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INFANTRY AND AIRCRAFT WEAPONS DIVISION

REPORT ON

A TEST TO INVESTIGATE VARIOUS FACTORS OF SIGHTING ERROR

by

L. F. MOORE

Report No. DPS-394

(OMS Code No. 5520.12.433C)

(D. A. Project No. 502-08-006)

DECEMBER 1961

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A TEST TO INVESTIGATE VARIOUS FACTORS OF SIGHTING ERROR

Report No. DPS-394

Dates of Test: November 1957 to October 1961

ABSTRACT

Three individuals conducted 10-trial exercises under various sighting conditions, using a sighting-error recorder designed and fabricated at Aberdeen Proving Ground. The effect of the following factors on sighting error was demonstrated: individual, intensity of illumination, atmospheric conditions, target, type of rear sight, diameter of rear-sight aperture, distance between rear sight and eye, type of front sight, diameter of front-sight aperture, distance between front sight and eye, magnification of telescopic sight, firing position, and relationship between sights and stock. It is recommended that these data be considered in marksmanship training and in weapon design, and that further tests be conducted in areas where quantitative data are desired.

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1. INTRODUCTION

A test of a sighting-error recorder was conducted at Aberdeen Proving Ground between 11 May and 23 December 1955, and the results are contained in the 44th Report on Project No. TS2-2015. This facility permits the sighting error for a particular condition to be recorded conveniently. The purpose of the tests reported herein was to investigate various factors of sighting error with this facility.

2. DESCRIPTION OF MATERIEL

2.1 Sighting-Error Recorder

Photographs in Appendix D illustrate the sighting-error recorder. The sights to be used in the test[a] are mounted on machined bases which can be adjusted to any point on a rail machined on the top of a 1-1/4 by 48-inch bar. The bar is secured to a Frankford Arsenal machine rest by means of two brackets and a base. A modified M1903 rifle stock is attached to the rear section of the bar and it provides a support for the face similar to that on a conventional rifle. The stock can be adjusted to give the desired height at comb with relation to the line of sight. A metal rod is assembled to the rear of the bar for contact with the cheek to assure a constant relationship with the rear sight.

The individual conducting the sighting-error exercise is seated on a specially constructed bench on which the target controls are arranged for convenient operation. The individual has complete control of the target movement and, therefore, requires no assistance during the exercise.

A target of any type desired is mounted on a 2-foot-square target board which is secured to a mechanism for obtaining vertical and horizontal movement. A movement of 11-1/2 inches is permitted in each direction. The movement is obtained by means of a type 23TX6 Synchro-Torque Transmitter in connection with a type 23TR6 Synchro-Torque Receiver assembled to each of two screws, one placed vertically and one placed horizontally. A steel plate is assembled to the frame supporting the target mechanism for attaching a sheet of paper on which is recorded the sighting-error group. A means for indexing the sheet of paper is provided. A pointed rod projects from the rear side of the target board. When the operator closes a circuit, a spark passes from the pointed rod to the steel plate to make a record on the paper. The size of the record hole in the paper can be controlled by adjusting the spark. The circuit used for producing the spark is energized by a 12-volt battery.

[a]In tests 7 and 8 the complete weapon was assembled to the machine rest.

2.2 Sights

Photographs of the sights used in this test may be found in Appendix E.

2.2.1 Match Rifle Sights. Redfield International front and rear sights were used because they provided a wide selection of aperture sizes. Inserts having aperture diameters of 0.020, 0.040, 0.080, 0.160, 0.320 and 0.480 inch were made locally for the rear sight. Inserts having aperture diameters of 0.035 and 0.170 inch were made locally for the front sight. An adapter was made to fit the rear sight to permit the front-sight inserts to be used as rear-sight apertures. Projections on the front-sight insert fit in corresponding recesses in the sight hood and the insert is retained in position by a tube threaded to the inside of the hood.

2.2.2 Sights on Weapons Previously Used in Rifle-Effectiveness Test. Sights on weapons previously used in rifle-effectiveness tests are listed in Table I.

Table I. Sights on Weapons Previously Used in Rifle Effectiveness Tests

	M1 Rifle	M2 Carbine	M760 Rifle	M70 Rifle	M99 Rifle	M94 Carbine	M12 Shotgun	M14 Rifle
Type of front sight:	Post	Post	[a]Bead	[b]Bead	[c]Bead	[d]Bead	[e]Bead	Post
Width of front sight:	0.076	0.080	0.093	0.076	0.082	0.078	0.126	0.080
Width of sighting notch in open rear sight:			0.072	0.069	0.055	0.076	0.280	
Depth of sighting notch in open rear sight:			0.070	0.032	0.041	0.042	0.021	
Diameter of aperture in rear sight:	0.070	0.082	0.046					0.074
Diameter of aperture disc in rear sight:	0.366	0.344	0.501					0.365
Sight radius with open sights:			15.9	15.6	19.1	16.8	30.7	
Sight radius with aperture rear sight:	27.9	21.7	27.3					26.8
Line of sight to forward end of comb (sight set for about 40 yards)[f]:	2.3	2.0	1.8	1.6	1.6	2.0	1.4	2.3

[a]A gold-colored sight mounted on a ramp. The rear surface of the bead is flat.
[b]A silver-colored sight mounted on a ramp and protected by a hood. The rear surface of the bead is flat.
[c]A gold-colored sight mounted on a ramp. The rear surface of the bead is convex.
[d]A silver-colored sight mounted on a ramp and protected by a hood. The rear surface of the bead is convex.
[e]A spherical ivory-colored sight.
[f]With factory sights.

Table I. (con'd)

Field and reticle characteristics of telescope sights

Sight	Field, inches at 100 yards	Reticle type	Reticle Size, minutes of angle
1X	989	Cross hair	4
2.5X	447	Cross hair	0.5
8X	148	Cross hair	0.3

2.2.3 Bead Sight Designed by Ithaca Gun Company. The M1 rifle front sight was modified to incorporate a red lucite bead. The lucite bead has a diameter of 0.10 inch and it is mounted in a metal post having a width of 0.19 inch. The lucite, which has a length of 0.57 inch, is exposed at the top for 0.35 inch. Both ends of the lucite are spherical.

2.2.4 Post Sight Designed by Ithaca Gun Company. The M1 sight was modified by replacing the metallic post with one of red lucite. The width of the lucite post is 0.090 inch.

2.2.5 Miltilite Sights. The miltilite sights, fabricated at Springfield Armory and based on U. S. Army Infantry School prototypes, each consist of a spherical member assembled to a post which is hinged to the standard M1 sight. The purpose of the spherical member is to reflect light. The spherical member of the rear sight has a diameter of 0.093 inch and that of the front sight a diameter of 0.140 inch. The width of the rear sight post is 0.130 inch and that of the front sight is 0.252 inch.

2.2.6 Twenty-Power Telescope Sight. A 20X Lyman Super Targetspot telescope sight was used in test 12. The cross-hair type reticle has a width of 0.15 minute.

2.3 Targets

A photograph is attached as page C-15 (Appendix C) which shows the types of targets used in this test.

2.4 Jet Black

Jet Black is marketed by Kenfield Products, San Clemente, Calif., in a 6-ounce can. The following statement is printed on the can: "Jet Black is scientifically compounded to stop glare." The material is sprayed from the can in liquid form and it dries quickly to form a black finish.

2.5 U. S. Army Signal Corps Viewer, PH558/TFP

This viewer, which has a magnification of 10 power, was used for measuring targets.

2.6 Individuals

Information on the individuals who participated in this test is given in Table II.

Table II. Information on Individuals Employed in Test

Name.	D. R. Davis	G. E. Hendricks	D. R. Smith
Shooter Designation:	A	B	C
Physical Characteristics			
Age.	35	35	39
Height, ft, in.	5 10	5 10	5 11
Wt, lb.	175	160	135
Shoulder used to support butt.	Right	Right	Right
Eyesight corrected.	No	No	Yes
Experience			
Hunting:			
Shotgun.	Yes	Yes	Yes
Smallbore rifle.	Yes	Yes	Yes
High-power rifle.	Yes	Yes	Yes
Military Marksmanship training.	Navy	Navy	No
NRA Competitions:			
Smallbore gallery.		Expert[a]	
Smallbore prone.	Master	Master	Expert
High-power rifle.	Expert	Expert	Expert
Other	Small Arms Firing School, Camp Perry, Ohio	Small Arms Firing School, Camp Perry, Ohio	Small Arms Firing School, Camp Perry, Ohio

[a]Temporary rating.

3. DETAILS OF TEST

3.1 Procedure

The test plan was approved in April 1956 but numerous delays in conducting the test were encountered. It was planned initially to conduct most of the test phases under controlled illumination, but since these facilities were not made available in 1957, the test was started in November 1957 using natural illumination. The test was suspended after the completion of two test phases. When the test was resumed in September 1960 it was necessary to replace two of the three participants. Therefore, test phases one and two were again conducted. A controlled-illumination facility was made available at the latter date and it was used in the effect-of-illumination test phase.

