	14.6B	3.6R
3	7.5B	0.1R	7.8R	2.3L	5.0B	6.3L
4	23.0B	11.1L	17.6B	2.0L	4.5B	0.0
5	8.6B	2.1R	8.2B	5.4L	2.8B	7.7L
6	30.6B	3.1R	30.2B	3.4R	1.5B	0.7R
7	7.2B	0.1R	11.1B	0.7R	1.6A	1.4R
8	18.0B	1.5L	25.7B	16.4L	1.4B	1.3L
9	8.1B	0.2R	10.6B	5.6L	5.5B	5.2R
10	5.9B	3.4R	6.2B	0.4R	11.6B	5.4L
Average	12.2B	0.3L	12.5B	2.3L	5.2B	2.3L

* The second and third shots in each round were not identified.

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ACCURACY TEST

DATE 11 June 1957 RANGE: 50 Yards
 RIFLE: U.S., Caliber .30, M1, Modified, Serial Number 5977047
 CARTRIDGE Ball, Caliber .30, Triplex
 FIRING POSITION: Bench rest RIFLEMAN: Davis
 TARGET NO.: 4

Measurements are Given in inches

ROUND NUMBER	DISTANCE FROM TARGET CENTER TO FIRST SHOT		DISTANCE FROM TARGET CENTER - TRAILING SHOTS		DISTANCE FROM TARGET CENTER TO TRAILING SHOTS	
	VERTICAL	HORIZONTAL	VERTICAL	HORIZONTAL	VERTICAL	HORIZONTAL
1	7.2B	1.5R	13.7B	3.4L	2.0B	2.2L
2	5.5B	1.4R	8.4B	1.4R	4.1B	0.6R
3	4.7B	10.2L	7.2A	11.4L	2.5B	2.0R
4	5.8B	2.2R	7.0B	3.0L	7.0B	1.2R
5	10.0B	1.8L	1.5B	8.0R	1.3B	2.0L
6	17.7A	10.5L	2.9A	16.0L	4.2B	0.0
7	4.7B	1.2R	12.7B	0.8L	0.1A	0.4R
8	9.0B	0.8R	0.5A	2.5R	4.5B	0.0
9	16.0B	2.9R	3.3B	5.5L	10.8B	12.3R
10	5.9B	1.2L	5.4B	5.3R	0.5B	2.9R
Average	5.1B	1.4L	4.1B	2.3L	3.7B	1.5R

* The second and third shots in each round were not identified.

TARGET NO.: 5

1	30.6A	2.5L	15.1A	16.9L	2.8B	2.1R
2	5.0B	3.4R	0.5B	4.9L	14.8A	4.2L
3	6.4B	1.4L	5.6B	3.7R	2.0B	3.9L
4	6.7B	1.0L	7.3B	3.7R	0.6B	2.2L
5	3.1B	3.4R	4.7B	0.7R	1.5A	0.5R
6	6.3B	1.9L	6.6B	0.2R	4.7B	3.7R
7	16.9B	11.4R	22.8B	14.6R	2.6B	0.8L
8	3.2A	3.8L	1.5B	2.0L	1.3B	0.1R
9	8.2A	13.1L	6.4B	3.1R	11.6B	18.0L
10	5.4B	2.7R	12.3B	3.3L	0.3B	2.1L
Average	0.8B	0.3L	5.3B	0.1L	1.0B	2.5L

* The second and third shots in each round were not identified.

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RETARDATION TEST

DATE 2 July 1957

TARGET Vest, Armor, M1953

RIFLE U.S., M1903, Serial No. 1515142 with Caliber .30 Accuracy Test Barrel

CARTRIDGE Ball, Caliber .30, M2, Lot PA 4310 with full and reduced charges

AMMUNITION TEMPERATURE 70°F RANGE TEMPERATURE 70 to 73°F DENSITY .995 to .988

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) $S_1 = 20$, $S_2 = 50$, $S_3 = 58$, $S_4 = 68$, $S_5 = 78$

ROUND NO.	TIME	VELOCITY (feet per second)					REMARKS
		35 ft*	55 ft**	63 ft*	73 ft*	55 ft**	
FULL CHARGE							
46	0954	2770	2763	2740	2717	2758	5
47	0958	2783	2768	2740	2725	2752	16
48	1001	2788	2773	2747	2732	2759	14
49	1003	2804	2789	2762	2749	2780	9
50	1005	2760	2745	2725	2703	2743	2
Average		2783	2768	2743	2723	2758	9
43.0 GRAINS PROPELLANT							
51	1015	2406	2392	2364	2347	2378	14
52	1017	2417	2403	2381	2364	2395	8
53	1018	2451	2437	2410	2392	2424	13
54	1022	2394	2380	2353	2336	2367	13
55	1025	2373	2359	2336	2320	2349	10
Average		2408	2394	2369	2352	2383	12
35.5 GRAINS PROPELLANT							
57	1031	1947	1933	1901	1887	1912	21
58	1037	2017	2003	1972	1957	1984	19
60	1039	2000	1986	1957	1942	1969	17
61	1051	2082	2068	2041	2024	2055	13
62	1053	2084	2070	2041	2024	2055	14
Average		2014	2000	1971	1956	1983	17
26.0 GRAINS PROPELLANT							
64	1058	1592	1580	1541	1527	1552	28
65	1104	1539	1527	1486	1473	1496	31
66	1106	1568	1556	1522	1508	1533	23
68	1122	1537	1525	1490	1479	1499	26
69	1125	1551	1539	1495	1477	1509	30
Average		1557	1545	1507	1493	1518	28

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATE 2 July 1957

TARGET Vest Armor, M1953

RIFLE Code E, M70, Serial No. 367368 with Caliber .27 Test Barrel

CARTRIDGE Ball, Caliber .27, with 95-Grain Bullet, Lot 661M62 with full and reduced charges

AMMUNITION TEMPERATURE 70°F RANGE TEMPERATURE 75 to 78°F DENSITY .985 to .979

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) $S_1 = 20$, $S_2 = 50$, $S_3 = 58$,
 $S_4 = 68$, $S_5 = 78$

ROUND NO.	TIME	VELOCITY (feet per second)					REMARKS
		AT 35 ft*	AT 55 ft**	AT 63 ft*	AT 73 ft*	AT 55 ft**	
FULL CHARGE							
27	1307	3138	3117	3077	3058	3092	25 Round 26 hit previous shot hole.
28	1309	3165	3144	3115	3077	3145	21
29	1311	3254	3233	3205	3175	3229	4
30	1313	3128	3107	3077	3049	3099	8
31	1315	3125	3104	3067	3049	3081	23
Average		3162	3141	3108	3082	3129	12
37.5 GRAINS PROPELLANT							
32	1317	2793	2772	2732	2703	2755	17
34	1327	2854	2833	2786	2755	2811	22 Velocity not recorded on rds 33 and 36
35	1329	2793	2772	2710	2653	2756	16
37	1340	2773	2752	2695	2646	2734	18 Bullets keyholed after perforating armor vest.
38	1343	2757	2736	2703	2674	2726	10
Average		2794	2773	2725	2686	2756	17
31.0 GRAINS PROPELLANT							
39	1359	2368	2348	2309	2288	2326	22 Velocity not recorded on rd 42
40	1401	2347	2327	2288	2262	2309	18
41	1403	2327	2307	2268	2237	2293	14 Round 43 hit previous shot hole.
44	1417	2351	2331	2294	2273	2311	20
45	1419	2351	2331	2294	2268	2315	16
Average		2349	2329	2291	2266	2311	18
23.0 GRAINS PROPELLANT							
47	1427	1662	1645	1575	1543	1601	44 Velocity not recorded on rds 46, 49, 50 and 51.
48	1430	1734	1717	1645	1610	1673	44
52	1500	1761	1744	1681	1650	1706	38
53	1502	1729	1712	1653	1626	1675	37
54	1504	1686	1669	1621	1605	1634	35
Average		1714	1697	1635	1607	1658	40

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATE 3 July 1957

TARGET Vest Armor, M1953

RIFLE, Code E, M70, Serial No. 364827 with Caliber .22 Test Barrel

CARTRIDGE Ball, Caliber .22 with 50-Grain Bullet, Inst 100K4 with full and reduced charges.

AMMUNITION TEMPERATURE 70°F RANGE TEMPERATURE 73 to 84°F. DENSITY .995 to .973

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) S₁ = 20, S₂ = 50, S₃ = 58, S₄ = 68, S₅ = 78

		VELOCITY (feet per second)					RETAR-	REMARKS
ROUND NO.	TIME	AT 35 ft*	AT 55 ft**	AT 63 ft*	AT 73 ft*	AT 85 ft**		
FULL CHARGE								
51	0904	3842	3813	3774	3745	3797	16	Bullets keyholed
52	0906	3891	3863	3802	3745	3848	15	after perforat-
53	0908	3861	3899	3774	3731	3808	25	ing armor vest.
54	0910	3876	3848	3802	3774	3824	24	
55	0912	3881	3853	3774	3704	3830	23	
Average		3870	3842	3785	3740	3821	21	
41.0 GRAINS PROPELLANT								
56	0914	3401	3373	3236	3115	3333	40	Velocity not re-
57	0916	3394	3366	3268	3185	3334	32	corded on rd 59.
58	0918	3398	3370	3279	3195	3346	24	Bullet keyholed
60	0924	3487	3452	3367	3300	3421	31	after perforating
61	1004	3378	3350	3289	3226	3339	11	armor vest.
Average		3410	3382	3288	3204	3355	28	
31.5 GRAINS PROPELLANT								
62	1006	2747	2721	2625	2538	2695	26	Velocity not re-
63	1008	2591	2465	2469	2387	2535	30	corded on rds 65,
64	1010	2604	2578	2481	2404	2543	35	66, 67, 68 and 69
70	1114	2710	2664	2577	2494	2643	41	Bullets keyholed
71	1116	2700	2674	2571	2494	2633	41	after perforating
Average		2670	2644	2545	2463	2610	35	armor vest.
21.0 GRAINS PROPELLANT								
75	1256	1755	1733	1653	1605	1591	42	Velocity not re-
78	1305	1742	1720	1616	1546	1672	48	corded on rds 72,
80	1310	1634	1612	1538	1497	1571	41	73, 74, 75, 77,
81	1318	1689	1667	1572	1515	1618	49	79, 82 and 83.
84	1330	1733	1711	1639	1582	1685	26	Bullets keyholed
Average		1711	1689	1604	1549	1647	41	after perforating
								armor vest.

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATE 5 July 1957

TARGET Vest, Armor, M1953

RIFLE, Code E, M70, Serial No. 304164 with Caliber .22 Carbine Test Barrel
CARTRIDGE, Ball, Caliber .22, Carbine with 41-Grain Bullet with full
and reduced charges.

AMMUNITION TEMPERATURE 70°F. RANGE TEMPERATURE 78 to 90°F. DENSITY .948
to .947

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) $S_1 = 20$, $S_2 = 50$, $S_3 = 58$, $S_4 = 68$,
 $S_5 = 78$

ROUND NO.	TIME	VELOCITY (feet per second)					REMARKS
		AT 35 ft*	AT 55 ft**	AT 63 ft*	AT 73 ft*	AT 55 ft**	
FULL CHARGE							
338	1250	3015	2977	2899	2841	2945	32 Velocity not re- corded on rds
340	1254	3021	2983	2933	2882	2974	9 341, 342 & 345.
343	1302	2938	2900	2857	2817	2889	11 Round 339 hit a previous shot
344	1304	3012	2974	2915	2857	2961	17 hole.
346	1508	2979	2941	2890	2857	2916	25
Average		2993	2955	2899	2851	2937	18
11.0 GRAINS PROPELLANT							
347	1315	2417	2384	2331	2284	2461	23
348	1317	2166	2133	2070	2028	2104	24
349	1319	2098	2065	2004	1969	2032	33
350	1321	2379	2346	2294	2257	2328	18
351	1323	2125	2092	2028	1988	2050	32
Average		2237	2204	2145	2106	2177	27
6.5 GRAINS PROPELLANT							
352	1325	1684	1659	1590	1560	1614	45 Velocity not re- corded on rd 354.
353	1327	1511	1486	1412	1383	1435	51
356	1333	1610	1585	1490	1435	1534	51 Rds 335 and 357 hit previous
358	1357	1566	1541	1473	1447	1494	47 shot holes.
359	1359	1561	1536	1443	1410	1469	67
Average		1586	1561	1482	1447	1509	52
2.5 GRAINS PROPELLANT							
360	1401	Lost		Lost	Lost		Partial penetra- tion or test.
361	1403	Lost		Lost	Lost		Bullet hit second initiator.
362	1405	Lost		Lost	Lost		Bullet did not leave bore.
363	1407	Lost		Lost	Lost		Bullet did not leave bore.
364	1409	Lost		Lost	Lost		Bullet did not leave bore.
Average							

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATE 5 July 1957

TARGET Vest, Armor, M1953

RIFLE, U.S., Caliber .30, M1903, Serial No. 4747051 with Caliber .22 Test Barrel.

CARTRIDGE, Ball, Caliber .22, T48 with full and reduced charges.

AMMUNITION TEMPERATURE 70°F. RANGE TEMPERATURE 90 to 93°F DENSITY .947 to .952

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) S₁ = 20, S₂ = 50, S₃ = 58, S₄ = 68, S₅ = 78

VELOCITY (feet per second)								
ROUND NO.	TIME	AT	AT	AT	AT	AT	RETAR-	REMARKS
		35 ft*	55 ft**	63 ft*	73 ft*	55 ft**	DATION	
FULL CHARGE								
358	1440	3322	3305	3215	3106	3302	3	Rd 360 hit previous shot hole.
359	1442	3344	3327	3247	3135	3337	-10	
361	1446	3311	3294	3165	3030	3273	21	Bullets keyholed after perforating armor vest.
362	1448	3341	3324	3289	3257	3315	9	
363	1450	3356	3339	3236	3115	3333	6	
Average		3335	3318	3230	3129	3312	6	
39.5 GRAINS PROPELLANT								
364	1453	2988	2972	2865	2755	2953	19	Bullets keyholed after perforating armor vest.
365	1455	3033	3017	2915	2809	3000	17	
366	1457	3080	3063	2959	2841	3053	10	
367	1459	3061	3045	2985	2910	3045	0	
368	1501	2994	2978	2849	2732	2943	35	
Average		3031	3015	2915	2809	2999	16	
35.0 GRAINS PROPELLANT								
369	1503	2793	2777	2688	2591	2766	11	Bullets keyholed after perforating armor vest.
370	1505	2879	2863	2747	2632	2839	24	
371	1507	2836	2820	2747	2681	2800	20	
372	1509	2844	2828	2740	2639	2821	7	
373	1511	2613	2597	2500	2392	2586	11	
Average		2793	2777	2684	2587	2762	15	
29.5 GRAINS PROPELLANT								
374	1513	2355	2340	2278	2217	2327	13	Velocity not recorded on rds 375, 379, 381, 382 and 383.
377	1519	2322	2307	2242	2183	2289	18	
378	1521	2273	2258	2174	2096	2236	22	Round 376 hit previous shot hole.
380	1530	2385	2370	2278	2203	2338	32	
384	1548	2370	2355	2278	2203	2338	17	Bullets keyholed after perforating armor vest.
Average		2341	2326	2250	2180	2306	20	

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATES 10 and 26 July 1957

TARGET Vest, Armor, M1953

RIFLE, Code E, M70, Serial No. 304164 with Caliber .22 Carbine Test Barrel
CARTRIDGE, Ball, Caliber .22, Carbine with 41-Grain Bullet with full and
reduced charges.