The sighting-error recorder was set up, as for the previous test, using facilities which were available. The Frankford Arsenal machine rest, on which the sight holder was mounted, was located at a firing position within Building Number 350. The direction of sighting was southwest. An attempt was made to minimize the effect of changing light conditions by erecting a cover over the target holder, thus eliminating direct sunlight from the target. The area between the sighting target and the framework supporting the cover was covered with paper of the same type as the target so the individual conducting the test could align the target with no points other than the sights. The first individual to conduct an exercise aligned the sights on the target, which was positioned in its center of movement, by adjusting the sights and machine rest. The locks on the machine rest were then set and no further adjustment was made on the rest or sights during the remainder of the test, except where a change was required by a change in sights.

Each of the three individuals employed in the test conducted a sufficient number of exercises to become acquainted with the operation of the sighting-error recorder. Each exercise consisted of ten trials. A standard procedure was used in conducting each exercise. The target board was moved to its extreme point in a different direction at the start of each trial. For example, the board was at its one o'clock position for the first trial, at its two o'clock position for the second trial, at its four o'clock position for the third trial, etc. On each trial the target was positioned so as to require both horizontal and vertical adjustment to bring it into the desired alignment. The individual attempted to make the alignment of sights and target as precise as possible, without limitations on time. When he was satisfied with the alignment he operated a switch which recorded the target location for that trial. Individuals were rotated after each ten-trial exercise to minimize fatigue. An individual was positioned at the target during each exercise to move the target to an extreme position after each trial and to check the location of the trial.

Various target measurements were recorded to determine the dispersion of each ten-trial exercise about its center and the variation of the center from exercise to exercise. Weather data were recorded.

The level of illumination was determined with a General Electric Type PR-1 exposure meter. For each reading the meter was held at a distance of four feet from the target and it was pointed toward the target. The meter was calibrated to permit the brightness in candles per square foot to be determined. A graph which permits the meter reading to be converted to candles per square foot is included in Appendix B.

Since the groups were generally too small to be measured with precision using a scale graduated to 0.1 inch the group was placed on a 10-power viewer and a plot was made. The plot was then measured. This method permitted an accuracy in measurement of 0.01 inch.

Tests 1 through 7 and test 11 were conducted with the facility installed in Building Number 350 as described previously. Test 8 was conducted in Building 746 under controlled illumination. Parallel rows of fluorescent lights extended throughout the length of the 100-yard range. A range of 90 yards was used between sights and target to insure uniform lighting at the sighting and target points as well as between these points. The exercises for each test day were conducted in order, according to levels of illumination; exercises at the lowest level of illumination were conducted first. Each participant was exposed to the level of illumination for the first exercise on a particular day for a minimum period of 1/2 hour before starting the exercise. Exercises were initially conducted at four levels of illumination but the test was expanded to include two lower levels. At the lowest level of illumination the target was barely visible to the participant when he was not sighting. The desired level of illumination was obtained by using a control panel and by adjusting individual bulbs.

Tests 9 and 10 were conducted with the target exposed to direct sunlight. The line of sight was on an azimuth of 340 degrees (from north). The terrain over which these exercises were conducted was covered with grass.

Test 12 was conducted with the target exposed to direct sunlight. The line of sight was on an azimuth of 340 degrees (from north). The terrain over which these exercises were conducted was covered with concrete.

3.2 Results

Complete test results are contained in Appendix B. The following paragraphs constitite a summary of results. Measurements are given in inches in the various tables. The legend used in the tables is explained below:

MR = Mean radius.
MVD = Mean vertical deviation.
MHD = Mean horizontal deviation.
EVD = Extreme vertical deviation.
EHD = Extreme horizontal deviation.
ES = Extreme spread.

3.2.1 Test 1, Consistency of Sighting Error. Three individuals each conducted four ten-trial exercises on each of three days under the following conditions:

Range - 100 yards.
Light - natural daylight.
Front Sight - 0.110-inch-diameter aperture.
Rear Sight - 0.046-inch-diameter aperture.
Distance Between Sights - 34 inches.
Distance Between Rear Sight and Eye - 2 inches.
Target - 100-yard NRA smallbore rifle (6-inch-diameter aiming point).

Results are summarized in Table III.

Table III. Test I. Consistency of Sighting Error

Day	Individual	MR	MVD	MHD	EVD	EHD	ES
1	A	0.070	0.044	0.046	0.18	0.17	0.22
	B	.149	.118	.067	.52	.29	.56
	C	.085	.052	.062	.20	.22	.27
Average		.101	.071	.058	.30	.23	.35
2	A	.077	.058	.044	.21	.16	.22
	B	.166	.126	.090	.52	.36	.55
	C	.100	.058	.070	.21	.25	.28
Average		.114	.081	.068	.31	.26	.35
3	A	.060	.046	.030	.21	.12	.22
	B	.092	.060	.058	.26	.22	.31
	C	.084	.055	.050	.26	.23	.29
Average		.079	.054	.046	.24	.19	.27
Averages for three days							
	A	.069	.049	.040	.20	.15	.22
	B	.136	.101	.072	.43	.29	.47
	C	.090	.055	.061	.22	.23	.28
Average		.098	.068	.058	.28	.22	.32

The test data show some variation in dispersion as well as in group center between individuals and also for a given individual from exercise to exercise and from day to day. In general there is a reduction in dispersion with experience. The reduction in dispersion which is attributed to learning was also observed in the test conducted in 1957 (these test data are attached as Appendix C.

Weather was expected to have an effect on the sighting error, but facilities which would be free of the effects of weather were not available for this test. The variation in light intensity within the range of that in effect during the conduct of this test did not affect the dispersion noticeably. However, a change in the group center in the vertical direction was observed with a change in temperature. This was possibly caused by expansion of the brass bar which supported the sights. The bar was initially fixed at two points and expansion of the bar would be expected to be accompanied by some bending. The facility was modified on 27 June 1961 by installing roller bearings at the front support to permit free expansion of the bar. Tests 9, 10, and 12 were conducted with this modified facility.

3.2.2 Test 2. Effect of Size of Front-Sight Aperture. Three individuals each conducted one ten-trial exercise with each size of aperture on each of four days under the following conditions:

Range - 100 yards.
Light - natural daylight.
Rear Sight - 0.046-inch-diameter aperture.
Distance Between Sights - 34 inches.
Distance Between Rear Sight and Eye - 2 inches.
Target - 100-yard NRA smallbore rifle (6-inch-diameter aiming point).

A summary of results is given in Table IV.

Table IV. Test 2. Effect of Size of Front-Sight Aperture

By Day: Day	Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
1	0.065	0.195	0.134	0.116	0.46	0.44	0.57
	.085	.113	.080	.063	.35	.25	.39
	.095	.121	.078	.076	.32	.28	.36
	.110	.084	.064	.043	.27	.18	.31
	.125	.088	.069	.041	.25	.15	.25
	.140	.074	.050	.045	.18	.19	.22
Average		.112	.079	.064	.30	.25	.35
2	.065	.151	.107	.086	.48	.32	.51
	.065	.130	.095	.074	.31	.31	.40
	.095	.077	.054	.044	.23	.22	.24
	.110	.085	.067	.041	.30	.12	.31
	.125	.066	.043	.043	.18	.17	.20
	.140	.069	.038	.049	.13	.22	.23
Average		.096	.067	.056	.27	.23	.32
3	.065	.201	.125	.129	.61	.51	.63
	.085	.119	.076	.075	.31	.31	.42
	.095	.108	.088	.049	.33	.19	.34
	.110	.067	.049	.033	.22	.15	.25
	.125	.078	.051	.049	.21	.19	.24
	.140	.094	.072	.047	.28	.20	.31
Average		.111	.077	.064	.33	.26	.36
4	.065	.208	.132	.137	.60	.50	.67
	.085	.073	.049	.041	.22	.17	.23
	.095	.091	.061	.055	.21	.26	.31
	.110	.069	.052	.039	.20	.14	.21
	.125	.061	.040	.037	.17	.16	.20
	.140	.069	.054	.033	.20	.11	.21
Average		.095	.065	.057	.27	.22	.30

Table IV (Cont'd)

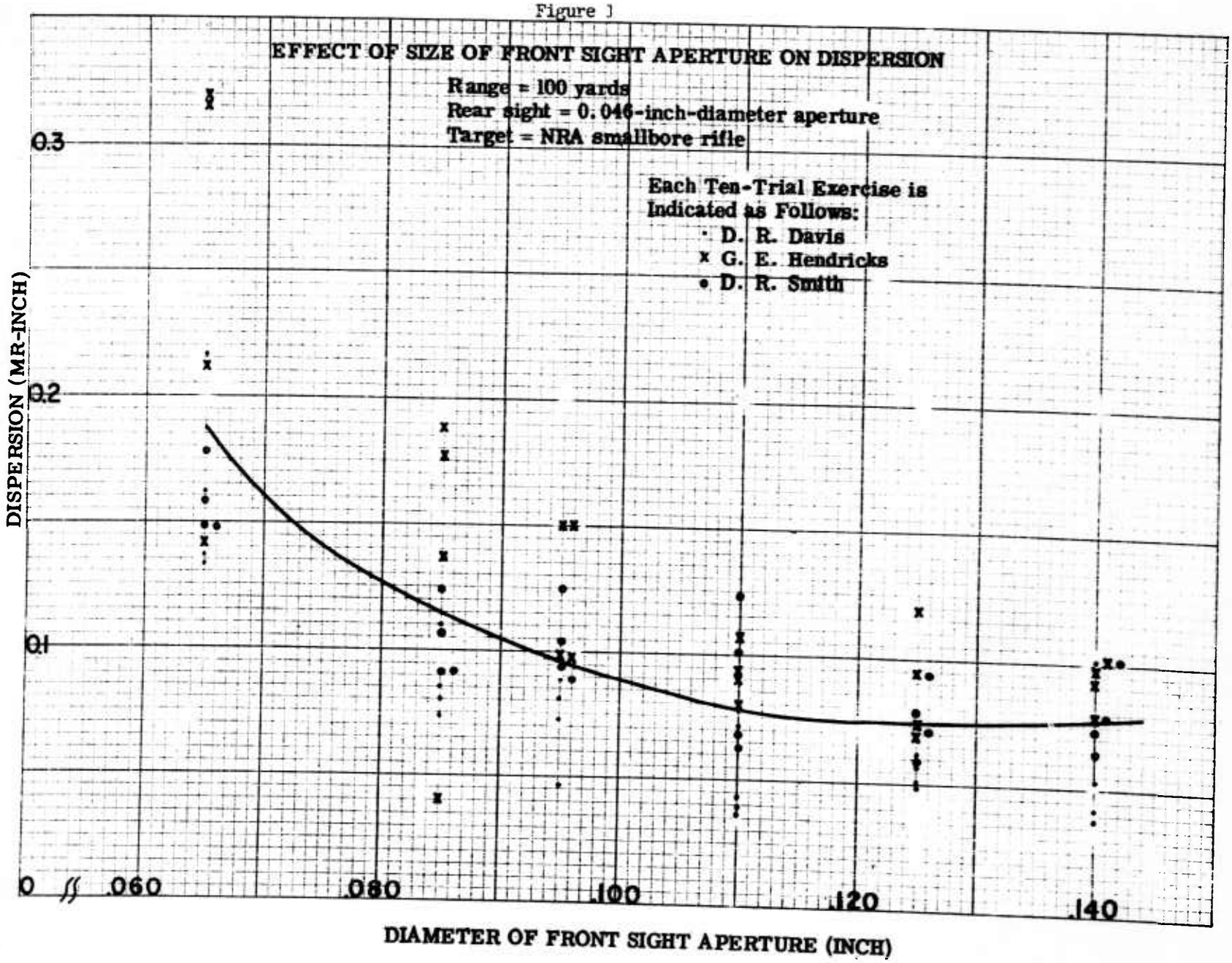
By Individual:

Individual	Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
A	0.065	0.162	0.114	0.087	0.42	0.32	0.43
	.085	.087	.053	.060	.26	.22	.31
	.095	.072	.057	.034	.22	.14	.22
	.110	.048	.040	.021	.16	.08	.16
	.125	.055	.038	.036	.14	.12	.16
	.140	.059	.045	.029	.14	.12	.15
Average		.080	.058	.044	.22	.17	.24
B	.065	.247	.154	.166	.75	.63	.82
	.085	.135	.110	.059	.41	.24	.43
	.095	.124	.091	.070	.34	.30	.42
	.110	.092	.080	.037	.36	.14	.37
	.125	.089	.069	.042	.28	.19	.30
	.140	.092	.062	.053	.25	.21	.30
Average		.130	.094	.071	.40	.28	.44
C	.065	.158	.104	.099	.44	.37	.53
	.085	.104	.062	.070	.22	.32	.34
	.095	.103	.064	.064	.26	.26	.30
	.110	.089	.055	.059	.22	.22	.28
	.125	.075	.045	.050	.18	.20	.21
	.140	.079	.054	.048	.21	.21	.27
Average		.101	.064	.065	.26	.26	.32
Average for Three Individuals and Four Days:							
	.065	.189	.124	.117	.54	.44	.60
	.085	.109	.075	.063	.30	.26	.36
	.095	.100	.070	.056	.27	.24	.31
	.110	.076	.058	.039	.25	.15	.27
	.125	.073	.051	.042	.20	.17	.22
	.140	.077	.054	.044	.20	.18	.24
Average		.104	.072	.060	.29	.24	.33

In test 2 both the individual and the front-sight aperture were changed between each exercise and because of manufacturing tolerances between sight and aperture,[a] the group-center data include an additional variable. A graph (Figure 1) shows the effect of size of front-sight aperture on dispersion. The results of the 1957 test (data are included in Appendix C) are similar to those of the recent test. The most effective diameter of front-sight aperture under the conditions of this test was between 0.110 and 0.140 inch.

[a]Since the inserts are made by production methods and they are readily interchangeable in the hood, some variation in size among inserts is expected.

Figure 1


EFFECT OF SIZE OF FRONT SIGHT APERTURE ON DISPERSION
Range = 100 yards
Rear sight = 0.046-inch-diameter aperture
Target = NRA smallbore rifle
Each Ten-Trial Exercise is Indicated as Follows:
· D. R. Davis
x G. E. Hendricks
• D. R. Smith
0.3
0.2
0.1
0
.060
.080
.100
.120
.140
DISPERSION (MR-INCH)
DIAMETER OF FRONT SIGHT APERTURE (INCH)

3.2.3 Test 3. Effect of Size of Rear-Sight Aperture. Three individuals each conducted one ten-trial exercise with each size of aperture on each of four days under the following conditions:

Range - 100 yards.
Light - natural daylight.
Front Sight - 0.125-inch-diameter aperture.
Distance Between Sights - 34 inches.
Distance Between Rear Sight and Eye - 2 inches.
Target - 100-yard NRA smallbore rifle (6-inch-diameter aiming point).

A summary of results is given in Table V.

Table V. Test 3. Effect of Size of Rear-Sight Aperture

By Day: Day	Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
1	0.030	0.092	0.066	0.047	0.30	0.17	0.31
	.038	.050	.022	.039	.08	.14	.15
	.042	.054	.032	.033	.14	.12	.18
	.046	.053	.035	.035	.14	.15	.19
	.050	.067	.046	.035	.17	.15	.19
	.058	.078	.056	.044	.23	.16	.25
Average		.066	.043	.039	.18	.15	.21
2	.030	.072	.051	.039	.22	.16	.24
	.038	.054	.034	.033	.15	.14	.18
	.042	.048	.039	.024	.16	.10	.17
	.046	.051	.029	.033	.14	.15	.17
	.050	.063	.037	.042	.13	.16	.18
	.058	.071	.043	.047	.20	.19	.23
Average		.060	.039	.036	.17	.15	.20
3	.030	.079	.044	.053	.22	.22	.24
	.038	.062	.039	.033	.17	.12	.21
	.042	.058	.040	.037	.15	.15	.18
	.046	.076	.042	.053	.17	.18	.20
	.050	.072	.047	.042	.19	.18	.24
	.058	.091	.054	.061	.20	.23	.28
Average		.073	.044	.046	.18	.18	.22
4	.030	.070	.051	.039	.19	.16	.22
	.038	.055	.039	.032	.13	.14	.19
	.042	.060	.042	.033	.19	.11	.21
	.046	.070	.044	.043	.16	.20	.22
	.050	.050	.034	.029	.16	.11	.17
	.058	.063	.034	.048	.14	.18	.20
Average		.061	.041	.037	.16	.15	.20

Table V. (Cont'd)

By Individual:

Individual	Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
A	0.030	0.067	0.047	0.038	0.20	0.16	0.22
	.038	.055	.028	.038	.10	.14	.15
	.042	.048	.037	.024	.14	.11	.16
	.046	.048	.031	.032	.10	.12	.13
	.050	.053	.035	.030	.15	.13	.18
	.058	.058	.037	.038	.15	.13	.18
Average		.055	.036	.033	.14	.13	.17
B	.030	.074	.054	.036	.23	.17	.24
	.038	.060	.044	.030	.18	.11	.20
	.042	.070	.051	.038	.20	.14	.23
	.046	.082	.049	.052	.20	.20	.24
	.050	.072	.049	.041	.20	.18	.22
	.058	.080	.055	.049	.21	.19	.24
Average		.073	.050	.041	.20	.16	.23
C	.030	.092	.058	.060	.27	.21	.29
	.038	.051	.028	.036	.12	.16	.19
	.042	.047	.026	.032	.13	.10	.16
	.046	.058	.032	.040	.15	.19	.21
	.050	.064	.040	.041	.14	.14	.18
	.058	.088	.048	.063	.22	.25	.30
Average		.067	.039	.045	.17	.18	.22