AMMUNITION TEMPERATURE 70°F RANGE TEMPERATURE 75 to 77°F. DENSITY .984 to .985

DISTANCE BETWEEN MUZZLE AND TARGET (ft) 55

DISTANCE FROM MUZZLE TO DETRATORS (ft) S₁ = 20, S₂ = 50, S₃ = 58, S₄ = 68,
S₅ = 78

VELOCITY (feet per second)

ROUND NO.	TIME	AT	AT	AT	AT	AT	REMARKS
		35 ft*	55 ft**	63 ft*	73 ft*	55 ft**	
<u>10 July 1957</u>		<u>3.5 GRAINS PROPELLANT</u>					
365	1053	961	952	Lost	Lost		Bullets, after perforating armor vest, did not pass through remaining initiators.
366	1056	945	937	Lost	Lost		
367	1105	1005	995	Lost	Lost		
368	1107	935	927	Lost	Lost		
369	1112	932	924	Lost	Lost		
Average		956	947				

26 July 1957		3.5 GRAINS PROPELLANT					
380	1030	856	Lost	Lost			Bullets, after perforating armor vest, did not pass through remaining initiators.
381	1034	926	Lost	Lost			
382	1038	848	Lost	Lost			
383	1044	803	Lost	Lost			
384	1048	832	Lost	Lost			
Average		853					

* Instrumental velocity

** Calculated velocity

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STANDARDIZATION TEST

DATE 10 July 1957

TARGET Vest, Armor, M1953

RIFLE Code R, M70, Serial No. 367844 with Caliber .25 Test Barrel

CARTRIDGE Ball, Caliber .25, with 75-Grain Bullet, Lot 74MC34 with
full and reduced charges

AMMUNITION TEMPERATURE 70°F RANGE TEMPERATURE 74 to 75°F. Density .991

DISTANCE BETWEEN Muzzle AND TARGET (ft) 53

DISTANCE FROM MUZZLE TO INITIATORS (ft) S₁ = 20, S₂ = 50, S₃ = 58, S₄ = 68,
S₅ = 78

ROUND NO.	TIME	VELOCITY (feet per second)					REMARKS
		AT 35 ft*	AT 55 ft**	AT 63 ft*	AT 73 ft*	AT 55 ft**	
FULL CHARGE							
29	0854	3448	3423	3390	3356	3417	6 Velocity not recorded on rd 33.
30	0857	3472	3447	3401	3378	3419	28
31	0859	3468	3443	3390	3367	3408	35 Bullets keyholed after perforating armor vest.
32	0901	3488	3463	3367	3311	3412	51
34	0906	3468	3443	3413	3378	3441	9
Average		3469	3444	3392	3358	3419	24
38.0 GRAINS PROPELLANT							
35	0916	2820	2795	2740	2703	2770	25 Bullets keyholed after perforating armor vest.
36	0918	3018	2993	2924	2890	2951	42
37	0920	2970	2945	2857	2817	2889	56
39	0929	2997	2972	2924	2907	2938	34 Velocity not recorded on rd 38.
40	0947	2957	2972	2915	2899	2928	44
Average		2960	2935	2872	2843	2895	40
25.5 GRAINS PROPELLANT							
42	0955	1859	1839	1783	1770	1793	46 Velocity not recorded on rd 41.
43	0957	1866	1846	1789	1773	1802	44
44	1000	1911	1891	1842	1821	1859	32 Bullets keyholed after perforating armor vest.
45	1002	2013	1992	1934	1923	1943	49
46	1004	2068	2047	1988	1965	2006	41
Average		1943	1923	1867	1850	1881	42
21.5 GRAINS PROPELLANT							
47	1007	1609	1591	1538	1529	1545	46 Velocity not recorded on rd 48.
49	1012	1640	1622	1572	1553	1587	35
50	1014	1670	1648	1527	1511	1540	42 Bullet keyholed after perforating armor vest.
51	1016	1671	1653	1600	1585	1612	41
52	1018	1576	1558	1506	1488	1520	33
Average		1619	1601	1549	1533	1561	40

* Instrumental Velocity

** Calculated Velocity

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RETARDATION TEST

DATE 11 July 1957

TARGET Vest, Armor, M1953

RIFLE Code E, M70, Serial No. 304827 with Caliber .22 Test Barrel

CARTRIDGE Caliber .22, Loaded with 50-Grain Pull Patch Front Bullets for
Caliber .22-06 Duplex Cartridge and IMR No. 4895 Propellant,
Lot A14, 2425

AMMUNITION TEMPERATURE 70°F. RANGE TEMPERATURE 78 to 79°F. DENSITY .978
to .982

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) S₁ = 20, S₂ = 50, S₃ = 58, S₄ = 68,
S₅ = 78

ROUND NO.	TIME	VELOCITY (feet per second)					REAR- DATION	REMARKS
		AT 35 ft*	AT 55 ft**	63 ft*	AT 73 ft*	AT 55 ft**		
FULL CHARGE								
120	1408	3623	3592	3497	3413	3564	58	Velocity not re-
121	1411	3580	3549	3472	3448	3491	58	corded on rd 122
123	1416	3641	3610	3546	3509	3576	54	
124	1418	3619	3588	3521	3484	3551	57	
125	1422	3641	3610	3472	3367	3556	54	
Average		3621	3590	3502	3444	3548	42	
28.5 GRAINS PROPELLANT								
126	1428	2854	2825	2770	2755	2782	43	Round 126 hit a
127	1433	2871	2841	2762	2710	2804	37	previous shot
129	1438	2901	2871	2817	2809	2823	48	hole.
130	1440	2895	2869	2770	2710	2818	51	Bullets keyholed
131	1446	2890	2860	2786	2732	2829	31	after perforating
Average		2883	2853	2781	2743	2811	42	armor vest.
20.0 GRAINS PROPELLANT								
132	1448	2114	2089	2088	2012	2041	48	Bullets keyholed
133	1450	2101	2076	1988	1946	2022	54	after perforating
134	1452	2069	2044	1957	1916	1990	54	armor vest.
135	1454	2063	2038	1965	1934	1990	48	
136	1456	2068	2043	1980	1946	2007	36	
Average		2083	2058	1984	1951	2010	48	
12.0 GRAINS PROPELLANT								
137	1458	1563	1542	1437	1408	1460	82	Bullets keyholed
138	1500	1603	1780	1704	1681	1722	58	after perforating
139	1501	1596	1574	1499	1479	1515	59	armor vest.
140	1503	1612	1590	1508	1481	1530	60	
141	1505	1792	1769	1701	1675	1722	47	
Average		1673	1651	1570	1545	1590	51	

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATE 12 July 1957

TARGET Vest, Armor, M1953

RIFLE U.S., Caliber .30, M1903, Serial No. 1515142 with Caliber .30

Accuracy Test Barrel

CARTRIDGE Caliber .30, Loaded with 1st Duplex Bullet and Western Ball-Type Propellant, Lot AL-2796-45, with full and reduced charges.

AMMUNITION TEMPERATURE 70°F. RANGE TEMPERATURE 83 to 85°F. DENSITY .966 to .962

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) S₁ = 20, S₂ = 50, S₃ = 58, S₄ = 58, S₅ = 78

ROUND NO.	TIME	VELOCITY (feet per second)					REAR-DATION	REMARKS
		35 ft*	55 ft**	63 ft*	73 ft*	55 ft**		
25.0 GRAINS PROPELLANT								
114	1324	2588	2554	2475	2457	2489	65	Velocity not recorded on rds 116 and 119.
115	1327	2564	2530	2469	2451	2483	47	Round 117 hit a previous shot hole.
118	1337	2586	2552	2475	2445	2499	53	
120	1358	2562	2528	2469	2451	2483	45	
121	1402	2555	2521	2475	2445	2499	22	
Average		2571	2537	2473	2450	2491	46	
16.0 GRAINS PROPELLANT								
122	1418	1824	1796	1736	1721	1748	48	
123	1420	1882	1854	1786	1770	1799	55	
124	1422	1893	1864	1802	1783	1817	47	
125	1424	1877	1849	1789	1773	1802	47	
126	1426	1866	1838	1779	1761	1793	45	
Average		1868	1840	1778	1762	1792	48	
10.0 GRAINS PROPELLANT								
127	1428	1282	1253	1170	1167	1172	91	
128	1430	1293	1274	1192	1181	1201	73	
129	1432	1258	1240	1155	1144	1164	76	
130	1434	1265	1266	1190	1178	1200	66	
131	1436	1251	1233	1163	1153	1171	62	
Average		1274	1255	1174	1165	1182	74	
7.0 GRAINS PROPELLANT								
134	1459	1000	992	790	782	796	196	
137	1517	1287	1268	814	808	819	449	
139	1521	1036	1008	869	864	873	155	Velocity not recorded on rds 132, 133, 136 and 138.
140	1523	1124	1111	965	960	969	142	
141	1535	1172	1157	939	932	945	212	
Average		1124	1111	875	869	880	231	
* Instrumental velocity								
** Calculated velocity								

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATE 26 July 1957

TARGET Vent, Armor, M193

RIFLE U.S., Caliber .30, M1903, Serial No. 1515142 with Chamber .30
Accuracy Test Barrel

CARTRIDGE Caliber .30 Loaded with 2nd Duplex Bullet and Western
Ball-Type Propellant, Lot AL-2796-45, with full and reduced
charges.

AMMUNITION TEMPERATURE 70°F. RANGE TEMPERATURE 82 to 83 °F. DENSITY .980
to .982

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) $S_1 = 20$, $S_2 = 50$, $S_3 = 58$, $S_4 = 68$
 $S_5 = 78$

VELOCITY (feet per second)

ROUND NO.	TIME	AT 35 ft*	AT 50 ft**	AT 63 ft*	AT 73 ft*	AT 85 ft**	RETAR- DATION	REMARKS
22.5 GRAINS PROPELLANT								
227	1251	2392	2359	2304	2278	2325	34	
228	1252	2379	2346	2288	2262	2309	37	
229	1254	2379	2346	2288	2268	2304	42	
230	1256	2358	2325	2273	2247	2294	31	
231	1259	2355	2322	2262	2242	2276	44	
Average		2373	2340	2283	2259	2302	38	
14.5 GRAINS PROPELLANT								
232	1303	1675	1649	1582	1567	1594	55	
233	1304	1753	1726	1661	1642	1676	50	
234	1305	1729	1703	1637	1618	1652	51	
235	1306	1717	1691	1629	1613	1642	49	
236	1308	1709	1683	1608	1595	1628	65	
Average		1717	1690	1623	1607	1636	54	
9.5 GRAINS PROPELLANT								
238	1327	1182	1167	1073	1064	1080	87	Velocity not re-
240	1332	1182	1167	1080	1074	1085	82	corded on rds 237,
241	1334	1219	1203	1119	1109	1127	76	239, 243, 244, 245
242	1413	1127	1114	1025	1018	1031	83	and 246.
247	1512	1157	1143	1046	1042	1049	94	
Average		1173	1159	1069	1061	1074	84	
7.0 GRAINS PROPELLANT								
249	1522	1022	1014	926	923	928	86	Velocity not re-
252	1529	1065	1055	969	962	975	80	corded on rds 248
253	1545	1010	1002	903	899	906	96	and 250.
254	1547	1014	1006	932	926	937	69	Round 251 hit a
255	1549	1065	1055	963	956	969	86	previous shot hole.
Average		1035	1026	939	933	943	83	

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATE 26 July 1957

TARGET Vest, Armor, M1953

RIFLE Code 2, M70, Serial No 367044 with Caliber .25 Test Barrel

CARTRIDGE Ball, Caliber .25, with 75-Grain Bullet, Lot 74MC31 with reduced charge.

AMMUNITION TEMPERATURE 70°F RANGE TEMPERATURE 74 to 75°F. DENSITY 1.007 to .996

DISTANCE FROM MUZZLE TO TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) $S_1 = 20$, $S_2 = 30$, $S_3 = 50$, $S_4 = 68$, $S_5 = 78$

RANGED NO.	TIME	VELOCITY (feet per second)					REMARKS
		AT 15 ft*	AT 55 ft**	AT 63 ft*	AT 73 ft*	AT 55 ft**	
		20.5 GRAIN PROPellant					
57	0848	2385	2362	2325	2309	2340	22
58	0852	2168	2146	2079	2053	2100	46
59	0853	2232	2210	2155	2123	2181	29
60	0855	2152	2130	2083	2066	2097	33
61	0857	2283	2260	2208	2183	2228	32
Average		2244	2222	2170	2147	2189	32

* Instrumental velocity

** Calculated velocity

Bullets keyholed after perforating armor vest.

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RETARDATION TEST

DATE 27 July 1957

TARGET Vest, Armor, M1953

RIFLE U.S., Caliber .30, M1903, Serial No. 1515142 with Caliber .30 Accuracy Test Barrel

CARTRIDGE Caliber .30, Loaded with 1st Triplex Bullet and Western Ball-Type Propellant, Lot AL-2796-45, with full and reduced charges.

AMMUNITION TEMPERATURE 70°F. RANGE TEMPERATURE 80 to 87°F. DENSITY .576 to .968

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE BETWEEN MUZZLE TO INITIATORS(ft) $S_1 = 20$, $S_2 = 50$, $S_3 = 58$, $S_4 = 68$, $S_5 = 78$

		VELOCITY (feet per second)						
ROUND NO.	TIME	A*	AT	AT	AT	AT	RETAR-DATION	REMARKS
		35 ft*	55 ft**	63 ft*	73 ft*	55 ft**		
22.0 GRAINS PROPELLANT								
259	0943	2558	2500	2435	2387	2417	63	Velocity not re-corded on rd 260.
261	0954	2720	2660	2564	2538	2585	75	
262	0955	2562	2504	2427	2358	2450	54	
263	0957	2708	2648	2564	2532	2590	58	
264	1022	2747	2687	2591	2558	2617	70	
Average		2639	2600	2512	2483	2536	64	
11.0 GRAINS PROPELLANT								
265	1030	1446	1511	1445	1422	1463	81	
266	1032	1569	1527	1431	1410	1448	79	
267	1034	1585	1543	1443	1416	1465	78	
268	1036	1576	1534	1433	1412	1450	84	
269	1038	1589	1547	1445	1425	1461	86	
Average		1581	1539	1439	1417	1457	82	
6.0 GRAINS PROPELLANT								
272	1047	1042	1027	892	804	898	129	Velocity not re-corded on rds 270, 271 and 274. Rounds 273, 275, 278 hit previous shot holes.
276	1137	1165	1142	1017	1009	1023	119	
277	1139	1216	1189	1109	1099	1117	72	
279	1144	1227	1200	1114	1098	1127	73	
280	1146	1169	1146	989	980	996	150	
Average		1164	1141	1024	1014	1032	109	
4.5 GRAINS PROPELLANT								
282	1240	931	891	769	763	774	117	Velocity not re-corded on rds 281, 283, 284, 285, 287 and 290.
286	1307	917	907	729	719	737	170	
288	1315	979	967	822	806	817	150	
289	1318	972	960	795	789	800	160	
291	1322	994	981	898	891	904	77	
Average		953	941	801	794	806	135	

* Instrumental velocity

** Calculated velocity

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STABILIZATION TEST

DATE 29 and 31 July 1957

TARGET Vest, Armor, M1953

RIFLE U.S., Caliber .30, M1903, Serial No. 1515142 with Caliber .30

Accuracy Test Barrel

CART. EDGE Caliber .30, Loaded with 2nd Triplex Bullet and Western Ball-Type Propellant, Lot AL-2796-45, with full and reduced charges.

AMMUNITION TEMPERATURE 70°F. RANGE TEMPERATURE 80 to 86°F. DENSITY .965 to .962

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) $S_1 = 30, S_2 = 50, S_3 = 58, S_4 = 68, S_5 = 78$

VELOCITY (feet per second)

ROUND NO.	TIME	AT 25 ft*	AT 55 ft**	AT 63 ft*	AT 73 ft*	AT 75 ft**	REMARKS
21.0 GRAINS PROPELLANT							
292	1355	2600	2532	2539	2398	2472	66
293	1356	2506	2524	2399	2364	2409	115
294	1357	2609	2547	2421	2375	2458	89
295	1358	2585	2524	2404	2364	2436	88
296	1400	2502	2441	2320	2273	2358	83
Average		2577	2515	2395	2355	2427	88
10.0 GRAINS PROPELLANT							
299	1408	1433	1391	1245	1227	1259	132
300	1410	1435	1393	1272	1252	1288	105
301	1412	1417	1375	1247	1227	1255	112
303	1435	1381	1340	1236	1227	1243	97
305	1522	1647	1600	1466	1439	1488	112
Average		1463	1420	1293	1274	1308	112
6.0 GRAINS PROPELLANT							
306	1537	1087	1069	880	876	883	186
309	1544	1213	1184	1033	1025	1039	145
310	1546	1200	1171	1027	1019	1033	138
315	0914	1263	1230	1093	1080	1103	127
316	0917	1199	1170	1024	1018	1029	141
Average		1192	1165	1011	1004	1017	147
4.0 GRAINS PROPELLANT							
318	0929	885	876	670	665	674	202
330	1056	829	821	Lost	Lost		
331	1057	857	849	Lost	Lost		
332	1059	855	847	586	Lost		
334	1107	828	820	Lost	Lost		
Average		851	843				

* Instrumental velocity

** Calculated velocity

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RETARDATION TEST

DATE 31 July 1957
 TARGET Vest, Armor, M1953
 RIFLE U.S., Caliber .30, M1903, Serial No. 1515142 with Caliber .30
 Accuracy Test Barrel
 CARTRIDGE Caliber .30, Loaded with 2nd Triplex Bullet and Western
 Ball-Type Propellant, Lot Al-2796-45, with full and
 reduced charges.