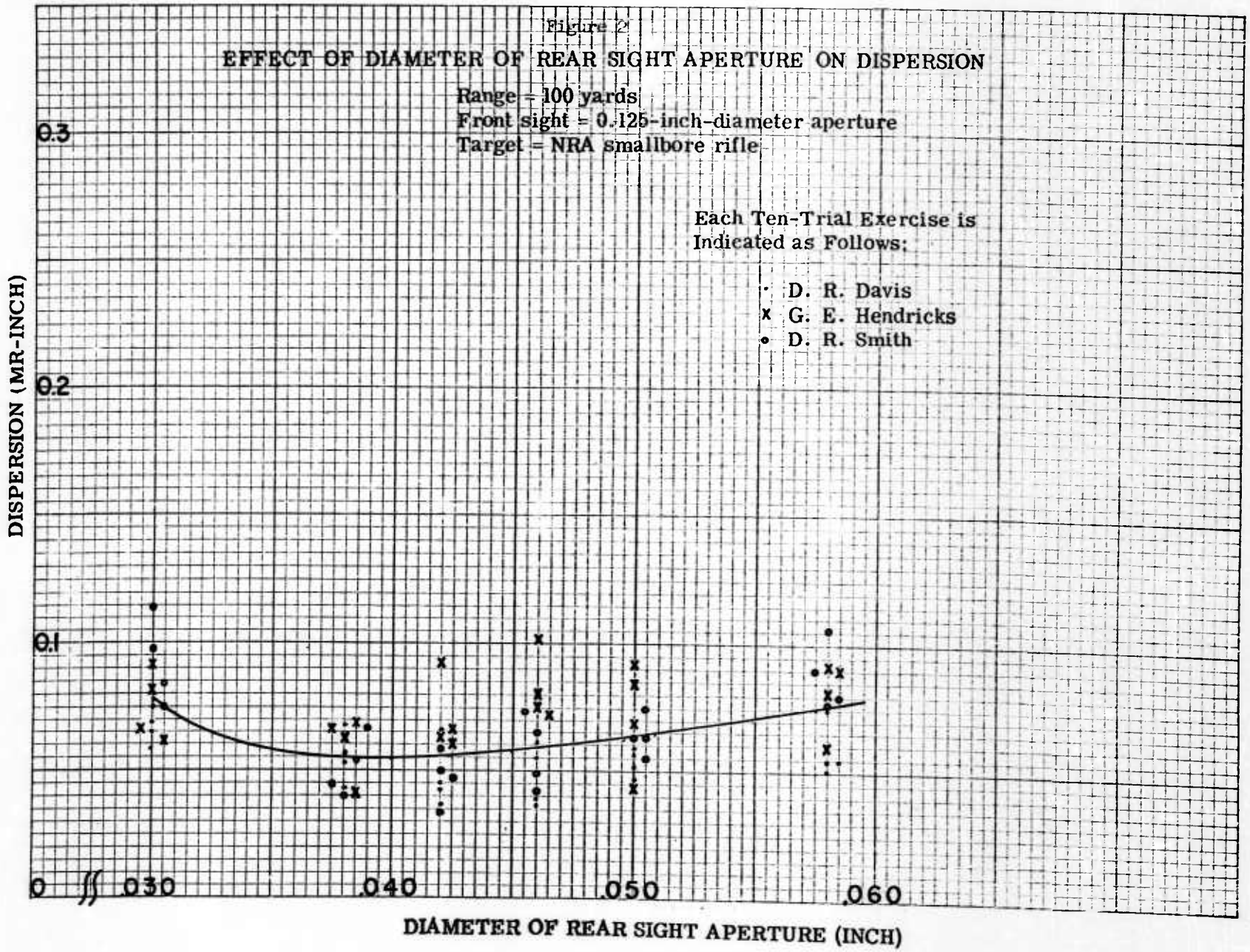
Average for Three Individuals and Four Days:

	.030	.078	.053	.044	.23	.18	.25
	.038	.055	.033	.034	.13	.14	.18
	.042	.055	.038	.032	.16	.12	.18
	.046	.062	.038	.041	.15	.17	.20
	.050	.063	.041	.037	.16	.15	.20
	.058	.076	.047	.050	.19	.19	.24
Average		.065	.042	.040	.17	.16	.21

Figure 2 shows the effect of size of rear-sight aperture on dispersion. The graph shows that the dispersion increases rapidly as the aperture size is decreased below the most effective size and somewhat less rapidly as the aperture size is increased above the most effective size. The most effective aperture diameter for the conditions and individuals employed in this test was between 0.038 and 0.046 inch.

Figure 2

EFFECT OF DIAMETER OF REAR SIGHT APERTURE ON DISPERSION



3.2.4 Test 4. Effect of Size of Aiming Point. Three individuals each conducted one ten-trial exercise with each target-sight combination on each of four days under the following conditions:

Range - 100 yards.
Light - natural daylight.
Rear Sight - 0.046-inch-diameter aperture.
Distance Between Sights - 34 inches.
Distance Between Rear Sight and Eye - 2 inches.

A summary of results is given as Table VI.

Table VI. Test 4. Effect of Size of Aiming Point

By Day: Day	Aperture Diameter	Aiming Point Diameter	MR	MVD	MHD	EVD	EHD	ES
1	0.075	2.9	0.100	0.065	0.066	0.26	0.21	0.29
	.100	2.9	.080	.054	.044	.19	.18	.26
	.125	2.9	.083	.062	.046	.24	.19	.27
	.125	6.0	.057	.041	.033	.16	.12	.18
	.125	8.1	.060	.039	.038	.16	.16	.18
	.125	12.0	.091	.063	.053	.24	.22	.30
Average			.078	.054	.047	.21	.18	.25
2	.075	2.9	.087	.052	.060	.16	.24	.27
	.100	2.9	.064	.041	.039	.16	.17	.22
	.125	2.9	.082	.059	.044	.24	.17	.26
	.125	6.0	.071	.049	.040	.19	.18	.22
	.125	8.1	.079	.065	.034	.27	.11	.24
	.125	12.0	.087	.052	.060	.19	.22	.24
Average			.078	.053	.046	.20	.18	.24
3	.075	2.9	.128	.075	.088	.28	.37	.41
	.100	2.9	.065	.041	.043	.15	.18	.21
	.125	2.9	.095	.072	.047	.27	.20	.31
	.125	6.0	.060	.042	.036	.22	.17	.25
	.125	8.1	.071	.050	.037	.22	.19	.25
	.125	12.0	.124	.076	.083	.33	.35	.41
Average			.090	.059	.056	.24	.24	.31
4	.075	2.9	.095	.048	.069	.22	.28	.32
	.100	2.9	.084	.067	.040	.21	.12	.23
	.125	2.9	.102	.069	.060	.28	.21	.34
	.125	6.0	.064	.038	.045	.15	.18	.20
	.125	8.1	.080	.046	.056	.20	.19	.26
	.125	12.0	.116	.081	.061	.33	.27	.38
Average			.090	.058	.055	.23	.21	.29

By Individual:

Table VI (Cont'd)

Individual	Aperture Diameter	Aiming Point Diameter	MR	MVD	MHD	EVD	EHD	ES
A	0.075	2.9	0.098	0.049	0.076	0.18	0.27	0.31
	.100	2.9	.054	.044	.026	.16	.10	.18
	.125	2.9	.083	.062	.041	.24	.18	.28
	.125	6.0	.046	.034	.025	.13	.10	.14
	.125	8.1	.064	.045	.038	.17	.12	.18
	.125	12.0	.110	.072	.070	.30	.31	.35
Average			.076	.051	.046	.20	.18	.24
B	.075	2.9	.130	.080	.086	.31	.36	.41
	.100	2.9	.097	.069	.054	.25	.19	.30
	.125	2.9	.110	.084	.056	.34	.22	.37
	.125	6.0	.083	.052	.053	.22	.24	.28
	.125	8.1	.084	.057	.047	.28	.20	.28
	.125	12.0	.097	.064	.054	.27	.22	.32
Average			.100	.068	.058	.28	.24	.33
C	.075	2.9	.080	.052	.050	.19	.20	.25
	.100	2.9	.067	.038	.045	.13	.20	.22
	.125	2.9	.080	.050	.050	.19	.18	.24
	.125	6.0	.060	.041	.037	.18	.15	.22
	.125	8.1	.069	.048	.039	.20	.17	.26
	.125	12.0	.106	.068	.069	.25	.27	.32
Average			.077	.050	.048	.19	.20	.25
Average for Three Individuals and Four Days:								
	.075	2.9	.102	.060	.071	.23	.28	.32
	.100	2.9	.073	.050	.042	.18	.16	.23
	.125	2.9	.091	.066	.049	.26	.19	.30
	.125	6.0	.063	.042	.038	.18	.16	.21
	.125	8.1	.072	.050	.041	.21	.16	.24
	.125	12.0	.104	.068	.064	.27	.26	.33
Average			.084	.056	.051	.22	.20	.27

It was expected that the most advantageous size of aiming point is dependent on the size of front-sight aperture used. Therefore, to demonstrate this point, two additional aperture sizes were used in conjunction with one size of aiming point. Graphs are attached (Figures 3 and 4) which show the effect on dispersion of the size of aiming point when using a 0.125-inch diameter front-sight aperture, and of the size of front-sight aperture when using a 2.9-inch-diameter aiming point. While the smallest dispersion in this test phase was obtained with a 6-inch-diameter aiming point and a 0.125-inch-diameter front-sight aperture it is possible that other combinations of target and aperture front sight would permit a dispersion as small or smaller.

Figure 3

EFFECT OF SIZE OF AIMING POINT ON DISPERSION

Range = 100 yards

Rear sight = 0.042-inch-diameter aperture

Front sight = 0.125-inch-diameter aperture

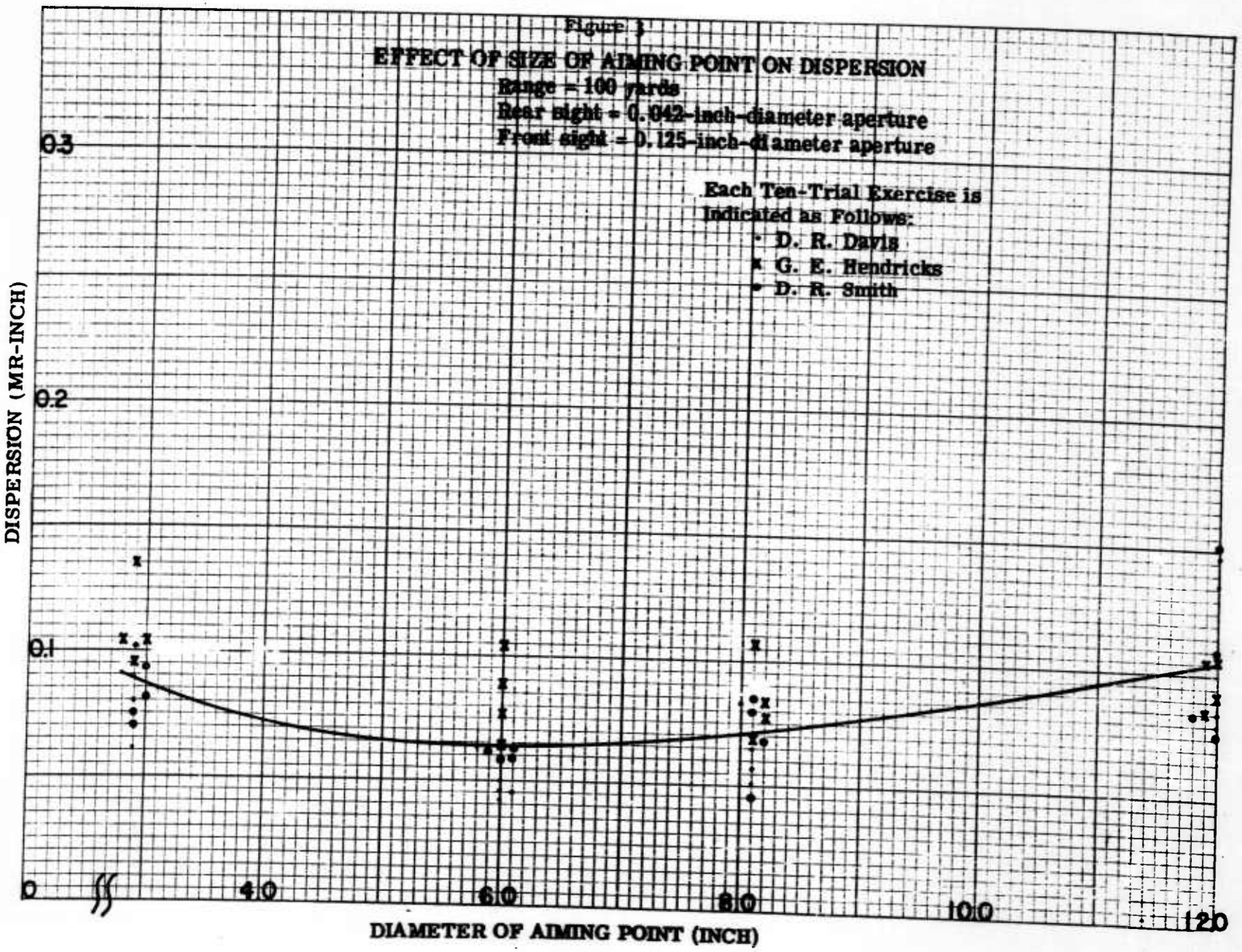
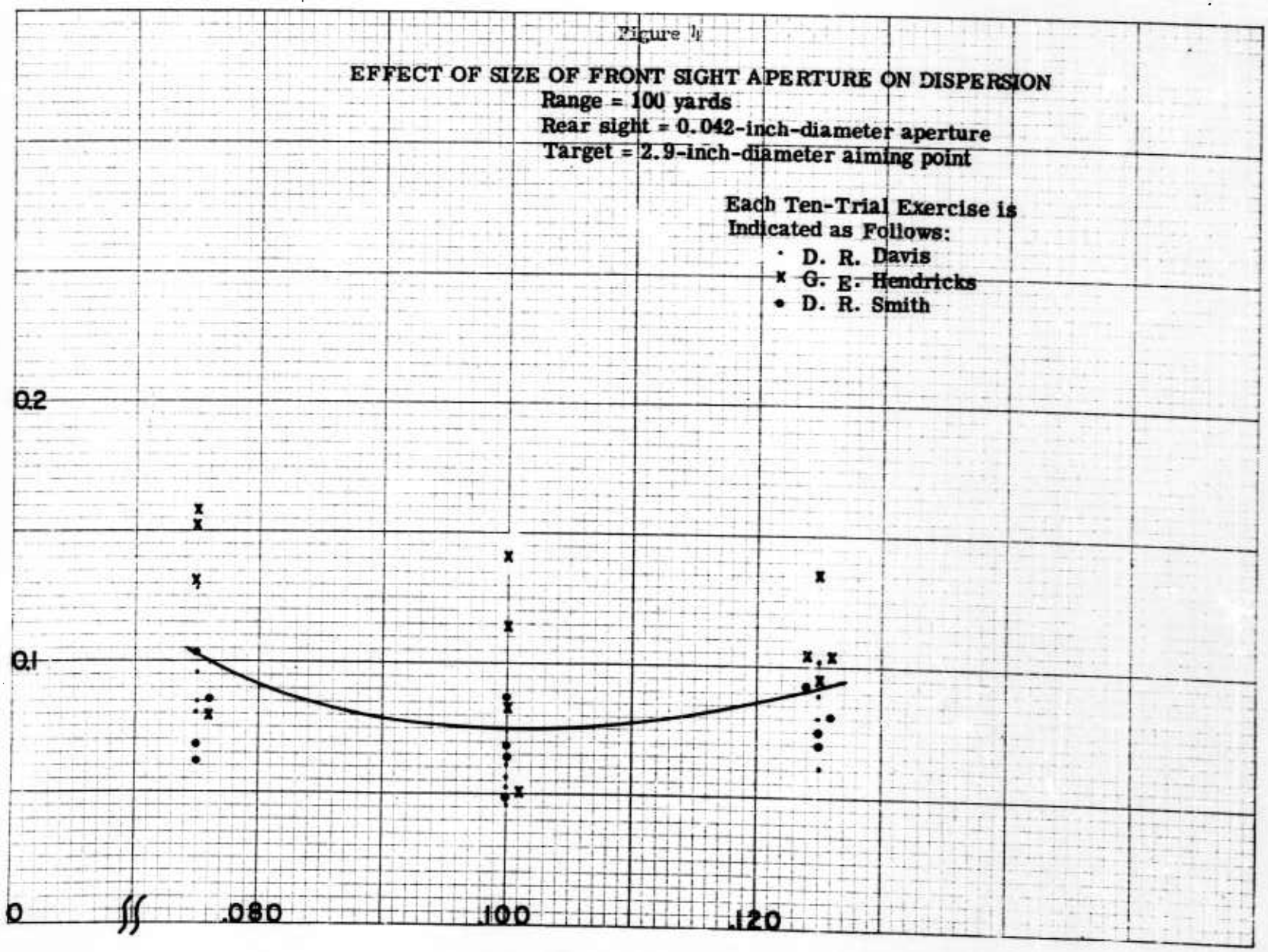


Figure 4

EFFECT OF SIZE OF FRONT SIGHT APERTURE ON DISPERSION

Range = 100 yards
Rear sight = 0.042-inch-diameter aperture
Target = 2.9-inch-diameter aiming point



3.2.5 Test 5. Effect of Position of Rear-Sight Aperture. Three individuals each conducted one ten-trial exercise with each aperture-distance combination under the following conditions:

Range - 100 yards.
Light - natural daylight.
Front Sight - 0.125-inch-diameter aperture.
Distance Between Eye and Front Sight - 36 inches.
Target - 100-yard NRA smallbore rifle (6-inch-diameter aiming point).