AMMUNITION TEMPERATURE 70°F. RANGE TEMPERATURE 82 to 85°F. DENSITY .953
 to .946

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) $S_1 = 20$, $S_2 = 50$, $S_3 = 58$, $S_4 = 68$,
 $S_5 = 73$

ROUND NO.	TIME	VELOCITY (feet per second)					REMARKS
		AT 35 ft*	AT 55 ft**	AT 63 ft*	AT 73 ft*	AT 55 ft**	
<u>3.0 GRAINS PROPELLANT</u>							
335	1318	--	--	--	--	--	Bullet did not leave the bore.
336	1320	189	--	--	--	--	Bullet hit the target frame.
337	1323	527	522	394	381	404	118 Bullet hit edge of vest.
338	1335	--	--	--	--	--	Bullet did not pass over 2nd initiator.
339	1338	392	--	--	--	--	Partial penetration of the vest.
340	1344	636	--	--	--	--	Partial penetration of the vest.
341	1347	443	--	--	--	--	Partial penetration of the vest.
Average							
<u>3.5 GRAINS PROPELLANT</u>							
342	1413	782	--	--	--	--	Bullets from rds 342 and 346 struck the armor plate in front of the 4th initiator.
343	1417	806	799	539	530	546	253
344	1420	747	740	699	687	719	31
345	1443	588	--	--	--	--	Partial penetration of the vest.
346	1445	703	--	--	--	--	There is a possibility that round 344 hit a previous hole in vest.
Average							

* Instrumental velocity

** Calculated velocity

CONFIDENTIAL

RETARDATION TEST

DATE 31 July 1957

TARGET West, Arrow, M1953

RIFLE U.S., Caliber .30, M1903, Serial No. 1515142 with Caliber .30 Accuracy Test Barrel

CARTRIDGE Caliber .30, Loaded with 3rd Triplex Bullet and Western Ball-Type Propellant, Lot AL-2796-45, with full and reduced charges.

AMBUSH TEMPERATURE 70°F RANGE TEMPERATURE 85 to 89°F. DENSITY .946 to .947

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) S₁ = 80, S₂ = 50, S₃ = 58, S₄ = 68, S₅ = 78

VELOCITY (feet per second)

ROUND NO.	TIME	AT	AT	AT	AT	AT	REMARKS
		35 ft*	55 ft**	63 ft*	73 ft*	55 ft**	
20.0 GRAINS PROPELLANT							
347	1450	2408	2425	2320	2257	2370	55
348	1455	2408	2346	2227	2173	2254	92
349	1457	2502	2439	2315	2270	2345	94
350	1500	2477	2414	2299	2262	2329	85
351	1501	2573	2509	2375	2336	2406	103
Average		2490	2427	2307	2265	2341	86
9.5 GRAINS PROPELLANT							
352	1504	1326	1289	1144	--	--	Velocity at 73' from the muzzle was not recorded on rounds 352 and 354.
353	1508	1221	1190	1030	1026	1033	
354	1509	1341	1303	1159	--	--	
355	1511	1379	1340	1196	1182	1207	133
356	1512	1368	1349	1214	1204	1225	124
Average		1331	1294	1149			
5.5 GRAINS PROPELLANT							
357	1514	1084	1054	918	927	919	Velocity at 73' from the muzzle was not recorded on rounds 358 through 361.
358	1516	1188	1105	944	-----	-----	
359	1517	1114	1092	940	-----	-----	
360	1518	1113	1086	948	-----	-----	
361	1520	1117	1095	-----	-----	-----	
Average		1110	1089				

* Instrumental velocity

** Calculated velocity

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CONFIDENTIAL

CONFIDENTIAL

REGULATION TEST

DATE 9 September 1957

TARGET Vest, Armor, M1953

RIFLE U.S., Caliber .30, M1903, Serial No. 1515142 with Caliber .30

Accuracy Test Barrel

CARTRIDGE Caliber .30, Loaded with 1st Duplex Bullet and Western Ball-type Propellant, Lot AL-2796-45

AMMUNITION TEMPERATURE 70°F RANGE TEMPERATURE 70 to 71°F. DENSITY 1.005 to 1.003

DISTANCE BETWEEN MUZZLE AND TARGET(ft) 55

DISTANCE FROM MUZZLE TO INITIATORS(ft) S₁ = 20, S₂ = 50, S₃ = 58, S₄ = 58, S₅ = 76

ROUND NO.	TIME	VELOCITY (feet per second)					REMARKS
		AT	AT	AT	AT	AT	
		35 ft*	55 ft**	63 ft*	73 ft*	55 ft**	
7.0 GRAINS PROPELLANT							
367	1344	1103	1083	992	986	997	86
368	1348	1092	1072	1021	1019	1023	49
371	1356	1034	1019	976	971	980	39
374	1404	978	966	884	881	886	80
375	1406	985	972	893	890	895	77
Average		1038	1022	953	949	956	66
Velocity not re- corded on rounds 369, 370, 372, 373 and 376.							

* Instrumental velocity

** Calculated velocity

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CONFIDENTIAL

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BALLISTIC FIRING REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 20 May 1957

CALIBER .30

GUN NO. 1521616

CARTRIDGE TYPE AND LOT: Cartridge, Ball, Caliber .30, M2, Lot FA 4407

SCREEN DISTANCES FROM First 27.51 ft Second 79.35 ft

MUZZLE: Third 1775 ft Last 1825 ft

TEMPERATURE: 56.3°F REL. HUMIDITY 1.015 DIRECTION OF FIRE TOWARD 00

TIME FIRED	RD	TIME		VELOCITY		TIME		VELOCITY		TIME		WIND		RANGE COMP.
		1st-2d	1st-2d	1st-2d	1st-2d	3d-Last	3d-Last	3d-Last	3d-Last	1st-3rd	1st-3rd	VEL.	VEC.	
		sec	fps	sec	fps	sec	fps	sec	fps	sec	fps	TOR	WIND	fps
1311	1	2087	2404	2084	2404	1304	1304	.96009	6	-9	-5.4			
	2	2094	2404	2084	2404	1302	1302	.96083	3	-7	-2.1			
	3	2084	2408	2084	2408	1333	1333	.95043	12	-7	-8.4			
	4	2115	2451	2084	2451	1318	1318	.96376	6	-4	-2.4			
	5	2075	2498	2075	2498	1324	1324	.95316	6	-9	-5.4			
	6	2115	2451	2084	2451	1301	1301	.96906	6	-1	-6.0			
	7	2123	2442	2084	2442	1309	1309	.96708	6	-1	-6.0			
	8	2091	2479	2084	2479	1304	1304	.95996	3	-1	-3.0			
	9													
	10	2145	2440	2084	2440	1303	1303	.97252	3	-5	-1.5			
	11	2100	2469	2084	2469	1333	1333	.95432	12	-2	-2.4			
	12	2141	2421	2084	2421	1279	1279	.96814	6	-9	-5.4			
	13	2124	2441	2084	2441	1304	1304	.96984	6	-5	-3.0			
	14	2115	2451	2084	2451	1325	1325	.96049	6	-9	-5.4			
	15	2122	2444	2084	2444	1303	1303	.97311	0	-8	0			
	16	2126	2438	2084	2438	1304	1304	.97176	0	-9	0			
	17													
	18	2041	2540	2084	2540	1294	1294	.97652	0	-9	0			
	19	2090	2480	2084	2480	1319	1319	.95892	0	-9	0			
	20	2132	2432	2084	2432	1312	1312	.96937	6	-6	-3.6			
	21	2098	2471	2084	2471	1308	1308	.96388	3	-7	-2.1			
1326	22	2111	2456	2084	2456	1295	1295	.97087	3	-8	-2.4			
	Avg.	2103	2465	2084	2465	1308	1308	.96355			-3.2			

* Rounds 9 and 17 were lost.

CONFIDENTIAL

BALLISTIC FIRING REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 20 May 1957

CALIBER .22 Carbine

GUN NO. 304164

BARREL ASSIGNMENT 19 August 54

CARTRIDGE TYPE: Cartridge, Ball, Caliber .22 Carbine

SCREEN DISTANCES FROM First 28.51 ft Second 40.35 ft

MUZZLE: Third 1775 ft Last 1825 ft

TEMPERATURE: 59.3°F REL. DENSITY 1.009 DIRECTION OF FIRE TOWARD 00

TIME FIRED NO.	RD	TIME 1st-2d sec x10	VELOCITY 1st-2d fps	TIME 3d-last sec x10	VELOCITY 3d-last fps	TIME 1st-3rd sec	COS RANGE		
							WIND VRL.	WIND VEC-	COMP. WIND
1350	1	1804	2874	5725	873	1.22098	6	-9	-5.4
	2	1877	2762	6063	825	1.27945	9	-9	-8.1
	3	1807	2669	5851	855	1.23555	3	-9	-2.7
	4	1786	2903	5814	860	1.22089	3	-9	-2.7
	*								
	7	1776	2919	5712	875	1.21074	0	-9	0
	8	1800	2880	5781	865	1.22439	0	-1	0
	9	1791	2854	5732	872	1.21545	3	-9	-2.7
	10	1791	2894	5754	869	1.21598	6	-8	-4.8
	11	1777	2917	5729	873	1.20708	3	-3	-9
	12	1795	2889	5859	853	1.22917	3	-7	-2.1
	13	1763	2940	5677	881	1.20010	6	-9	-5.4
	*								
	15	1818	2851	5789	864	1.23271	0	-2	0
	*								
	17	1788	2899	5774	866	1.21773	0	-1	0
	18	1789	2898	5719	874	1.21392	0	-7	0
	*								
	20	1793	2891	5747	870	1.21791	0	-1	0
	21	1781	2911	5782	865	1.21683	0	-1	0
	22	1788	2899	5768	867	1.22154	6	-8	-4.8
	23	1832	2830	5874	851	1.24875	6	-1	-6.0
	24	1772	2926	5720	874	1.20238	0	-1	0
	*								
1415	25	1794	2890	5742	871	1.21772	3	-9	-2.7
	Avg.	1796	2888	5781	865	1.22246			-2.4

* Rounds were lost.

CONFIDENTIAL

BALLISTIC FIRING REPORT
TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 20 May 1957

CALIBER .22 Carbine

GUN NO. 304164

BARREL ASSEMBLED 19 August 54

CARTRIDGE TYPE: Cartridge, Ball, Caliber .22 Carbine

SCREEN DISTANCES FROM First 28.51 ft Second 80.35 ft

MUZZLE: Third 1775 ft Last 1825 ft

TEMPERATURE: 59.3°F REL. DENSITY 1.009 DIRECTION OF FIRE TOWARD 00°

TIME FIRED	RD NO.	TIME 1st-2d sec x10	VELOCITY 1st-2d fps	TIME 3d-Last sec x10	VELOCITY 3d-Last fps	TIME 1st-3rd sec	COS		RANGE WIND COMP.
							WIND VEL.	WIND VEC-	
1350	1	1804	2874	5725	873	1.22098	6	-.9	-5.4
	2	1877	2762	6063	825	1.27945	9	-.9	-8.1
	3	1807	2869	5851	855	1.23555	3	-.9	-2.7
	4	1786	2903	5814	860	1.22089	3	-.9	-2.7
	*								
	7	1776	2919	5712	875	1.21074	0	-.9	0
	8	1800	2880	5781	865	1.22439	0	-1	0
	9	1791	2894	5732	872	1.21545	3	-.9	-2.7
	10	1791	2894	5754	869	1.21598	6	-.8	-4.8
	11	1777	2917	5729	873	1.20708	3	-.3	-.9
	12	1795	2888	5859	853	1.22917	3	-.7	-2.1
	13	1763	2940	5677	881	1.20010	6	-.9	-5.4
	*								
	15	1818	2851	5789	864	1.23271	0	-.2	0
	*								
	17	1788	2899	5774	866	1.21773	0	-1	0
	18	1789	2898	5719	874	1.21392	0	-.7	0
	*								
	20	1793	2891	5747	870	1.21791	0	-1	0
	21	1781	2911	5782	865	1.21683	0	-1	0
	22	1788	2899	5768	867	1.22154	6	-.8	-4.8
	23	1832	2830	5874	851	1.24875	6	-1	-6.0
	24	1772	2926	5720	874	1.20238	0	-1	0
	*								
1415	28	1794	2890	5742	871	1.21772	3	-.9	-2.7
	Avg.	1796	2888	5781	865	1.22246			-2.4

* Rounds were lost.

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BALLISTIC Firing Report
TIME OF FLIGHT - REMAINDER VELOCITY

DATE FIRED: 21 May 1957

CALIBER .22 Carbine

GUN NO. 304164

RANGE ASSEMBLED 19 August 54

CARTRIDGE TYPE: Cartridge, Ball, 0.18 in. .22 Carbine

SCREEN DISTANCES FROM First 28.38 ft Second 80.24 ft

MUZZLE: Third 1180 ft Last 1220 ft

TEMPERATURE: 53.40° REL. DENSITY 1.033 DIRECTION OF FIRE TOWARD 00

TIME FIRED	RD NO.	TIME		VELOCITY		TIME		VELOCITY		TIME sec	WIND VEL. fps	COS WIND COR	RANGE WIND COMP. fps
		1st-2d sec x10 ⁵	3d-Last sec x10 ⁵	1st-2d fps	3d-Last sec x10 ⁵	1st-3rd sec	1st-3rd fps						
1140	1	1822		2846	3602	1110		.64589	3	-9	-2.7		
	2	1800		2881	3574	1119		.63966	0	-1	0		
	3	1808		2868	3613	1107		.64484	0	-1	0		
	4	1853		2799	3687	1085		.66202	0	-9	0		
	5	1791		2896	3555	1125		.63481	0	-7	0		
	6	1805		2873	3591	1114		.64106	3	-1	-3.0		
	7	1797		2886	3537	1131		.63473	3	-9	-2.7		
	*												
	9	1825		2842	3629	1102		.65000	0	-7	0		
	10	1796		2888	3554	1125		.64975	0	-9	0		
	11	1776		2920	3506	1141		.62697	0	-1	0		
	12	1770		2930	3448	1150		.62069	6	-1	-6.0		
	13	1858		2791	3674	1089		.66193	3	-9	-2.7		
	14	1815		2857	3500	1117		.64271	0	-8	0		
	15	1786		2904	3496	1144		.60813	3	-6	-1.8		
	16	1825		2842	3541	1116		.64398	3	-1	-3.0		
	17	1846		2809	3654	1095		.65601	0	-1	0		
	18	1802		2868	3581	1117		.64104	0	-9	0		
	19	1791		2896	3483	1148		.62803	0	-8	0		
	20	1814		2859	3557	1125		.64099	3	-1	-3.0		
	1148	21	1789		2899	3551	1126		.63500	3	-1	-3.0	
		Avg.	1809		2869	3573	1120		.64071			-14	

* Round was lost.

CONFIDENTIAL

BALLISTIC FIRING REPORT
TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 21 May 1957

CALIBER .22

CAN NO. 4747051

CARTRIDGE TYPE: Cartridge, Ball, Caliber .22, T48

SOURCE DISTANCES FROM First 27.98 ft Second 79.4 ft

MUTUAL: Third 1180 ft Last 1220 ft

TEMPERATURE: 57.3°F REL. DENSITY 1.025 DIRECTION OF FIRE TOWARD 00

TIME FIRED	RD NO.	TIME		VELOCITY		TIME		VELOCITY		TIME		WIND		WIND		COS RANGE	
		1st-2nd	1st-3rd	1st-2nd	1st-3rd	2nd-3rd	2nd-4th	2nd-3rd	2nd-4th	3rd-4th	3rd-4th	VEL.	VEL.	VEL.	VEL.	VEL.	VEL.
		sec	sec	fps	fps	sec	sec	fps	fps	sec	sec	fps	fps	fps	fps	fps	fps
1250	1	1613		3215		1766		2265		.42767		9	-8	-7.2			
	2	1600		3211		1759		2274		.42550		3	-1	-3.0			
	3	1615		3211		1782		2245		.43129		0	-1	0			
	4	1601		3239		1763		2269		.42726		0	-8	0			
	5	1710		3033		1781		2246		.43065		0	-7	0			
	6	1606		3229		1758		2275		.42636		0	-7	0			
	7	1591		3260		1761		2271		.42851		0	-1	0			
	8	1594		3253		1736		2309		.42095		0	-8	0			
	9	1612		3217		1783		2243		.43186		0	-8	0			
	10	1605		3231		1767		2264		.42730		0	-9	0			
	11																
	15	1576		3291		1699		2354		.41409		0	1.5	0			
	16	1580		3266		1710		2399		.41796		3	-1	-3			
	17	1614		3213		1789		2236		.43422		3	-1	-3			
	18	1586		3270		1722		2323		.41864		0	1.4	0			
	19	1617		3207		1785		2241		.43280		0	1.4	0			
	20	1583		3276		1728		2315		.41950		6	-1	-6.0			
	21	1592		3258		1738		2301		.42152		0	-1	0			
	22	1589		3264		1743		2295		.42228		3	-8	-2.4			
	23	1580		3282		1712		2336		.41822		3	.9	-2.7			
1359	24	1583		3276		1724		2320		.42077		9	-9	-8.1			
	Avg.	1602		3237		1740		2206		.42457				-1.6			

* Rounds 11 to 14 were lost.

CONFIDENTIAL

BALLISTIC FIRING REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 21 May 1957

CALIBER .30

QUN NO. 1521616

CARTRIDGE TYPE AND LOT: Cartridge, Ball. Caliber .30, M2, Lot FA 4407

SCREEN DISTANCES FROM First 27.94 ft Second 79.80 ft

MUZZLE: Third 11.80 ft Last 1220 ft

TEMPERATURE: 58.3°F REL. DENSITY 1.022 DIRECTION OF FIRE TOWARD 0°

TIME FIRST	RT NO.	TIME		VELOCITY		TIME		VELOCITY		TIME		WIND		COS RANGE	
		1st-2d	sec x10 ⁵	1st-2d	fps	3d-Last	sec x10 ⁵	3d-Last	fps	1st-3rd	sec	VEL	fps	VEC-	WIND
1330	1	2042		2540		2292		1745		.54585	3		3	- .3	- .9
	2	2063		2490		2393		1672		.56330	3		3	- .6	-1.8
	3	2101		2468		2412		1658		.56836	0		0	-1	0
	4	2084		2488		2388		1675		.56308	3		3	/ .3	/ .9
	5	2101		2468		2389		1674		.56587	3		3	- .6	-1.8
	6	2130		2435		2433		1644		.57429	9		9	-1	-9.0
	*														
	8	2107		2461		2401		1666		.56735	6		6	- .8	-4.8
	9	2090		2481		2370		1688		.56203	3		3	- .9	-2.7
	10	1930		2619		2237		1788		.53121	12		12	- .7	-8.4
	11	2125		2440		2423		1651		.57330	9		9	-1	-9.0
	12	2100		2470		2410		1660		.56793	0		0	-1	0
	13	2097		2473		2411		1659		.56717	3		3	-1	-3.0
	14	2163		2398		2487		1608		.58549	12		12	- .8	-9.6
	15	2105		2464		2414		1657		.56884	9		9	- .7	-6.3
	16	2131		2434		2436		1642		.57523	12		12	- .7	-8.4
	*														
	18	2116		2451		2412		1658		.57078	15		15	- .6	-9.0
	19	2088		2494		2361		1694		.56072	15		15	- .7	-10.5
	20	2117		2450		2426		1649		.57205	12		12	- .8	-9.6
	21	2124		2442		2437		1641		.57387	9		9	- .5	-4.5
1341	22	2097		2473		2376		1664		.56360	9		9	- .9	-8.1
	Avg.	2099		2471		2395		1671		.56603					-5.3

* Rounds 7 and 17 were lost.

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BALLISTIC FIRING REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 22 May 1957

CALIBER .30

JUN NO.: 1521616

CARTRIDGE TYPE AND LOT: Cartridge, Ball, Caliber .30 M2, Lot FA 4407

SCREEN DISTANCES FROM First 27.40 ft Second 79.24 ft

MUZZLE: Third 580 ft Last 620 ft

TEMPERATURE: 77°F REL. DENSITY 1.028 DIRECTION OF FIRE TOWARD 0°

TIME FIRED	RD NO.	TIME	VELOCITY	TIME	VELOCITY	TIME	COS		RANGE
		1st-4th sec x10	1st-2d fps	3d-last sec x10	3d-last fps	1st-3rd sec	WIND VEL.	WIND VEC- TOR	COMP WIND FPS
1000	1	2081	2491	1925	2078	.24041	6	-.9	-5.4
	2	2141	2421	1979	2071	.24731	0	/.5	0
	3	2089	2482	1931	2071	.24128	0	-.6	0
	4	2150	2411	2005	1995	.24925	0	/.9	0
	5	2120	2445	1970	2070	.24533	3	/.3	/1.5
	6	2103	2465	1952	2049	.24320	1	-.1	-.1
	7	2101	2467	1948	2053	.24291	0	-.9	0
	8	2071	2503	1921	2082	.23949	3	/.8	/2.4
	9	2152	2409	1997	2003	.24888	4	/.2	/.8
	10	2136	2427	1985	2015	.24722	6	/.6	/3.6
	*								
	16	2091	2479	1980	2080	.24159	8	/.2	/1.6
	17	2102	2466	1942	2060	.24866	6	-.9	-5.4
	18	2113	2453	1963	2078	.24458	5	-.8	-4.0
	19	2121	2444	1973	2027	.24546	3	-.4	-1.2
	20	2147	2415	2005	1995	.24888	3	/.3	/.9
	21	2148	2413	2008	1992	.24902	3	/1.0	/3.0
	*								
	23	2076	2497	1922	2081	.23983	6	-1.0	-6.0
	24	2143	2419	1990	2010	.24767	3	-1.0	-3.0
	25	2171	2388	2032	1969	.25185	0	-1.0	0
	26	2075	2478	1921	2082	.24952	6	/.6	/3.6
	Avg.	.02116	2450	.01967	2074	.24482			

* Rounds were lost.

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BALLISTIC FIRING REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 22 May 1957

CALIBER .22

GUN NO. 4747051

CARTRIDGE TYPE: Cartridge, Ball, Caliber .22, T48

SCREEN DISTANCES FROM First 28.00 ft Second 79.84 ft

MUZZLE: Third 580 ft Last 620 ft

TEMPERATURES: 60.10° REL. HUMIDITY 1.021 DIRECTION OF FIRE TOWARD 00

TIME FIRED	RD NO.	TIME		VELOCITY		TIME 1st-Last	WIND VEL.	COS WIND	RANGE CCAP
		1st-2d sec x10 ³	1st-2d fps	3d-Last sec x10 ³	3d-Last fps				
1044	1	1578	3285	1444	2770	.18203	0	-1.0	0
	2	1585	3271	1447	2764	.18177	0	- .9	0
	3	1592	3256	1461	2736	.18130	0	- .9	0
	4	1581	3279	1444	2770	.18148	0	- .6	0
	*								
	9	1578	3285	1443	2772	.18121	3	/ .4	/1.2
	*								
	12	1574	3294	1436	2786	.18036	6	- .3	-1.8
	*								
	15	1582	3277	1446	2766	.18154	6	- .9	-5.4
	*								
	18	1595	3250	1470	2721	.18421	12	-1.0	-12.0
	19	1585	3271	1453	2753	.18220	9	-1.0	-9.0
	20	1603	3234	1473	2716	.18466	3	-1.0	-3.0
	21	1585	3271	1473	2716	.18393	3	-1.0	-3.0
	22	1602	3236	1470	2721	.18432	0	- .9	0
	23	1605	3230	1474	2714	.18472	0	-1.0	0
	25	1580	3281	1447	2764	.18174	2	-1.0	-2.0
	26	1590	3260	1476	2710	.18467	0	- .8	0
	27	1585	3271	1445	2761	.18233	9	-1.0	-9.0
	28	1595	3250	1462	2736	.18366	6	- .9	-5.4
	30	1590	3260	1459	2742	.18350	0	-1.0	0
	31	1593	3254	1470	2705	.18504	12	- .8	-9.6
1136	2	1570	3302	1448	2752	.18175	9	- .7	-6.3
	Avg.	.01587	3266	.01458	2744	.18292			

* Rounds were lost.

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BALLISTIC FIRE REPORT TIME OF FLIGHT - MAGAZINE VELOCITY

DATE FIRED: 22 May 1957

CALIBER .22 Carbine

OWN NO. 304164

RANGE ASSIGNED 19 August 54

CARTRIDGE TYPE: Cartridge, Ball, Caliber .22, Carbine

SCREW DISTANCES FROM First 50.40 ft Second 30.24 ft

MAGAZINE Third 50 ft Last 680 ft

TEMPERATURE: 62.1° F. HUMIDITY 1.014 DIRECTION OF FIRE TOWARD 0°

		TIME	VELOCITY		TIME	VELOCITY		TIME	WIND	COS	RANGE
TIME	RD	1st-2d	1st-2d	3d-Last	3d-Last	1st-Last	WIND	WIND	WIND	WIND	COMP
FIRED	NO.	sec x 10 ⁵	fps	sec x 10 ⁵	fps	sec	VEL.	VEC.	TOR	fps	WIND
1243	1	1825	2841	2130	1874	23301	9	- .8		-7.2	
	2	1756	2886	2068	1916	22983	12	-1.0		-12.0	
	3	1824	2842	2120	1887	23346	6	-1.0		-6.0	
	4	1805	2872	2097	1907	23095	3	- .9		-2.7	
	5										
	6	1834	2827	2131	1877	23448	6	- .4		-2.4	
	7	1797	2885	2084	1917	22955	3	- .8		-2.4	
	8	1824	2842	2126	1881	23364	7	-1.0		-7.0	
	9	1828	2836	2131	1877	23434	6	-1.0		-6.0	
	10	1807	2869	2092	1912	23059	9	- .9		-8.1	
	11	1812	2861	2109	1897	23173	15	- .9		-13.5	
	12										
	13	1773	2924	2049	1952	22625	3	- .8		-2.4	
	14	1792	2893	2074	1929	22873	6	-1.0		-6.0	
	15										
	16	1808	2867	2105	1900	23127	0	-1.0		0	
	17	1771	2927	2056	1946	22647	0	- .8		0	
	18	1765	2937	2034	1967	22470	0	- .9		0	
	19										
	20	1805	2878	2096	1908	23060	10	- .4		-4.0	
	21	1799	2822	2106	1899	23070	0	- .4		0	
	22	1775	2921	2061	1941	22690	0	- .1		0	
	23										
	24	1779	2914	2059	1943	22708	6	- .2		-1.2	
1315	25	1787	2901	2070	1932	22540	3	- .9		-2.7	
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BALLISTIC FIRING REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 16 July 1957

CALIBER: .30

FWN NO. 1315142

BARREL NO. 1, Serial No. 64

CARTRIDGE TYPE AND LOT Cartridge, Ball, Caliber .30, M2, Lot PA 4332
(Control)

SCREEN DISTANCES FROM First 26.93 ft Second 78.52 ft
Muzzle Third 1.85 ft Last 1215 ft

TEMPERATURE: 76 to 79°F REL. DENSITY 0.986 to 0.979

DIRECTION OF PIPE TOWARD 00

TIME FIRED	RD NO.	TIME		VELOCITY 1st-2d fps	TIME 3d-Last sec x10 ⁵	VELOCITY 3d-Last fps	TIME 1st-3rd sec	WIND		RANGE COMP WIND fps
		1st-2d sec x10 ⁵	3d-Last sec x10 ⁵					VEL. fps	VEC T/R	
1413	173	1934		2668	1619	1853	.51607	8	- .4	-3.2
1414	174	1928		2676	1634	1847	.51559	3	- .2	- .6
1415	175	1940		2659	1625	1846	.51766	6	-1.	-6.0
1417	177	1940		2659	1624	1847	.51775	6	- .5	-3.0
1420	180	1940		2659	1767	1698	.51716	3		
1421	181	1950		2646	1632	1838	.52052	0		
1422	182	1946		2651	1636	1834	.51986	0		
1422	183	1926		2679	1609	1865	.51305	0		
1429	187	1918		2690	1602	1873	.51151	0		
1430	188	1918		2690	1595	1881	.51063	3	+ .3	+1.5
1431	189	1930		2673	1610	1863	.51481	0		
1432	190	1920		2687	1600	1875	.51192	3	+ .5	+1.5
1433	191	1918		2690	1607	1867	.51239	0		
1434	192	1938		2662	1625	1846	.51770	0		
1435	193	1922		2684	1603	1871	.51265	8	-1.	-8.0
1436	194	1936		2645	1623	1848	.51754	3	+ .5	+1.5
1437	195	1903		2711	1590	1887	.50805	0		
1438	196	1934		2668	1622	1850	.51671	3	+ .2	+ .6
1439	197	1936		2665	1621	1851	.51730	0		
1440	198	1950		2646	1626	1845	.51985	3	+ .9	+2.7

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BALLISTIC Firing REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 16 July 1957

CALIBER .30

GUN NO. 15151A2

BARREL NO. 2, Serial No. 64

CARTRIDGE TYPE AND LOT: Cartridge, Ball, Caliber .30, M2, Lot PA 4332
(Control)

SCREEN DISTANCES FROM First 26.93 ft Second 78.52 ft

MUZZLE: Third 1790.00 ft Last 1810.00 ft

TEMPERATURE: 74.09° REL. DENSITY 0.990 DIRECTION OF FIRE TOWARD 0°

TIME FIRED	RD NO.	TIME		VELOCITY		TIME 1st-3rd sec	WIND VEL fps	COS WIND VEC- TOR	RANGE COMP. WIND fps
		1st-2d, sec x10	1st-2d, fps	3d-Last, sec x10	3d-Last fps				
1040	148	1934	2668	1337	1496	.87740	10	1.9	19.0
1042	150	1952	2643	1365	1465	.89256	3	1.6	11.8
1043	151	1894	2724	1357	1474	.87657	3	1.1	13.0
1044	152	1928	2676	1324	1511	.87408	3	1.5	11.5
1045	153	1953	2642	1366	1464	.89425	3	1.8	12.4
1046	154	1943	2655	1343	1489	.88485	8	1.9	17.2
1047	155	1904	2710	1309	1528	.86304	6	-1.	-6.0
1048	156	1936	2672	1345	1485	.88294	10	- .6	-6.0
1049	157	1937	2663	1350	1481	.88376	3	1.1	1.3
1051	159	1952	2643	1363	1467	.89082	6	1.1	16.0
1052	160	1940	2659	1342	1490	.88222	3	1.1	13.0
1053	161	1923	2683	1330	1504	.87394	5	1.5	12.5
1054	162	1950	2646	1358	1477	.89015	0		
1055	163	1947	2650	1360	1471	.88874	0		
1056	164	1946	2624	1368	1462	.89672	0		
1057	165	1915	2694	1320	1515	.87022	0		
1058	166	1939	2661	1352	1479	.88470	3	- .8	-2.4
1059	167	1950	2646	1355	1476	.88907	6	1.5	13.0
1100	168	1951	2644	1357	1474	.88913	3	1.3	1.9
1101	169	1923	2683	1325	1509	.87329	0		

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BALLISTIC FIRING REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 16 July 1957

CALIBER .22

GUN NO. 364827

BARREL ASSEMBLED 29 December 55

CARTRIDGE TYPE AND LOT: Cartridge, Caliber .22, Loaded with 50-Grain
Full Patch Front Bullets for Caliber .22-06
Duplex Cartridge and 37.0 Grains of DMR No. 4895
Propellant, Lot ALA 2423

SCREEN DISTANCES FROM MUZZLE: First 27.00 ft Second 78.59 ft
Third 1790.00 ft Last 1810.00 ft

TEMPERATURE: 74.0 to 76.0°F REL. DENSITY 0.990 to 0.986

DIRECTION OF FIRE TOWARD 0°

TIME FIRED	RD NO.	TIME		VELOCITY		TIME		VELOCITY		TIME sec	WIND VEL. fps	COS WIND TOR	RANGE WIND fps	COMP. WIND fps
		1st-2d sec x10 ⁻⁵	3d-Last sec x10 ⁻⁵	1st-2d fps	3d-Last fps	1st-3rd sec	3d-Last fps	1st-3rd sec	3d-Last fps					
1124	147	1506	1673	3426	1195	.86665	0							
1128	148	1487	1620	3469	1235	.84562	0							
1130	150	1503	1679	3432	1191	.86784	3	+.6	1.8					
1132	152	1504	1656	3430	1208	.85948	3	-.2	-.6					
1133	153	1528	1712	3376	1168	.88486	0							
1148	161	1470	1621	3510	1233	.84131	0							
1149	162	1468	1606	3514	1245	.83588	3	1.1	13.0					
1150	163	1454	1671	3548	1197	.85374	0							
1151	164	1466	1620	3519	1235	.84005	0							
1152	165	1474	1599	3500	1251	.83511	0							
1153	166	1440	1576	3583	1259	.81922	0							
1154	167	1458	1608	3538	1244	.83451	6	-.9	-5.4					
1155	168	1482	1652	3481	1211	.85270	0							
1156	169	1482	1620	3481	1235	.84496	6	-.9	-5.4					
1158	171	1488	1676	3467	1193	.85988	3	-1.	-3.0					
1201	173	1460	1585	3534	1202	.82709	0							
1211	179	1480	1647	3486	1214	.85262	3	+.2	+.6					
1213	181	1472	1595	3505	1254	.83355	3	+.2	+.6					
1214	182	1482	1660	3481	1205	.85828	0							
1215	183	1494	1635	3453	1223	.85004	0							