A summary of results is given as Table VII.

Table VII. Test 5. Effect of Position of Rear-Sight Aperture

Individual	Rear-Sight Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
Rear Sight to Eye = 1.0 inch							
A	0.020	0.128	0.071	0.079	0.23	0.46	0.46
B	.020	.112	.070	.079	.29	.31	.32
C	.020	.225	.105	.176	.39	.73	.73
	Average	.155	.082	.111	.30	.50	.50
A	.030	.063	.034	.044	.13	.18	.19
B	.030	.080	.048	.049	.19	.24	.27
C	.030	.079	.039	.055	.15	.24	.25
	Average	.074	.040	.049	.16	.22	.24
A	.034	.081	.057	.049	.17	.22	.22
B	.034	.096	.078	.040	.26	.14	.27
C	.034	.046	.026	.037	.10	.14	.16
	Average	.074	.054	.042	.18	.17	.22
A	.038	.037	.021	.032	.10	.10	.12
B	.038	.126	.101	.070	.29	.23	.35
C	.038	.043	.029	.027	.09	.09	.10
	Average	.069	.050	.043	.16	.14	.19
A	.042	.046	.027	.037	.13	.18	.22
B	.042	.108	.078	.065	.26	.21	.30
C	.042	.101	.051	.081	.20	.32	.38
	Average	.085	.052	.061	.20	.24	.30
A	.046	.057	.029	.048	.09	.16	.17
B	.046	.110	.071	.080	.25	.26	.36
C	.046	.054	.031	.045	.11	.16	.16
	Average	.074	.044	.058	.15	.19	.23

Table VII (Cont'd)

Individual	Rear-Sight Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
Rear Sight to Eye = 2.0 inches							
A	0.030	0.070	0.059	0.033	0.22	0.10	0.24
B	.030	.137	.117	.059	.47	.23	.49
C	.030	.090	.060	.050	.20	.20	.20
	Average	.099	.079	.047	.30	.18	.31
A	.034	.049	.027	.033	.12	.15	.17
B	.034	.076	.063	.034	.26	.20	.28
C	.034	.068	.021	.058	.13	.24	.24
	Average	.064	.037	.042	.17	.20	.23
A	.038	.031	.025	.011	.10	.08	.13
B	.038	.067	.047	.046	.13	.15	.17
C	.038	.082	.062	.049	.24	.18	.30
	Average	.060	.045	.035	.16	.14	.20
A	.042	.028	.017	.022	.09	.12	.12
B	.042	.089	.058	.057	.25	.13	.26
C	.042	.050	.031	.035	.10	.09	.11
	Average	.056	.035	.038	.15	.11	.16
A	.046	.086	.054	.057	.17	.16	.22
B	.046	.085	.062	.047	.24	.17	.26
C	.046	.060	.040	.036	.14	.16	.18
	Average	.077	.052	.047	.18	.16	.22
A	.050	.049	.026	.042	.10	.16	.17
B	.050	.063	.049	.034	.14	.15	.17
C	.050	.071	.055	.068	.21	.26	.27
	Average	.061	.043	.048	.15	.19	.20
Rear Sight to Eye = 3.0 inches							
A	.034	.036	.026	.016	.10	.05	.10
B	.034	.082	.062	.050	.30	.21	.36
C	.034	.067	.039	.047	.18	.16	.22
	Average	.062	.042	.038	.19	.14	.23
A	.038	.049	.025	.035	.08	.21	.22
B	.038	.092	.065	.050	.26	.22	.27
C	.038	.038	.026	.025	.10	.13	.13
	Average	.060	.039	.037	.15	.19	.21

Table VII (Cont'd)

Individual	Rear-Sight Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
A	0.042	0.062	0.048	0.032	0.23	0.11	0.24
B	.042	.074	.062	.037	.26	.15	.27
C	.042	.071	.049	.039	.15	.22	.24
	Average	.069	.053	.036	.21	.16	.25
A	.046	.051	.030	.032	.12	.12	.13
B	.046	.071	.052	.035	.28	.19	.29
C	.046	.103	.095	.035	.32	.18	.37
	Average	.075	.059	.034	.24	.16	.26
A	.050	.057	.038	.033	.14	.12	.15
B	.050	.076	.049	.047	.13	.26	.28
C	.050	.066	.032	.051	.15	.17	.18
	Average	.066	.040	.044	.14	.18	.20
A	.058	.065	.041	.042	.13	.18	.19
B	.058	.094	.075	.043	.34	.18	.35
C	.058	.084	.054	.053	.19	.27	.30
	Average	.081	.057	.046	.22	.21	.28
Rear Sight to Eye = 4.0 inches							
A	.038	.047	.030	.033	.11	.12	.14
B	.038	.120	.093	.052	.50	.20	.50
C	.038	.061	.041	.032	.18	.18	.18
	Average	.076	.055	.039	.26	.17	.27
A	.042	.036	.020	.028	.14	.09	.14
B	.042	.052	.023	.039	.10	.11	.12
C	.042	.078	.048	.052	.23	.26	.26
	Average	.055	.030	.040	.16	.15	.17
A	.046	.020	.015	.012	.07	.07	.08
B	.046	.104	.089	.038	.40	.20	.40
C	.046	.088	.059	.062	.19	.21	.26
	Average	.071	.054	.037	.22	.16	.25
A	.050	.099	.059	.068	.25	.23	.25
B	.050	.093	.056	.055	.27	.22	.28
C	.050	.048	.022	.038	.08	.14	.14
	Average	.080	.046	.054	.20	.20	.22
A	.054	.060	.029	.047	.16	.20	.20
B	.054	.097	.079	.041	.30	.20	.31
C	.054	.068	.049	.045	.17	.15	.22
	Average	.075	.052	.044	.21	.18	.24

Table VII (Cont'd)

Individual	Rear-Sight Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
A	0.058	0.053	0.032	0.039	0.12	0.16	0.17
B	.058	.079	.060	.036	.29	.12	.30
C	.058	.090	.042	.068	.17	.25	.25
	Average	.074	.045	.048	.19	.18	.24
Rear Sight to Eye = 8.0 inches							
A	.042	.128	.094	.073	.33	.27	.37
B	.042	.165	.133	.067	.63	.25	.63
C	.042	.090	.051	.064	.19	.26	.27
	Average	.128	.093	.068	.3	.26	.42
A	.050	.079	.054	.049	.26	.15	.27
B	.050	.131	.103	.075	.40	.29	.49
C	.050	.091	.045	.071	.25	.23	.26
	Average	.100	.067	.065	.30	.22	.34
A	.058	.082	.065	.050	.24	.21	.32
B	.058	.112	.103	.024	.35	.15	.35
C	.058	.184	.119	.118	.58	.44	.69
	Average	.126	.096	.064	.39	.27	.45
A	.065	.098	.076	.054	.39	.16	.39
B	.065	.150	.113	.077	.50	.34	.53
C	.065	.219	.125	.150	.46	.70	.79
	Average	.156	.105	.094	.45	.40	.57
A	.075	.165	.124	.093	.46	.36	.54
B	.075	.181	.144	.080	.63	.36	.64
C	.075	.237	.199	.088	.67	.51	.68
	Average	.194	.156	.087	.59	.41	.62
A	.140	.290	.169	.226	.68	.89	1.09
B	.140	.204	.164	.090	.61	.37	0.63
C	.140	.351	.204	.221	.92	1.02	1.16
	Average	.282	.179	.179	.74	0.76	0.96
Rear Sight to Eye = 16.0 inches							
A	.105	.279	.182	.172	.85	0.56	0.86
B	.105	.312	.255	.126	1.02	0.48	1.02
C	.105	.326	.190	.256	0.58	0.93	1.20
	Average	.306	.209	.185	0.82	0.66	1.03

Table VII (Cont'd)

Individual	Rear-Sight Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
A	0.110	0.154	0.058	0.133	0.28	0.50	0.51
B	.110	.210	.117	.147	0.50	0.55	0.57
C	.110	.317	.286	.110	0.99	0.44	0.99
	Average	.227	.154	.130	0.59	0.50	0.69
A	.120	.243	.196	.110	0.75	0.48	0.79
B	.120	.241	.143	.164	0.64	0.51	0.65
C	.120	.369	.210	.267	0.81	1.17	1.26
	Average	.284	.183	.180	0.73	0.72	0.90
A	.130	.193	.106	.119	0.37	0.60	0.60
B	.130	.230	.140	.149	0.66	0.66	0.70
C	.130	.403	.249	.264	1.00	1.02	1.07
	Average	.275	.165	.177	0.68	0.76	0.79
A	.140	.272	.142	.219	0.55	0.79	0.84
B	.140	.192	.142	.106	0.60	0.39	0.61
C	.140	.433	.331	.222	1.03	1.27	1.36
	Average	.299	.205	.182	0.73	0.82	0.94
A	.480	.690	.498	.343	2.62	1.27	2.65
B	.480	.366	.307	.140	1.20	0.63	1.20
C	.480	.592	.485	.319	1.87	1.26	2.25
	Average	.549	.430	.267	1.90	1.05	2.30

It was found in preliminary trials that the problem of determining the most advantageous position of the rear sight was complex because the sight picture obtained does not remain constant for various distances of the rear sight when the diameter of the rear-sight aperture is proportional with the distance from the eye. Therefore, a test procedure was used which permitted the most advantageous size of rear-sight aperture to be determined for several positions of the rear sight. By plotting the smallest dispersion obtained at each distance it was possible to determine the most advantageous position of the rear-sight aperture. Graphs are attached (Figures 5 through 11) which show the most advantageous position of rear-sight aperture to be between 2 and 4 inches from the eye.