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BALLISTIC FLIGHT REPORT TIME OF FLIGHT - REMAINING VELOCITY

DATE FIRED: 16 - 17 July 1957

CALIBER .22
GUN NO. 364827

BARREL ASSEMBLED 29 DECEMBER 55

CARTRIDGE TYPE AND LOT: Cartridge, Caliber .22, Loaded with 30-Grain Full
Patch Front Bullets for Caliber .22-06 Duplex
Cartridge and 37.0 Grains of IMR 4895 Propellant,
Lot ALA 2423

SCREEN DISTANCES FROM First 27.00 ft Second 78.59 ft
Muzzle: Third 1185.00 ft Last 1215.00 ft

TEMPERATURE: 79.0 to 80.0° REL. HUMIDITY 0.901

DIRECTION OF FIRE TOWARD 00°

TIME FIRED	RD NO.	TIME		VELOCITY		TIME sec	WIND VEL. fps	COR RANGE	
		1st-2d sec x10	1st-2d fps	3d-Last sec x10	3d-Last fps	1st-3rd sec		WIND COR	WIND COMP.
1516	192	1500	3439	1686	1845	.45280	0		
1517	193	1488	3467	1609	1865	.44111	0		
1534	197	1500	3439	1618	1854	.45260	3	- .5	-2.7
1535	198	1496	3449	1646	1823	.45600	0		
1537	200	1488	3467	1618	1851	.45057	6	- .5	-3.0
1541	203	1 44	3524	1573	1907	.44095	3	- .4	-1.2
1542	204	1492	3458	1607	1867	.44970	0		
1544	206	1494	3453	1645	1824	.45537	3	- .9	-2.7
1546	208	1448	3563	1578	1901	.43952	10	- .9	-2.0
1551	212	1484	3476	1599	1876	.44682	8	-1.	-3.0
1558	213	1484	3476	1626	1845	.45065	3	- .9	-2.7
1553	214	1458	3538	1577	1902	.44071	6	- .9	-5.4
1108	228	1510	3417	1651	1817	.45280	0		
1104	230	1506	3445	1655	1813	.45873	0		
1106	232	1510	3417	1663	1804	.46061	9	- .2	-1.8
1107	233	1495	3451	1634	1836	.45388	3	- .8	-2.4
1109	235	1514	3408	1680	1786	.46359	5	- .2	-1.0

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BALLISTIC FIRING REPORT TIME OF FLIGHT - REMAINING VELOCITY

CALIBER .30
GUN NO. 1515142
BARREL NO. 1, Serial No. 64
CARTRIDGE TYPE AND LOT: Cartridge, Ball, Caliber .30, M2, Lot FA 4332
(Control)
SCREEN DISTANCES FROM Muzzle: First 26.93 ft, Second 78.52 ft, Third 580.00 ft, Last 620.00 ft
TEMPERATURE: 73.3 to 77.4°F REL. DENSITY 0.992 to 0.983
DIRECTION OF FIRE TOWARD 0°

TIME FIRED	ROUND NUMBER	TIME 1st-2d sec x 10 ⁵	VELOCITY 1st-2d fps	TIME 3d-Last, sec x 10 ⁵	VELOCITY 3d-Last fps	TIME 1st-3rd sec	WIND VEL. fps
0928	203	1918	2690	1756	2278	.22156	0
0929	204	1954	2640	1796	2227	.22599	0
0930	205	1938	2662	1780	2247	.22409	0
0931	206	1946	2651	1790	2235	.22522	0
0932	207	1940	2659	1775	2254	.22347	0
0933	208	1936	2665	1776	2252	.22368	0
0934	209	1948	2648	1782	2245	.22476	0
0935	210	1960	2632	1799	2223	.22611	0
0936	211	1946	2651	1783	2243	.22482	0
0937	212	1952	2643	1794	2230	.22576	0
0938	213	1962	2629	1802	2220	.22685	0
0939	214	1938	2662	1774	2255	.22375	0
0940	215	1950	2646	1787	2238	.22525	0
0941	216	1974	2613	1808	2212	.22799	0
0942	217	1942	2657	1776	2252	.22409	0
0943	218	1942	2657	1776	2251	.22409	0
0944	219	1942	2657	1780	2247	.22442	0
0945	220	1946	2651	1781	2246	.22461	0
0946	221	1944	2654	1790	2247	.22447	0

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BALLISTIC FIREWORK REPORT TIME OF FLIGHT - REGULATING VELOCITY

DATE FIRED: 18 July 1957

CALIBER .22
GUN NO. 364027

BARREL ADJUSTED 29 December 55

CARTRIDGE TYPE AND LOT: Cartridge, Caliber .22, Loaded with 50-Grain
Full Patch Front Bullets for Caliber .22-05
Duplex Cartridge and 57.0 Grains of IMR No. 4895
Propellant, Lot ALA 2423

SCALING DISTANCES FROM: First 27.00 ft Second 78.59 ft
Third 580.00 ft Last 620.00 ft

MOULE: 77.4 to 79.7°F REL. HUMIDITY 0.983 to 0.979

DIRECTION OF FIRE TOWARD 0°

TIME FIRED	RU NO.	TIME 1st-2d sec x10 ³	VELOCITY 1st-2d fps	TIME 3d-Last sec x10 ³	VELOCITY 3d-Last fps	TIME 1st-3d sec	WIND VBL. mps	WIND VRC- TOR	RANGE COMP. WIND fps
1060	246	1504	3430	1548	2584	.18305	0		
1082	247	1504	3430	1538	2601	.18352	0		
1083	249	1494	3453	1532	2611	.18460	0		
1084	250	1486	3472	1524	2625	.18075	0		
1085	251	1516	3403	1558	2567	.18454	0		
1086	252	1506	3426	1550	2581	.18388	0		
1087	253	1492	3458	1522	2628	.18092	3	1.9	12.7
1094	254	1498	3444	1526	2621	.18147	0		
1035	255	1500	3439	1526	2621	.18160	1	1.9	12.7
1036	256	1520	3394	1561	2562	.18490	0		
1037	257	1494	3453	1525	2623	.18119	0		
1038	258	1504	3430	1539	2599	.18261	0		
1039	259	1502	3435	1538	2601	.18234	0		
1040	260	1514	3408	1568	2551	.18452	0		
1044	264	1490	3462	1524	2625	.18100	0		
1045	265	1522	3390	1549	2582	.18422	0		
1046	266	1522	3390	1549	2582	.18422	0		
1052	270	1498	3444	1536	2621	.18151	0		
1100	275	1478	3451	1510	2649	.17923	0		
1101	276	1492	3458	1529	2616	.18121	0		

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MEAN METEOROLOGICAL CONDITIONS

AT TIME OF FIRING

T = Temperature, °F
 D = Relative Atmospheric Density
 W_x = Range Component of Wind, fms

DATE	AMMUNITION	TIME	T	D	W_x
22 May	Duplex	1500-2100	64.7	1.006	9
23 May	Triplex	1700-2000	83.2	.962	12
	Duplex	2100-2115	79.5	.969	16
26 May	Triplex	1000-1400	63.4	1.015	8
	Duplex	1400-1500	68.3	1.003	7
12 June	Duplex	1800-2200	82.2	.972	3
17 June	Triplex	1800-2200	87.4	.962	-5
7 June	Duplex	1700-2200	78.0	.970	-6
10 June	Triplex	1600-2200	72.5	.998	-3

NOTE: Mean meteorological conditions for the single-projectile ammunition is given in the round-by-round data.

TIME OF FLIGHT TEST DATA

AMMUNITION: Cartridge, Ball, Caliber .30, Duplex (Loading Data: May 1956 Contamst No. DA-19-079-507-ORD-2174)

SCREEN DISTANCES FROM Muzzle: 10, 40, 200 and 310 ft for 100 yd data
10, 40, 200 and 310 ft for 300 yd data
10, 40, 60, 1495 and 1595 ft for 500 yd data

INSTRUMENTATION: Camera-Chronograph. (*Counter-Chronograph for 1st component for 25 ft Instrumental Velocity)

100 YARD DATA (Time of Flight: 10 to 200 ft Remaining Velocity at 300 ft)

DATE	ROUND NO.	INSTRUMENTAL VELOCITY AT 25 FT (COUNTER AND CAMERA)				TIME OF FLIGHT				REMAINING VELOCITY (Fps)			
		1st Component		2nd Component		Seconds		1st Comp.		2nd Comp.		1st Component	
		TIME	VEL.	TIME	VEL.	VEL.	Fps	TIME	Fps	TIME	Fps	TIME	VEL.
22 May	7	.0219	2461	.0219	2461	---	---	.12442	.13350	.00997	2006	---	---
22 May	8	.0237	2425	.0237	2427	---	---	.12540	.13021	.01010	1980	.01054	1898
22 May	9	.0235	2429	.0234	2431	---	---	.12608	.12823	.01004	1992	---	---
22 May	10	.0214	2471	.0213	2473	---	---	.12667	.12893	.01014	1918	---	---
22 May	11	.0240	2419	.0237	2425	---	---	.12569	.12896	.01008	1984	.01015	1970
22 May	12	.0231	2437	.0230	2439	---	---	.12566	---	.01004	1992	---	---
22 May	13	.0214	2471	.0213	2473	---	---	.12410	---	.00993	2014	---	---
22 May	14	.0230	2439	.0230	2439	---	---	.12572	.12870	---	---	---	---
22 May	15	.0205	2449	.0206	2447	---	---	.12418	---	---	---	---	---
22 May	16	.0242	2415	.0238	2423	---	---	.12740	.12740	.01112	1799	.01122	1783
22 May	17	.0233	2433	.0233	2433	---	---	.12780	.12835	.01237	1617	.01419	1409
22 May	18	.0221	2457	.0220	2459	---	---	.12458	.13239	.00996	2008	.01063	1881
22 May	19	.0243	2414	.0242	2415	---	---	---	---	---	---	---	---
22 May	20	.0228	2443	.0228	2443	.01330	2257	.12558	---	.00990	2020	---	---
22 May	21	.0256	2399	.0257	2397	.01313	2285	.12830	.13259	---	---	---	---
22 May	22	.0236	2437	.0235	2439	---	---	.12616	.12670	.01014	1972	.01080	1961
22 May	23	.0194	2513	.0191	2519	---	---	.12207	.12230	.00968	2066	.00984	2033
22 May	24	.0205	2490	.0204	2496	.01222	2445	.12280	.12322	.00976	2049	.01080	1961
22 May	25	.0241	2417	.0244	2412	---	---	.12686	---	---	---	---	---
22 May	26	.0256	2389	.0250	2400	---	---	---	---	---	---	---	---
22 May	27	.0231	2437	.0232	2435	---	---	.12601	---	---	---	---	---
22 May	28	.0229	2431	.0229	2431	---	---	---	---	---	---	---	---
22 May	29	.0221	2442	.0220	2444	---	---	---	---	---	---	---	---
22 May	30	.0213	2473	.0212	2475	---	---	.13121	.13505	---	---	---	---
22 May	31	.0189	2523	.0188	2525	---	---	.13086	.13086	---	---	.01176	1754
22 May	32	.0248	2404	.0248	2404	---	---	.12720	.12870	.00990	2084	.01090	1964
22 May	1	.0214	2471	.0216	2467	---	---	.13446	.13434	.01090	1965	.01080	1910
22 May	2	.0254	2382	.0256	2385	.01326	2262	.12866	---	---	---	---	---
22 May	3	.0234	2401	.0234	2401	.01318	2276	.12866	---	.01030	1942	.01104	1812
22 May	4	.0202	2477	.0204	2473	---	---	.13384	.13740	.01080	1852	.01092	1832
22 May	5	.0238	2423	.0240	2419	.01346	2229	.12970	.13394	.01010	1969	.01064	1880
22 May	6	.0224	2451	.0220	2459	.01334	2249	.12888	.13284	---	---	.01074	1862
22 May	7	.0225	2449	---	---	---	---	.12534	---	---	---	---	---
22 May	8	.0238	2429	.0236	2422	---	---	---	---	---	---	---	---
22 May	9	.0234	2431	.0232	2435	.01406	2134	---	---	---	---	---	---
22 May	10	.0237	2425	.0238	2423	.01287	2443	---	---	---	---	---	---
22 May	11	.0229	2441	.0232	2435	.01318	2256	.13332	---	---	---	.01066	1876
22 May	12	.0214	2471	.0214	2471	.01306	2297	.12432	.13180	.01000	2000	---	---

[illegible]

FOUND NUMBER	LONG. COMPONENT		LAT. COMPONENT		ANG. COMPONENT		TOTAL OF PLACES		ROTATING VELOCITY (Fps)	
	VEL. Fps	VEL. Fps	VEL. Fps	VEL. Fps	TYPE	1st Comp.	2nd Comp.	1st Comp.	2nd Comp.	
1	0.157	0.106	0.100	0.100	0.206	0.206	0.206	0.206	0.158	1.305
2	0.184	0.121	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
3	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
4	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
5	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
6	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
7	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
8	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
9	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
10	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
11	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
12	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
13	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
14	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
15	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
16	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
17	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
18	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
19	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
20	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
21	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
22	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
23	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
24	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
25	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
26	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
27	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
28	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
29	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
30	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
31	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
32	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
33	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
34	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309
35	0.122	0.122	0.122	0.122	0.246	0.246	0.246	0.246	0.198	1.309

REMARKS: Carriage, Ball, Caliber .30, Weight (Long Dash Gun. Let in 1974, 1980, 1981.)

1st, 2nd and 3rd Pz for 100 yd shot
1st, 2nd and 3rd Pz for 200 yd shot
1st, 2nd, 3rd and 4th Pz for 300 yd shot

REMARKS: One in 1000 (One in 1000) used for shooting 1st Company and 1st Pz.

1st, 2nd and 3rd Pz (One in 1000) used for shooting 1st Company and 1st Pz.

1st Component										2nd Component										3rd Component										4th Component										5th Component										6th Component										7th Component										8th Component										9th Component										10th Component										11th Component										12th Component										13th Component										14th Component										15th Component										16th Component										17th Component										18th Component										19th Component										20th Component										21st Component										22nd Component										23rd Component										24th Component										25th Component										26th Component										27th Component										28th Component										29th Component										30th Component										31st Component										32nd Component										33rd Component										34th Component										35th Component										36th Component										37th Component										38th Component										39th Component										40th Component										41st Component										42nd 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TABLE 1.0 - 1000 FT. (1000)									
Alt.	Temp.	Wind	Hum.	Vis.	Clouds	Pressure	Temp.	Wind	Hum.
1000	59.0	0.0	100	10	0	30.00	59.0	0.0	100
900	58.0	0.0	100	10	0	30.01	58.0	0.0	100
800	57.0	0.0	100	10	0	30.02	57.0	0.0	100
700	56.0	0.0	100	10	0	30.03	56.0	0.0	100
600	55.0	0.0	100	10	0	30.04	55.0	0.0	100
500	54.0	0.0	100	10	0	30.05	54.0	0.0	100
400	53.0	0.0	100	10	0	30.06	53.0	0.0	100
300	52.0	0.0	100	10	0	30.07	52.0	0.0	100
200	51.0	0.0	100	10	0	30.08	51.0	0.0	100
100	50.0	0.0	100	10	0	30.09	50.0	0.0	100
0	49.0	0.0	100	10	0	30.10	49.0	0.0	100
100	48.0	0.0	100	10	0	30.11	48.0	0.0	100
200	47.0	0.0	100	10	0	30.12	47.0	0.0	100
300	46.0	0.0	100	10	0	30.13	46.0	0.0	100
400	45.0	0.0	100	10	0	30.14	45.0	0.0	100
500	44.0	0.0	100	10	0	30.15	44.0	0.0	100
600	43.0	0.0	100	10	0	30.16	43.0	0.0	100
700	42.0	0.0	100	10	0	30.17	42.0	0.0	100
800	41.0	0.0	100	10	0	30.18	41.0	0.0	100
900	40.0	0.0	100	10	0	30.19	40.0	0.0	100
1000	39.0	0.0	100	10	0	30.20	39.0	0.0	100
1100	38.0	0.0	100	10	0	30.21	38.0	0.0	100
1200	37.0	0.0	100	10	0	30.22	37.0	0.0	100
1300	36.0	0.0	100	10	0	30.23	36.0	0.0	100
1400	35.0	0.0	100	10	0	30.24	35.0	0.0	100
1500	34.0	0.0	100	10	0	30.25	34.0	0.0	100
1600	33.0	0.0	100	10	0	30.26	33.0	0.0	100
1700	32.0	0.0	100	10	0	30.27	32.0	0.0	100
1800	31.0	0.0	100	10	0	30.28	31.0	0.0	100
1900	30.0	0.0	100	10	0	30.29	30.0	0.0	100
2000	29.0	0.0	100	10	0	30.30	29.0	0.0	100
2100	28.0	0.0	100	10	0	30.31	28.0	0.0	100
2200	27.0	0.0	100	10	0	30.32	27.0	0.0	100
2300	26.0	0.0	100	10	0	30.33	26.0	0.0	100
2400	25.0	0.0	100	10	0	30.34	25.0	0.0	100
2500	24.0	0.0	100	10	0	30.35	24.0	0.0	100
2600	23.0	0.0	100	10	0	30.36	23.0	0.0	100
2700	22.0	0.0	100	10	0	30.37	22.0	0.0	100
2800	21.0	0.0	100	10	0	30.38	21.0	0.0	100
2900	20.0	0.0	100	10	0	30.39	20.0	0.0	100
3000	19.0	0.0	100	10	0	30.40	19.0	0.0	100
3100	18.0	0.0	100	10	0	30.41	18.0	0.0	100
3200	17.0	0.0	100	10	0	30.42	17.0	0.0	100
3300	16.0	0.0	100	10	0	30.43	16.0	0.0	100
3400	15.0	0.0	100	10	0	30.44	15.0	0.0	100
3500	14.0	0.0	100	10	0	30.45	14.0	0.0	100
3600	13.0	0.0	100	10	0	30.46	13.0	0.0	100
3700	12.0	0.0	100	10	0	30.47	12.0	0.0	100
3800	11.0	0.0	100	10	0	30.48	11.0	0.0	100
3900	10.0	0.0	100	10	0	30.49	10.0	0.0	100
4000	9.0	0.0	100	10	0	30.50	9.0	0.0	100
4100	8.0	0.0	100	10	0	30.51	8.0	0.0	100
4200	7.0	0.0	100	10	0	30.52	7.0	0.0	100
4300	6.0	0.0	100	10	0	30.53	6.0	0.0	100
4400	5.0	0.0	100	10	0	30.54	5.0	0.0	100
4500	4.0	0.0	100	10	0	30.55	4.0	0.0	100
4600	3.0	0.0	100	10	0	30.56	3.0	0.0	100
4700	2.0	0.0	100	10	0	30.57	2.0	0.0	100
4800	1.0	0.0	100	10	0	30.58	1.0	0.0	100
4900	0.0	0.0	100	10	0	30.59	0.0	0.0	100
5000	-1.0	0.0	100	10	0	30.60	-1.0	0.0	100
5100	-2.0	0.0	100	10	0	30.61	-2.0	0.0	100
5200	-3.0	0.0	100	10	0	30.62	-3.0	0.0	100
5300	-4.0	0.0	100	10	0	30.63	-4.0	0.0	100
5400	-5.0	0.0	100	10	0	30.64	-5.0	0.0	100
5500	-6.0	0.0	100	10	0	30.65	-6.0	0.0	100
5600	-7.0	0.0	100	10	0	30.66	-7.0	0.0	100
5700	-8.0	0.0	100	10	0	30.67	-8.0	0.0	100
5800	-9.0	0.0	100	10	0	30.68	-9.0	0.0	100
5900	-10.0	0.0	100	10	0	30.69	-10.0	0.0	100
6000	-11.0	0.0	100	10	0	30.70	-11.0	0.0	100
6100	-12.0	0.0	100	10	0	30.71	-12.0	0.0	100
6200	-13.0	0.0	100	10	0	30.72	-13.0	0.0	100
6300	-14.0	0.0	100	10	0	30.73	-14.0	0.0	100
6400	-15.0	0.0	100	10	0	30.74	-15.0	0.0	100
6500	-16.0	0.0	100	10	0	30.75	-16.0	0.0	100
6600	-17.0	0.0	100	10	0	30.76	-17.0	0.0	100
6700	-18.0	0.0	100	10	0	30.77	-18.0	0.0	100
6800	-19.0	0.0	100	10	0	30.78	-19.0	0.0	100
6900	-20.0	0.0	100	10	0	30.79	-20.0	0.0	100
7000	-21.0	0.0	100	10	0	30.80	-21.0	0.0	100
7100	-22.0	0.0	100	10	0	30.81	-22.0	0.0	100
7200	-23.0	0.0	100	10	0	30.82	-23.0	0.0	100
7300	-24.0	0.0	100	10	0	30.83	-24.0	0.0	100
7400	-25.0	0.0	100	10	0	30.84	-25.0	0.0	100
7500	-26.0	0.0	100	10	0	30.85	-26.0	0.0	100
7600	-27.0	0.0	100	10	0	30.86	-27.0	0.0	100
7700	-28.0	0.0	100	10	0	30.87	-28.0	0.0	100
7800	-29.0	0.0	100	10	0	30.88	-29.0	0.0	100
7900	-30.0	0.0	100	10	0	30.89	-30.0	0.0	100
8000	-31.0	0.0	100	10	0	30.90	-31.0	0.0	100
8100	-32.0	0.0	100	10	0	30.91	-32.0	0.0	100
8200	-33.0	0.0	100	10	0	30.92	-33.0	0.0	100
8300	-34.0	0.0	100	10	0	30.93	-34.0	0.0	100
8400	-35.0	0.0	100	10	0	30.94	-35.0	0.0	100
8500	-36.0	0.0	100	10	0	30.95	-36.0	0.0	100
8600	-37.0	0.0	100	10	0	30.96	-37.0	0.0	100
8700	-38.0	0.0	100	10	0	30.97	-38.0	0.0	100
8800	-39.0	0.0	100	10	0	30.98	-39.0	0.0	100
8900	-40.0	0.0	100	10	0	30.99	-40.0	0.0	100
9000	-41.0	0.0	100	10	0	31.00	-41.0	0.0	100
9100	-42.0	0.0	100	10	0	31.01	-42.0	0.0	100
9200	-43.0	0.0	100	10	0	31.02	-43.0	0.0	100
9300	-44.0	0.0	100	10	0	31.03	-44.0	0.0	100
9400	-45.0	0.0	100	10	0	31.04	-45.0	0.0	100
9500	-46.0	0.0	100	10	0	31.05	-46.0	0.0	100
9600	-47.0	0.0	100	10	0	31.06	-47.0	0.0	100
9700	-48.0	0.0	100	10	0	31.07	-48.0	0.0	100
9800	-49.0	0.0	100	10	0	31.08	-49.0	0.0	100
9900	-50.0	0.0	100	10	0	31.09	-50.0	0.0	100
10000	-51.0	0.0	100	10	0	31.10	-51.0	0.0	100

[illegible]

900 YARD MARK (Time of Flight: 10 to 1.95 ft Remaining Velocity at 1500 ft) Taken 17 June 1957

RD.	TIME	INSTRUMENTAL VELOCITY AT 25 ft			INSTRUMENTAL VELOCITY AT 35 ft			TIME OF FLIGHT			REMAINING VELOCITY (fps)		
		1st Component TIME sec	2nd Component TIME sec	3rd Component TIME sec	1st Component TIME sec	2nd Component TIME sec	3rd Component TIME sec	1st Comp.	2nd Comp.	3rd Comp.	1st Component TIME sec	2nd Component TIME sec	3rd Component TIME sec
53	.0113	2646	.0120	2659	2646	.0120	2659	1.32452	1.42442	1.42442	.01498	668	---
54	.01170	2654	.0124	2671	2654	.0124	2671	2608	2608	2608	.01410	703	---
55	.01180	2658	.0126	2678	2658	.0126	2678	2611	2611	2611	---	---	---
56	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01332	750	---
57	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	---	---	---
58	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01346	743	---
59	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
60	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
61	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
62	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
63	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
64	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
65	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
66	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
67	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
68	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
69	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
70	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
71	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
72	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
73	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
74	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
75	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
76	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
77	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
78	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
79	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
80	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---
81	.0119	2661	.0128	2683	2661	.0128	2683	2613	2613	2613	.01350	668	---

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VELOCITY TEST

Time Started: 1439 Time Completed: 1518 Date: 25 April 1957
 Code H, M70, Serial No. 304164, Manufactured by Code G, 19 August 1954
 Ammunition Temperature: 70°F. Range Temperature 63°F Density 1.021
 Chronograph Type: Counter Initiator Type: Lumiline
 Test Ammunition: Ball, Caliber .22, Carbine

INSTRUMENTAL VELOCITY AT 76 FEET		INSTRUMENTAL VELOCITY AT 76 FEET	
ROUND NO.	IN FEET PER SECOND	ROUND NO.	IN FEET PER SECOND
1	2836	11	2825
2	2941	12	2864
3	2869	13	2899
4	2834	14	2877
5	2892	15	2864
6	2851	16	2872
7	2865	17	2890
8	2856	18	2860
9	2860	19	2859
10	2842	20	2879

Time Started: 1528 Time Completed: 1547 Date: 25 April 1957
 Springfield, Caliber .22, Serial No. 4747051 Manufactured by Code H,
 4 September 1954
 Ammunition Temperature: 70°F Range Temperature: 63°F Density 1.019
 Chronograph Type: Counter Initiator Type: Lumiline
 Test Ammunition: Ball, Caliber .22, T48

INSTRUMENTAL VELOCITY AT 76 FEET		INSTRUMENTAL VELOCITY AT 76 FEET	
ROUND NO.	IN FEET PER SECOND	ROUND NO.	IN FEET PER SECOND
1	3264	11	3289
2	3240	12	3240
3	3303	13	3255
4	3303	14	3285
5	3285	15	3230
6	3247	16	3283
7	3230	17	3266
8	3238	18	3253
9	3232	19	3232
10	3296	20	3211

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PRESSURE TEST

Time Started 1307 Time Completed: 1355 Date: 25 April 1957
 Universal Receiver No. 127, Manufactured by Code G, 16 August 1954
 Ammunition Temperature 70°F Range Temperature: 62°F Density 1.025
 Chronograph Type: Counter Initiator Type: Lumdline
 Test Ammunition: Ball, Caliber .22, Carbine

ROUND NUMBER	INSTRUMENTAL VELOCITY AT 75 FEET IN FEET PER SECOND	PRESSURE psi
1	2818	35,800
2	2826	37,300
3	2807	38,000
4	2756	33,600
5	2851	38,100
6	2839	39,500
7	2801	35,100
8	2743	32,600
9	2815	36,200
10	2825	36,000
11	2830	36,000
12	2815	36,400
13	2826	36,700
14	2838	37,600
15	2814	36,300
16	2862	38,200
17	2834	37,300
18	2838	38,700
19	2828	36,900
20	2839	37,500

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PRESSURE TEST

Time Started: 1242 Time Completed: 1429 Date: 17 June 1957
Universal Receiver No. 197 Barrel No. 3830
Ammunition Temperature: 70°F Range Temperature: 87 to 91°F
Density 0.958 to 0.960
Chronograph Type: Counter Initiator Type: Lumiline
Test Ammunition: Ball, Caliber .30, Duplex Control Ammunition: Reference Rounds

<u>ROUND NUMBER</u>	<u>INSTRUMENTAL VELOCITY AT 78 FEET IN FEET PER SECOND</u>	<u>PRESSURE psi</u>
1	2491	53,600
2	2408	52,500
3	2428	52,100
4	2443	51,000
5	2431	52,300
6	2462	52,400
7	2478	52,800
8	2393	47,200
9	2443	52,600
10	2425	50,600
11	2428	54,300
12	2405	48,600
13	2469	52,300
14	2470	52,800
15	2474	55,800
16	2475	54,900
17	2455	53,200
18	2455	50,800
19	2428	49,700
20	2457	52,800

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PRESSURE TEST

Time Started: 1445 Time Completed: 1608 Date: 17 June 1957
 Universal Receiver No. 197 Barrel No. 3830
 Ammunition Temperature: 70°F Range Temperature: 93°F Density 0.957
 Chronograph Type: Counter Initiator Type: Lumiline
 Test Ammunition: Ball, Caliber .30, Triplex Control Ammunition: Reference Rounds

RD NO.	INSTRUMENTAL VELOCITY AT 78 ft (fps)	PRESSURE psi	RD NO.	INSTRUMENTAL VELOCITY AT 78 ft (fps)	PRESSURE psi
1	2252	56,200	1	2640	44,000
2	2551	54,500	2	2591	40,900
3	2584	54,100	3	2599	41,600
4	2244	54,100	4	2606	42,300
5	2548	59,000	5	2621	44,300
6	2571	58,900	6	2618	43,600
7	2546	56,600	7	2587	42,500
8	2542	53,100	8	2612	44,200
9	2580	58,200	9	2616	43,000
10	2538	52,600	10	2618	44,000
11	2552	56,200	11	2627	46,500
12	2527	52,200	12	2592	44,900
13	2308	53,800	13	2597	44,700
14	2491	53,000	14	2592	43,700
15	2534	53,000	15	2585	42,800
16	2215	55,800	16	2597	44,300
17	2496	52,100	17	2601	43,100
18	2545	58,400	18	2583	41,700
19	2272	55,400	19	2580	42,700
20	2564	55,300	20	2585	42,400

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VELOCITY TEST

Time Started: 1108 Time Completed 1134 Date: 21 June 1957
 Rifle, U.S., M1903, Serial No. 1515142 with Caliber .30 Accuracy Test
 Barrel
 Ammunition Temperature 70°F Range Temperature 78 to 79°F Density 0.980
 Chronograph Type: Counter Initiator Type: Lumiline
 Test Ammunition: Cartridge, Ball, Caliber .30 ME, Lot PA 4310 with full and
 reduced charges.

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

FULL CHARGE

4	2650
5	2687
6	2667
7	2686
8	2688
Average	2664

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

40.0 GRAINS PROPELLANT

14	2269
15	2198
16	2281
17	2242
18	2283
Average	2255

45.0 GRAINS PROPELLANT

9	2307
10	2432
11	2360
12	2447
13	2398
Average	2405

30.0 GRAINS PROPELLANT

19	1651
20	1719
21	1708
22	1756
23	1686
Average	1692

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VELOCITY TEST

Time Started: 1307 Time Completed: 1328 Date: 21 June 1957
 Rifle, Code 2, M70, Serial No. 367844 with Caliber .25 Test Barrel
 Ammunition Temperature: 70°C Range Temperature: 81 to 83°C
 Density: 0.973 to 0.974
 Chronograph Type: Counter Initiator Type: Lumiline
 Cartridge, Ball, Caliber .25, with 75-Grain Bullet, Lot 74M031 with full
 and reduced charges.

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

PULL CHARGE

5	3458
6	3458
7	3467
9	3434
10	3441
Average	3452

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

36.0 GRAINS PROPELLANT

16	2644
17	2667
18	2567
19	2703
20	2682
Average	2653

41.0 GRAINS PROPELLANT

11	3064
12	3119
13	3177
14	3049
15	3106
Average	3103

26.0 GRAINS PROPELLANT

21	2044
22	1944
23	1998
24	1989
25	1936
Average	1970

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VELOCITY TEST

Time Started: 1517 Time Completed: 1534 Date: 21 June 1957
 Rifle, U.S., M1903, Serial No. 1515142 with Caliber .30 Accuracy Test Barrel.
 Ammunition Temperature: 70°F Range Temperature: 83 to 82°F Density 0.968
 Chronograph Type: Counter Initiator Type: Lumiline
 Cartridge, Ball, Caliber .30, M2, Lot PA 4310 with reduced charges.

<u>ROUND NUMBER</u>	<u>INSTRUMENTAL VELOCITY AT 55 ft (fps)</u>
<u>43.0 GRAINS PROPELLANT</u>	
27	2404
28	2426
29	2347
30	2309
31	2364
Average	2370

<u>36.5 GRAINS PROPELLANT</u>	
32	2103
33	2108
34	2081
35	2077
36	2092
Average	2092

<u>29.5 GRAINS PROPELLANT</u>	
37	1746
38	1728
39	1754
40	1705
41	1604
Average	1723

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VELOCITY TEST

Time Started: 0945 Time Completed: 1107 Date: 4 June 1957
 Rifle, Code B, M70, Serial No. 354827 with Caliber .22 Test Barrel
 Ambient Temperature: 70°F Range Temperature: 81 to 87°F
 Density: 0.973 to 0.969
 Chronograph Type: Counter Initiator Type: Lumiline
 Cartridge, Ball, Caliber .22 with 50-Grain Bullet, Lot 1C LK4, with
 full and reduced charges.