All individuals reported that the sights used with the 16-inch-distance were difficult to align with the aiming point because of poor definition. Two individuals reported that the use of this sight combination caused a headache.

Figure 5

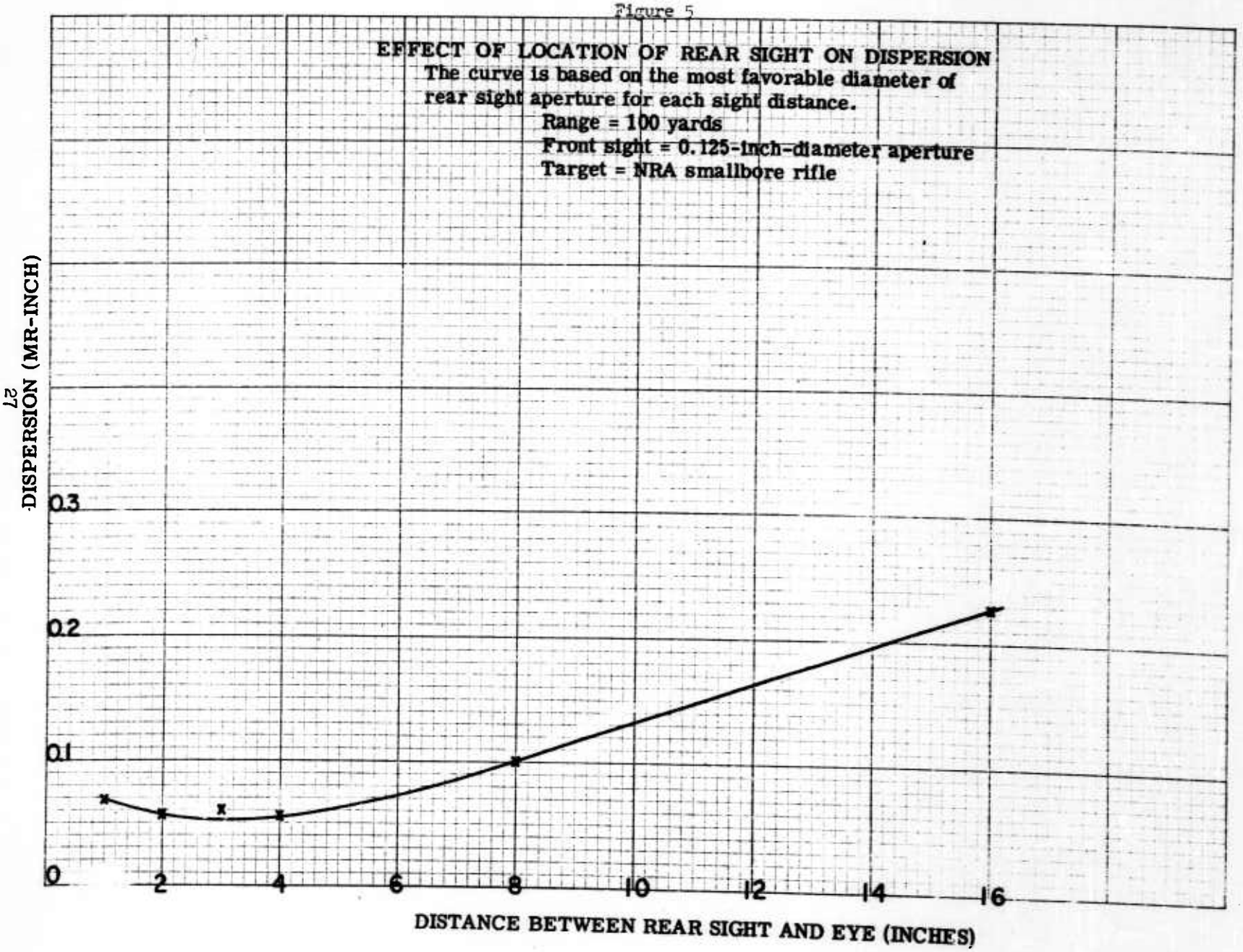

EFFECT OF LOCATION OF REAR SIGHT ON DISPERSION
The curve is based on the most favorable diameter of rear sight aperture for each sight distance.
Range = 100 yards
Front sight = 0.125-inch-diameter aperture
Target = NRA smallbore rifle
DISPERSION (MR-INCH)
0.3
0.2
0.1
0
2
4
6
8
10
12
14
16
DISTANCE BETWEEN REAR SIGHT AND EYE (INCHES)

Figure 6

EFFECT OF SIZE OF REAR SIGHT APERTURE ON DISPERSION

Range = 100 yards
Front sight = 0.125-inch-diameter aperture
Distance between rear sight and eye = 1.0 inch
Target = NRA smallbore rifle

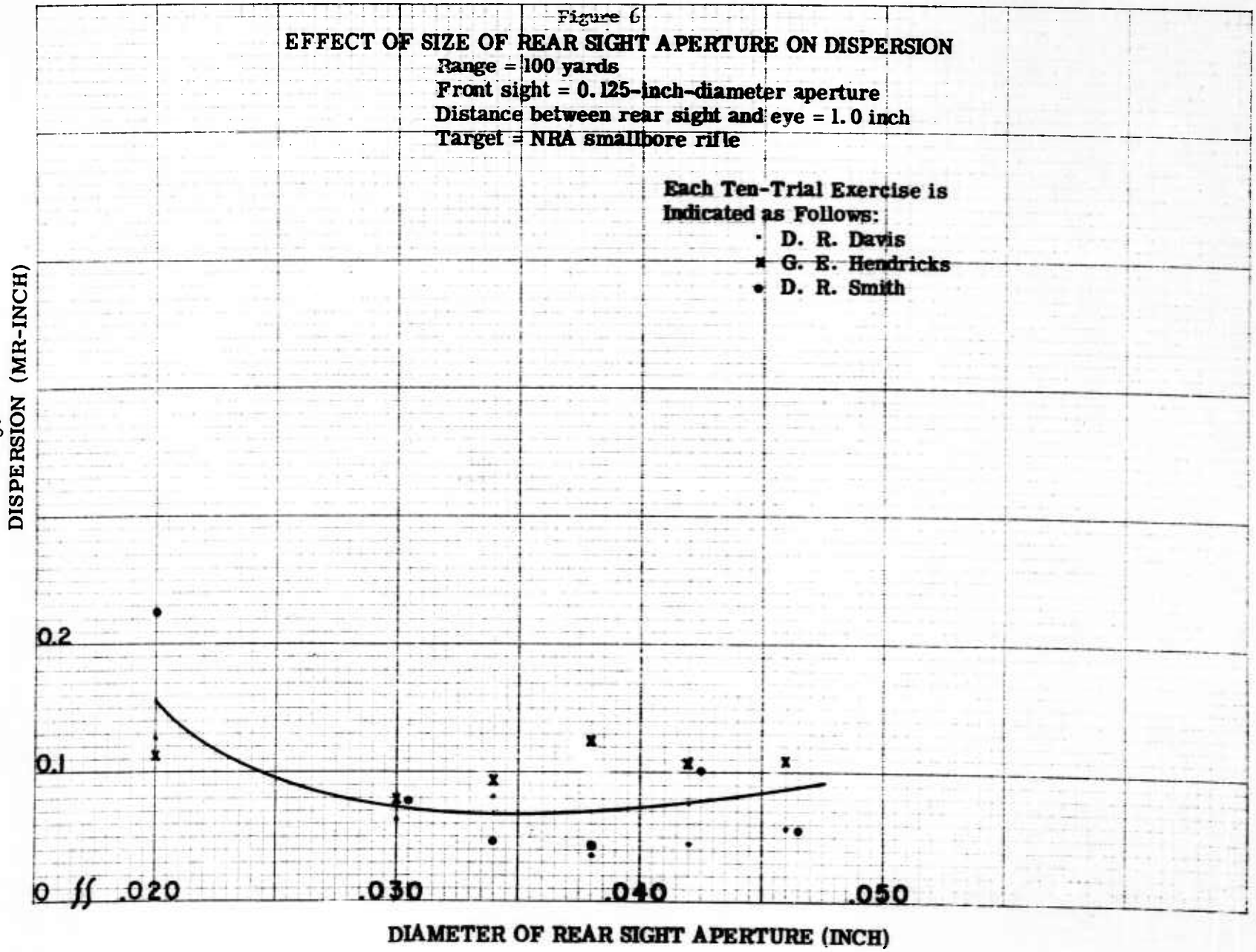


Figure 7

EFFECT OF SIZE OF REAR SIGHT APERTURE ON DISPERSION

Range = 100 yards
Front sight = 0.125-inch-diameter aperture
Distance between rear sight and eye = 2.0 inches
Target = NRA smallbore rifle