RD NO.	INSTRUMENTAL VELOCITY AT 55 feet (fps)	RD NO.	INSTRUMENTAL VELOCITY AT 55 feet (fps)
<u>FULL CHARGE (47.7 grs)</u>		<u>28.0 GRAINS PROPELLANT</u>	
10	3774	25	2480
11	3708	26	2445
12	3757	27	2349
13	3802	28	2468
14	3817	29	2685
Average	3708	Average	2405

<u>43.0 GRAINS PROPELLANT</u>		<u>18.0 GRAINS PROPELLANT</u>	
15	3236	30	1686
16	3358	31	1673
17	3333	32	1916
18	3226	33	1599
19	3333	34	1588
Average	3297	Average	1692

<u>18.0 GRAINS PROPELLANT</u>	
20	2992
21	2953
22	2926
23	2894
24	2887
Average	2930

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VELOCITY TEST

Time Started: 1333 Time Completed: 1353 Date: 24 June 1957
 Rifle, Code N, M70, Serial No. 304164 with Caliber .22 Carbine
 Test Barrel

Ambient Temperature: 70°F Range Temperature 88 to 90°F

Density 0.960 to 0.962

Chronograph Type: Counter

Initiator Type: Lumdine

Cartridge, Ball, Caliber .22, Carbine, with full and reduced charges.

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

FULL CHARGE

310	2948
311	2999
312	2941
313	2964
314	2939
Average	2958

10.0 GRAINS PROPELLANT

320	2180
321	2175
322	1947
323	2135
324	2089
Average	2089

13.0 GRAINS PROPELLANT

315	2484
316	2485
317	2437
318	2364
319	2294
Average	2401

7.0 GRAINS PROPELLANT

325	1695
326	1697
327	1406
328	1550
329	1633
Average	1596

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VELOCITY TEST

Time Started: 1445 Time Completed: 1504 Date: 24 June 1957
 Rifle, Code B, M70, Serial N 367368 with Caliber .27 Test Barrel
 Ammunition Temperature: 70°F Range Temperature: 90° to 91°F
 Density: 0.962 to 0.955
 Chronograph Type: counter Initiator Type: Lumiline
 Cartridge, Ball, Caliber .27 with 95-Grain Bullet, Lot 66 1462, with full
 and reduced charges.

RD **INSTRUMENTAL VELOCITY**
NO. **AT 55 ft (fps)**

FULL CHARGE

4	3102
5	3117
6	3245
7	3125
8	3155
Average	3149

RD **INSTRUMENTAL VELOCITY**
NO. **AT 55 ft (fps)**

35.0 GRAINS PROPELLANT

14	2633
15	2664
16	2475
17	2257
18	2430
Average	2492

40.0 GRAINS PROPELLANT

9	2952
10	2902
11	2915
12	2905
13	2707
Average	2876

25.0 GRAINS PROPELLANT

19	1597
20	1661
21	1788
22	1766
23	1729
Average	1752

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VELOCITY TEST

Time Started: 1527 Time Completed: 1535 Date: 24 June 1957
Rifle, Winchester, M70, Serial No. 364827 with Caliber .22 Test Barrel
Ambient Temperature: 70°F Range Temperature: 91 to 92°F
Density: 0.955 to 0.961
Chronograph Type: Counter Initiator Type: Laserline
Cartridge, Ball, Caliber .22, T48 with full and reduced charges.

<u>RD</u> <u>NO.</u>	<u>INSTRUMENTAL VELOCITY</u> <u>AT 55 ft (3ps)</u>
	<u>FULL CHARGE (44.3 grs)</u>
38	3177
39	3109
40	3183
41	3108
42	3111
Average	3138

39.0 GRAINS PROPELLANT

43	2921
44	2830
45	2723
46	2834
47	Lost

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VELOCITY TEST

Time Started: 0849 Time Completed: 1023 Date: 25 June 1957
 Rifle, U.S., Caliber .30, M1903, Serial No. 4747051 with Caliber .22
 Code H Barrel
 Ammunition Temperature: 70°F Range Temperature: 79 to 83°F
 Density: 0.971 to 0.967
 Chronograph Type: Counter Initiator Type: Jamline
 Cartridge, Ball, Caliber .22, T48 with full and reduced charges.

RD NO.	INSTRUMENTAL VELOCITY AT 55 ft (fps)	RD NO.	INSTRUMENTAL VELOCITY AT 55 ft (fps)
<u>FULL CHARGE (44.3 grs)</u>		<u>24.0 GRAINS PROPELLANT</u>	
323	3305	333	2330
324	3287	334	2309
325	3311	335	2463
326	3268	336	2632
327	3292	337	2510
Average	3293	Average	2449

<u>39.0 GRAINS PROPELLANT</u>		<u>24.0 GRAINS PROPELLANT</u>	
328	2939	338	1742
329	2830	339	1687
330	2812	340	1759
331	2660	341	1547
332	2719	342	1695
Average	2792	Average	1686

<u>14.0 GRAINS PROPELLANT</u>	
349	1036
350	1115
351	Lost
353	580
354	1288

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VELOCITY TEST

Time Started: 1110 Time Completed: 1316 Date: 9 July 1957
 Rifle, U.S., Caliber .30, M1903, Serial No. 1515142 with Caliber .30 Accuracy
 Test Barrel
 Ammunition Temperature: 70°F Range Temperature: 81 to 85°F
 Density: 0.957 to 0.949
 Chronograph Type: Counter Initiator Type: Lumiline
 Cartridge, Caliber .30, Loaded with 1st Duplex Bullet with Western Ball
 Type Propellant, Lot AL-2796-45

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

25.0 GRAINS PROPELLANT

70	2438
71	2564
72	2350
73	253
74	2551
Average	2526

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

15.0 GRAINS PROPELLANT

80	1774
81	1802
82	1785
83	1783
84	1786
Average	1786

20.0 GRAINS PROPELLANT

75	2202
76	2165
77	2222
78	2237
79	2192
Average	2204

10.0 GRAINS PROPELLANT

85	1185
86	1285
87	1273
88	1291
89	1285
Average	1264

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VELOCITY TEST

Time Started: 1333 Time Completed: 1437 Date: 9 July 1957
 Rifle, U.S., Caliber .30, M1903, Serial No. 1515142 with Caliber .30
 Accuracy Test Barrel
 Ammunition Temperature: 70°F Range Temperature: 85 to 86°F
 Density: 0.949
 Chronograph Type: Counter Initiator Type: Lumiline
 Cartridge, Caliber .30, Loaded with 1st Triplex Bullet with Western Ball
 Type Propellant, Lot AL 2796-45

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

25.0 GRAINS PROPELLANT

90 2690

32.0 GRAINS PROPELLANT

91 2697

92 2677

93 2674

94 2690

95 2697

Average 2687

17.0 GRAINS PROPELLANT

96 2223

97 2238

98 2269

99 2254

100 2243

Average 2245

RD INSTRUMENTAL VELOCITY
 NO. AT 55 ft (fps)

12.0 GRAINS PROPELLANT

101 1668

102 1721

103 1709

104 1701

105 1745

Average 1709

7.0 GRAINS PROPELLANT

106 1019

107 1066

108 1083

109 1087

110 1096

Average 1070

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VELOCITY TEST

Time Started: 1430 Time Completed: 1521 Date: 10 July 1957
 Rifle, Code K, M70, Serial No. 364827 with Caliber .22 Test Barrel
 Ammunition Temperature: 70°F Range Temperature: 78°F Density: 0.983
 Chronograph Type: Counter Initiator Type: Lumiline
 Cartridge, Caliber .22, Loaded with 50-Grain Full Patch Front Bullets for
 Caliber .22-06 Duplex Cartridge*

RD NO.	<u>INSTRUMENTAL VELOCITY</u> <u>AT 75 ft (fps)</u>	RD NO.	<u>INSTRUMENTAL VELOCITY</u> <u>AT 75 ft (fps)</u>
	<u>25.0 GRAINS PROPELLANT</u>		<u>37.5 GRAINS PROPELLANT</u>
88	3494	92	3499
	<u>30.0 GRAINS PROPELLANT</u>		<u>37.0 GRAINS PROPELLANT</u>
89	2701	93	3333
	<u>35.0 GRAINS PROPELLANT</u>	94	3477
		95	3392
90	3203	96	3484
	<u>37.0 GRAINS PROPELLANT</u>	97	3322
		Average	3402
91	3344		

* Propellant: DSR No. 4895, Lot No. ALA. 2423

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VELOCITY TEST

Time Started: 0955 Time Completed: 1022 Date: 11 July 1957
 Rifle, Code E, M70, Serial No. 364827 with Caliber .22 Test Barrel
 Ammunition Temperature: 70°F Range Temperature 76°F Density: 0.992
 Chronograph Type: Counter Initiator Type: Lumiline
 Cartridge, Caliber .22, Loaded with 50-Grain Full Patch Front Bullets for
 Caliber .22-06 Duplex Cartridge*

RD	INSTRUMENTAL VELOCITY
NO.	AT 78 ft (fps)
<u>32.0 GRAINS PROPELLANT</u>	

101	2917
102	2632
103	3117
104	3125
106	3163
Average	2991

<u>27.0 GRAINS PROPELLANT</u>	
107	2701
108	2732
109	2538
110	2653
111	2668
Average	2658

<u>17.0 GRAINS PROPELLANT</u>	
112	1856
113	1802
114	1770
115	1786
116	1766
Average	1796

* Propellant: DMR No. 4895, Lot No. ALA 2423

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PENETRATION TESTS

Complete penetration (C.P.) is the condition which exists when any portion of the core protrudes through the plate, or opens a hole in the rear of the plate which permits the passage of light.

Complete perforation (C.Perf.) is the occurrence wherein a hole has been made in the plate whose diameter clearly indicates passage of the core, or the major part thereof, entirely through and free of the plate.

Failure to penetrate (F.P.) is the condition which exists when the bullet fails to penetrate the plate. Hits in which the bullet struck the plate within three calibers (measured from nearest edge to nearest edge) of either the edge of the plate or of an indent or crack made by a previous bullet were disregarded.

PENETRATION TEST

CARTRIDGE: Ball, Caliber .30, Duplex

RIFLE: U.S., Caliber .30, M1, Modified, Serial No. 9973453

PLATE: Steel, homogeneous, 1/4 x 14 x 36-inch.

B.H.N. 363 to 388

DATE: 14 May 1957

TEMPERATURE: Range 74°F.

Ammunition 74°F

Density 0.986

RANGE: 100 yards

NO
NO.

CHARACTER OF PENETRATION

1st Projectile **2nd Projectile**

1	Missed Plate	F.P.
2	F.P.	F.P.
3	F.P.	F.P.
4	F.P.	F.P.
5	F.P.	F.P.

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PENETRATION TEST

CARTRIDGE: Ball, Caliber .30, Triplex
 RIFLE: U.S., Caliber .30, M1, Modified, Serial No. 9973453
 PLATE: Steel, homogeneous, 1/4 x 18 x 36-inch
 B.H.N.: 363 to 388
 DATE: 14 May 1957
 TEMPERATURE: Range 74°F Ammunition 74°F Density 0.985 to 0.988
 RANGE: 100 yards

RD NO.	CHARACTER OF PENETRATION	
	1st Projectile	2nd or 3rd Projectile
1	Missed Plate	F.P.
2	Missed Plate	F.P.
3	Missed Plate	F.P.
4	Missed Plate	F.P.
5	Missed Plate	F.P.

Caliber .22, loaded with 50-Grain Full Patch Front Bullet for
 CARTRIDGE: Caliber .22-06 Duplex Cartridge and 37.0 Grains of IMR 4895
 Propellant, Lot ALA 2423
 RIFLE: Code E, M70, Serial No. 364827 with Caliber .22 Test Barrel
 PLATE: Steel homogeneous, 1/4 x 18 x 36-inch
 B.H.N.: 363 to 388
 DATE: 5 September 1957
 TEMPERATURE: Range 76°F Ammunition 76°F Density 0.986
 RANGE: 200 yards

RD NO.	CHARACTER OF PENETRATION	
	1st Projectile	2nd or 3rd Projectile
1	C. Perf.	
2	F.P.	
3	C. Perf.	
4	C. Perf.	
5	C. Perf.	

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PENETRATION TEST

CARTRIDGE: Ball, Caliber .22, Carbine
 RIFLE: Code E, M70, Serial No. 304164 with Caliber .22 Test Barrel
 PLATE: Steel, homogeneous, 1/4 x 18 x 36-inch
 B.H.N.: 363 to 388
 DATE: 15 May 1957
 TEMPERATURE: Range 74°F Ammunition 74°F Density 0.941
 RANGE: 100 yards

RD NO.

CHARACTER OF PENETRATION

1	P.P.
2	P.P.
3	P.P.
4	P.P.
5	P.P.

CARTRIDGE: Ball, Caliber .22, Carbine
 RIFLE: Code E, M70, Serial No. 304164
 SHOOT: Soldier, Steel, M1 with liner M1-L-1910
 DATE: 3 May 1957
 TEMPERATURE: Range 55°F Ammunition 55°F Density 1.022 to 1.026
 RANGE: 500 yards

PAIR HIT NO.

ORANGUTY

CHARACTER OF PENETRATION FRONT SIDE OF PLATE

1	15°	P.P.
2	30°	P.P.
3	10°	P.P.
4	15°	P.P.
5	10°	P.P.
6	25°	P.P.

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PENETRATION TEST

CARTRIDGE: Ball, Caliber .22, T48
 RIFLE: Springfield, M1903, Serial No. 4747051
 HELMET: Soldier, Steel, M1 with liner M1-L-1910
 DATE: 3 May 1957
 TEMPERATURE: Range 54°F Ammunition 54°F Density 1.028
 RANGE: 500 yards

FAIR HIT NUMBER	OBLIQUITY	CHARACTER OF PENETRATION			
		FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER	REAR SIDE OF HELMET
1	50°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
2	30°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
3	55°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
4	60°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
5	35°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
6	85°	C. Perf.	C. Perf.		

CARTRIDGE: Ball, Caliber .22, Carbine
 RIFLE: Code E, M70, Serial No. 304164
 HELMET: Soldier, Steel, M1 with liner M1-L-1910
 DATE: 6 May 1957
 TEMPERATURE: Range 63°F Ammunition 63°F Density 1.016
 RANGE: 300 yards

FAIR HIT NUMBER	OBLIQUITY	CHARACTER OF PENETRATION			
		FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER	REAR SIDE OF HELMET
1	15°	C. Perf.	C. Perf.	C. Perf.	F. F.
2	20°	C. Perf.	C. Perf.	C. Perf.	F. P.
3	15°	C. Perf.	C. Perf.	F. P.	
4	15°	C. Perf.	C. Perf.	C. Perf.	F. P.
5	50°	C. Perf.	C. Perf.	F. P.	

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PENETRATION TEST

CARTRIDGE: Ball, Caliber .22, Carbine
 RIFLE: Code E, M70, Serial No. 304164
 HELMET: Soldier, Steel, M1 with liner M1-L-1910
 DATE: 6 May 1957
 TEMPERATURE: Range 61°F Ammunition 61°F Density 1.017
 RANGE: 400 yards

CHARACTER OF PENETRATION

FAIR HIT NUMBER	OBLIQUITY	FRONT SIDE OF HELMET
1	25°	F. P.
2	30°	F. P.
3	0°	F. P.
4	20°	F. P.
5	0°	F. P.

CARTRIDGE: Ball, Caliber .30, Duplex
 RIFLE: U.S., Caliber .30, M1, Modified, Serial No. 5973453
 HELMET: Soldier, steel, M1, with liner, M1-L-1910
 DATE: 15 May 1957
 TEMPERATURE: Range 76-82°F Ammunition 76-82°F Density 0.964 to 0.975
 RANGE: 300 yards

FAIR HIT NUMBER	OBLIQUITY	CHARACTER OF PENETRATION			
		FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER	REAR SIDE OF HELMET
*1	0°	C. Perf.	C. Perf.	C. Perf.	F. P.
2	20°	F. P.			
3	10°	F. P.			
4	30°	F. P.			
*5	25°	C. Perf.	C. Perf.	C. Perf.	C. P.

* Designates hit made by first projectile.

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PENETRATION TEST

CARTRIDGE: Ball, Caliber .30, Duplex

RIFLE: U. S., Caliber .30, M1, Modified, Serial No. 5973453

HELMET: Soldier, steel, M1 with liner M1-L-1913

DATE: 16 May 1957

TEMPERATURE Range 66 to 68°F Ammunition 66 to 68°F Density 1.002 to 1.006

RANGE 400 yards

PAIR HIT NUMBER	OBLIQUITY	CHARACTER OF PENETRATION			
		FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER	REAR SIDE OF HELMET
#1	25°	F. P.			
#2	0°	C. Perf.	C. Perf.	C. P.	F. P.
3	40°	C. P.	C. P.		
#4	20°	F. P.			
#5	40°	F. P.			

CARTRIDGE: Ball, Caliber .30, Triplex

RIFLE: U. S., Caliber .30, M1, Modified, Serial No. 5973453

HELMET: Soldier, steel, M1 with liner M1-L-1910

DATE: 16 May 1957

TEMPERATURE: Range 65°F Temperature 65°F Density 1.007

RANGE: 100 yards

PAIR HIT NUMBER	OBLIQUITY	CHARACTER OF PENETRATION			
		FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER	REAR SIDE OF HELMET
1	75°	C. Perf.	C. Perf.	C. Perf.	F. P.
2	30°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
3	80°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
4	20°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
5	10°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
6	50°	C. Perf.	C. Perf.	C. Perf.	C. Perf.
#7	40°	C. Perf.	C. Perf.	C. Perf.	C. Perf.

* Designates hit made by first projectile.

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PENETRATION TEST

CARTRIDGE: Ball, Caliber .30, Triplex
RIFLE: U.S., Caliber .30, M1, Modified, Serial No. 5973453
HELMET: Soldier, Steel, M1, with liner M1-L-1910
DATE: 16 May 1957
TEMPERATURE: Range 63°F Ammunition 63°F Density 1.011
RANGE: 200 yards

<u>PAIR HIT</u> <u>NUMBER</u>	<u>OBLIQUITY</u>	<u>CHARACTER OF PENETRATION</u> <u>FRONT SIDE OF HELMET</u>
*1	60°	F. P.
2	40°	F. P.
3	10°	F. P.
4	60°	F. P.
*5	10°	F. P.

* Designates hit made by first projectile.

CARTRIDGE: Ball, Caliber .30, Triplex
RIFLE: U.S., Caliber .30, M1, Modified, Serial No. 5973453
HELMET: Soldier, Steel, M1, with liner M1-L-1910
DATE: 16 May 1957
TEMPERATURE: Range 61°F Ammunition 61°F Density 1.013
RANGE: 300 yards

<u>PAIR HIT</u> <u>NUMBER</u>	<u>OBLIQUITY</u>	<u>CHARACTER OF PENETRATION</u> <u>FRONT SIDE OF HELMET</u>
1	15°	F. P.
2	40°	F. P.
3	0°	F. P.
*4	20°	F. P.
5	35°	F. P.
6	10°	F. P.

* Designates hit made by first projectile.

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PENETRATION TEST

CARTRIDGE: Caliber .22, Loaded with 50-Grain Full Patch Front Bullet for Caliber .22-06 Duplex Cartridge and 37.0 Grains of IMR 4895 Propellant, Lot ALA-2423.

RIFLE: Code E, M70, Serial No. 364827 with Caliber .22 Test Barrel.

HELMET: Soldier, Steel, M1 with Liner M1-L-1910

DATE: 5 September 1957

TEMPERATURE: Range 78°F Ammunition 78°F Density 0.983

RANGE: 600 yards

FAIR HIT NUMBER	OBLIQUITY	CHARACTER OF PENETRATION		
		FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER
1	20°	F. P.		
2	10°	F. P.		
3	15°	F. P.		
4	0°	C. Perf.	C. Perf.	C. P.
5	0°	F. P.		

DATE: 13 August 1957

WEAPON: Shotgun, 12 gage Shell: Flechette, Type L-11 (AA-32)

AMMUNITION TEMPERATURE: 65 to 68°F

RANGE TEMPERATURE: 65 to 68°F Density 1.005 to 1.009

PENETRATION AT 200 YARDS IN HELMET, SOLDIER, STEEL, M1 WITH LINER M1-L-1910

HIT NO.	SHELL NO.	OBLIQUITY	CHARACTER OF PENETRATION		
			FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER
1	1	70°	Slight dent**		
2	1	40°	Slight dent		
3	2	55°	Slight dent		
4	4	0°	C. Perf.	C. Perf.	C. P.*
5	5	5°	C. Perf.	C. Perf.	C. P.
6	5	40°	Slight dent		
7	5	65°	Slight dent		

* Projectile did not remain in liner.

** Projectile grazed side of helmet.

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PENETRATION TEST

DATE: 5 September 1957

WEAPON: Shotgun, 12 gage. Shell: Flechette, Type L-11

AMMUNITION TEMPERATURE: 78 to 80°F Range Temperature: 76 to 78°F

Density 0.977 to 0.983

PENETRATION AT 300 AND 400 YARDS IN HELMET, SOLDIER, STEEL, M1 WITH LINER M1-L-1910

CHARACTER OF PENETRATION				
HIT NO.	OBLIQUITY	FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER
<u>PENETRATION AT 300 YARDS</u>				
1	42°	Slight dent		
2	0°	C. P.*	C. P.*	
3	0°	C. Perf.	C. Perf.	C. P.
<u>PENETRATION AT 400 YARDS</u>				
1	0°	C. P.*	C. P.*	
2	30°	Slight dent		
3	25°	Slight dent		

DATE: 6 September 1957

WEAPON: Shotgun, 12 gage. Shell: Flechette, Type L-11 (AA-32)

AMMUNITION TEMPERATURE: 68 to 71°F Range Temperature: 68 to 71°F

Density 0.997 to 1.003

PENETRATION AT 500 YARDS IN HELMET, SOLDIER, STEEL, M1 WITH LINER M1-L-1910

HIT NO.	OBLIQUITY	CHARACTER OF PENETRATION	
		FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER
1	40°	Slight dent	
2	15°	C. P.*	C. P.*
3	30°	Slight dent	
4	20°	Slight dent**	
5	15°	Slight dent**	
6	50°	Slight dent	
7	60°	Slight dent	
8	15°	Slight dent**	
9	30°	Slight dent	

* Projectile remained in helmet and liner.

** Projectile was yawing before it hit helmet.

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VELOCITY, PATTERN AND PENETRATION TEST

DATE: 2 August 1957
 WEAPON: Shotgun, 12 gage. Shell: Flechette, Type L-11 (AA-32)
 AMMUNITION TEMPERATURE: 70°F Range Temperature: 86°F
 Density .962 to .964
 CHRONOGRAPH TYPE: Counter INITIATOR TYPE: Lumines

SHELL NO.	VELOCITY AT 7 ft (ft/sec)	PATTERN AT 40 YARDS	
		NO. HITS IN 60-INCH CIRCLE	NO. HITS IN 30-INCH CIRCLE
1	1220	24 (5 keyholes)	17 (3 keyholes)
2	1316	26 (4 keyholes)	18 (4 keyholes)
3	1227	28 (3 keyholes)	17
4	1302	30 (1 keyhole)	22 (1 keyhole)
5	1241	26	16
6	1264	22 (5 keyholes)	18 (3 keyholes)
7	1205	28 (5 keyholes)	19 (3 keyholes)
8	1272	28 (3 keyholes)	15 (2 keyholes)
9	1258	26 (3 keyholes)	14
10	1280	22 (7 keyholes)	12 (3 keyholes)
Average	1258.5	26.6	16.8

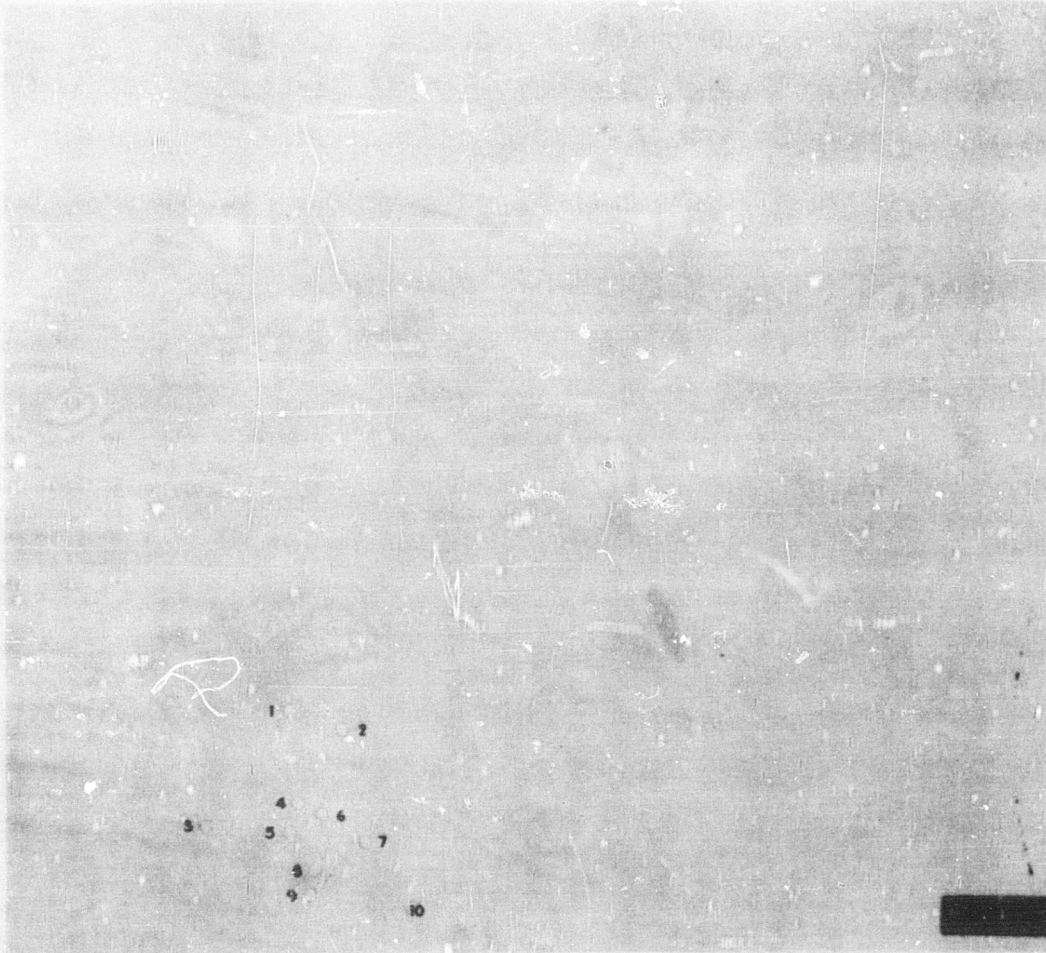
PENETRATION AT 100 YARDS IN HELMET, SOLDIER,
 STEEL, M1 WITH LINER M1-L-1910

HIT SHELL			CHARACTER OF PENETRATION			
			FRONT SIDE OF HELMET	FRONT SIDE OF HELMET LINER	REAR SIDE OF HELMET LINER	REAR SIDE OF HELMET
1	2	15°	C. Perf.	C. Perf.	P. P.*	
2	2	5°	C. Perf.	C. Perf.	(Projectile stopped in webbing.)	
3	6	40°	Slight dent			
4	6	25°	C. Perf.	C. Perf.	P. P.*	
5	7	20°	C. Perf.	C. Perf.	P. P.*	
6	7	35°	Small dent			
7	7	15°	C. Perf.	C. Perf.	P. P.*	
8	8	15°	C. Perf.	C. Perf.	P. P.*	
9	10	25°	C. Perf.	C. Perf.	P. P.*	
10		45°	Slight dent			
11		65°	Slight dent			

* Projectile did not remain in liner.

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APPENDIX D

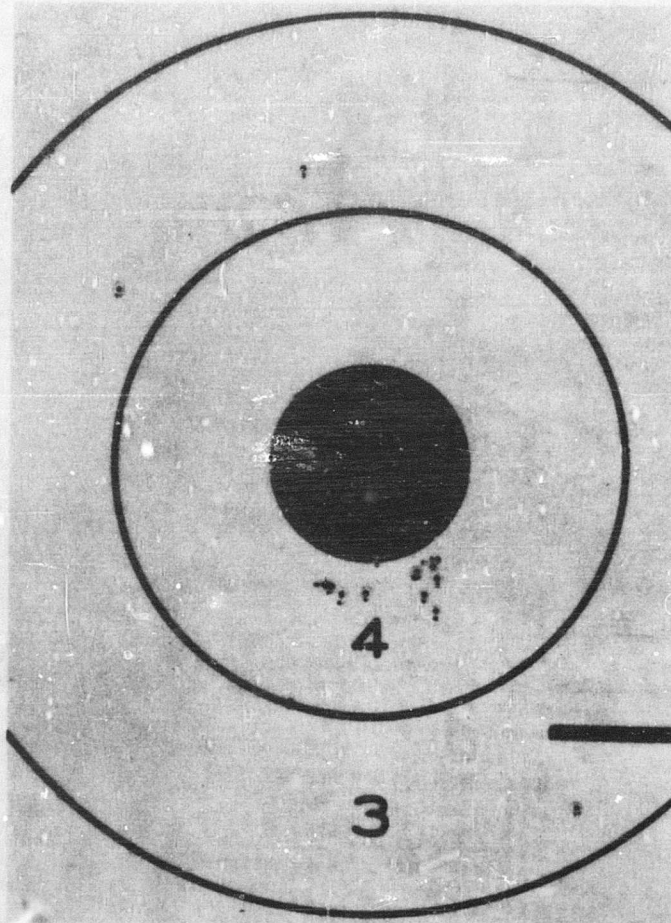


B25262 - A ten-round machine-rest target fired at 100 yards, using Cartridge, Ball, Caliber .30, Duplex in Rifle, U.S., Caliber .30, M1, Modified. The numbered shot holes are those made by the first shot in each round.

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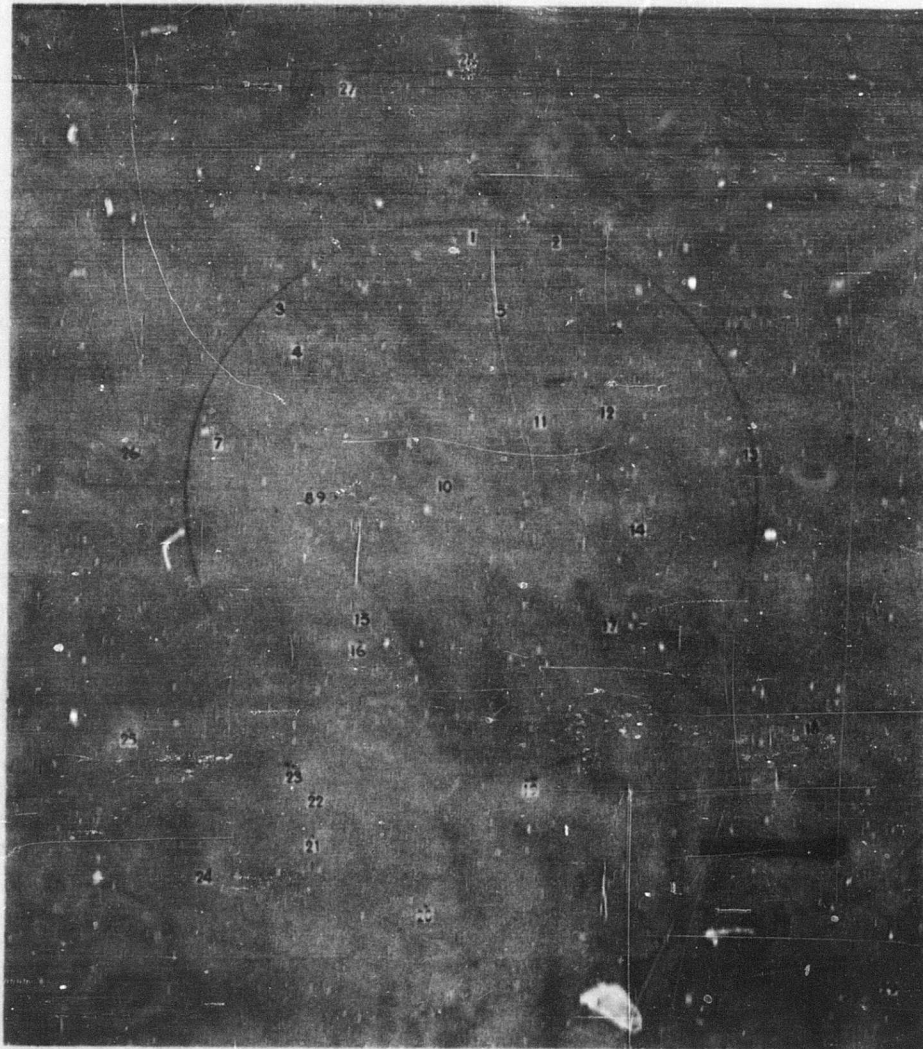
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B26047 - A ten-round target fired from a bench rest at 50 yards using Cartridge, Ball, Caliber .30, Triplex in Rifle, U.S., Caliber .30, M1, Modified. Each shot hole is identified with the round number. The hole made by the first shot in each round is identified with an F.

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B26048 - A pattern made at 40 yards with a 12 gage shotgun and flechette ammunition, Type L-L1 (AA-32).

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APPENDIX E

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