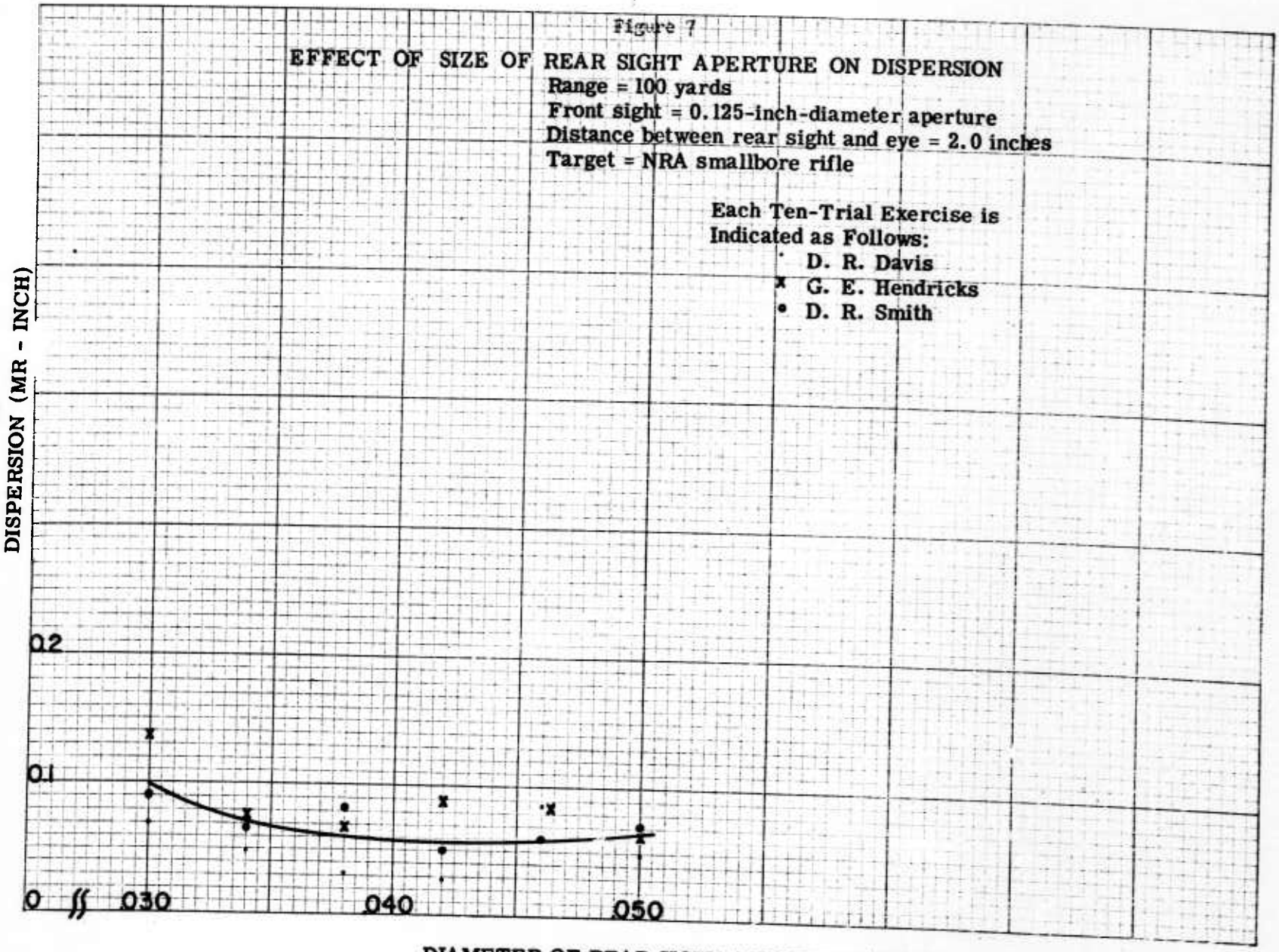


Figure 8

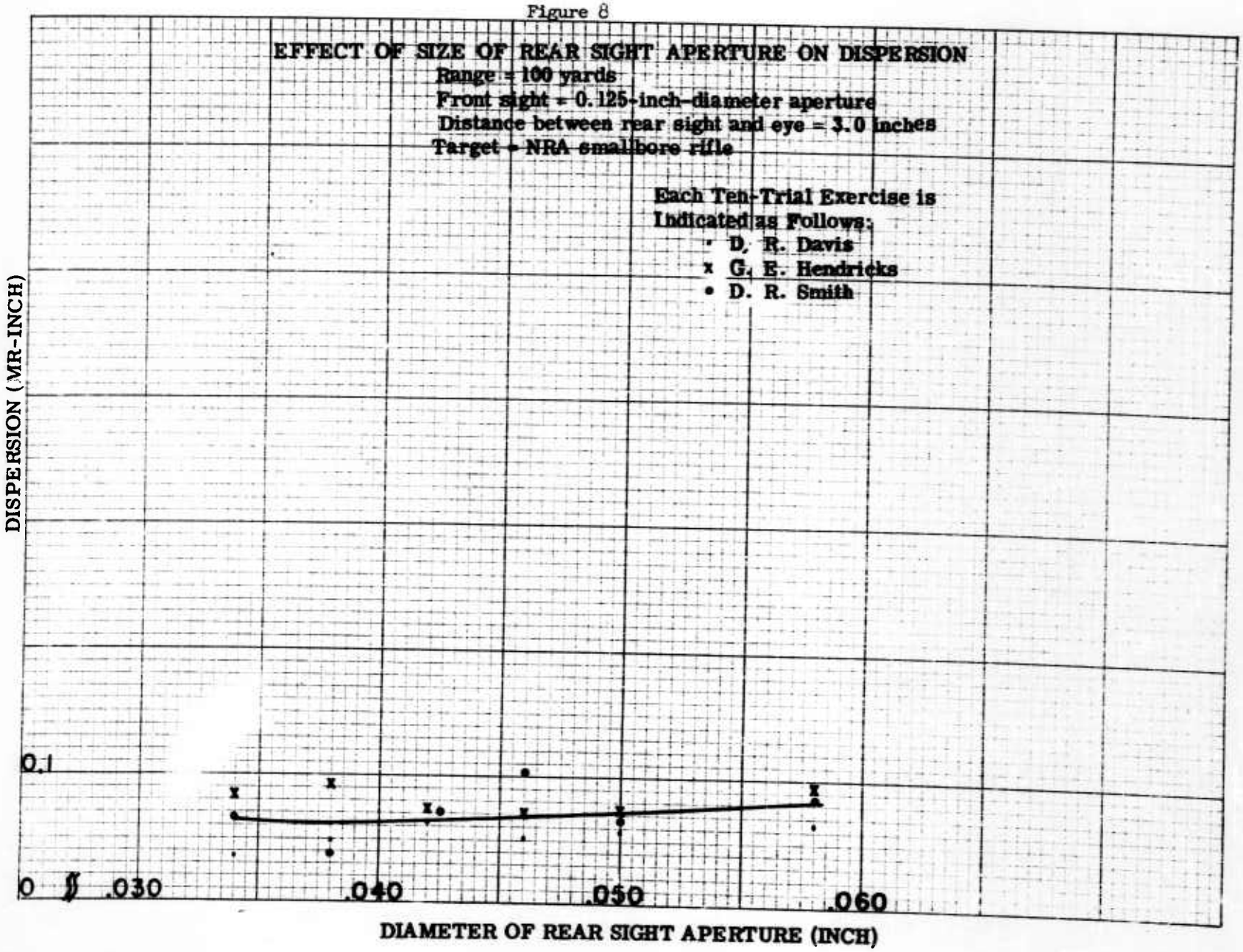

EFFECT OF SIZE OF REAR SIGHT APERTURE ON DISPERSION
Range = 100 yards
Front sight = 0.125-inch-diameter aperture
Distance between rear sight and eye = 3.0 inches
Target = NRA smallbore rifle
Each Ten-Trial Exercise is Indicated as Follows:
• D. R. Davis
x G. E. Hendricks
• D. R. Smith
DISPERSION (MR-INCH)
0.1
0
.030
.040
.050
.060
DIAMETER OF REAR SIGHT APERTURE (INCH)

Figure 9

EFFECT OF SIZE OF REAR SIGHT APERTURE ON DISPERSION

Range = 100 yards
Front sight = 0.125-inch-diameter aperture
Distance between rear sight and eye = 4.0 inches
Target = NRA smallbore rifle

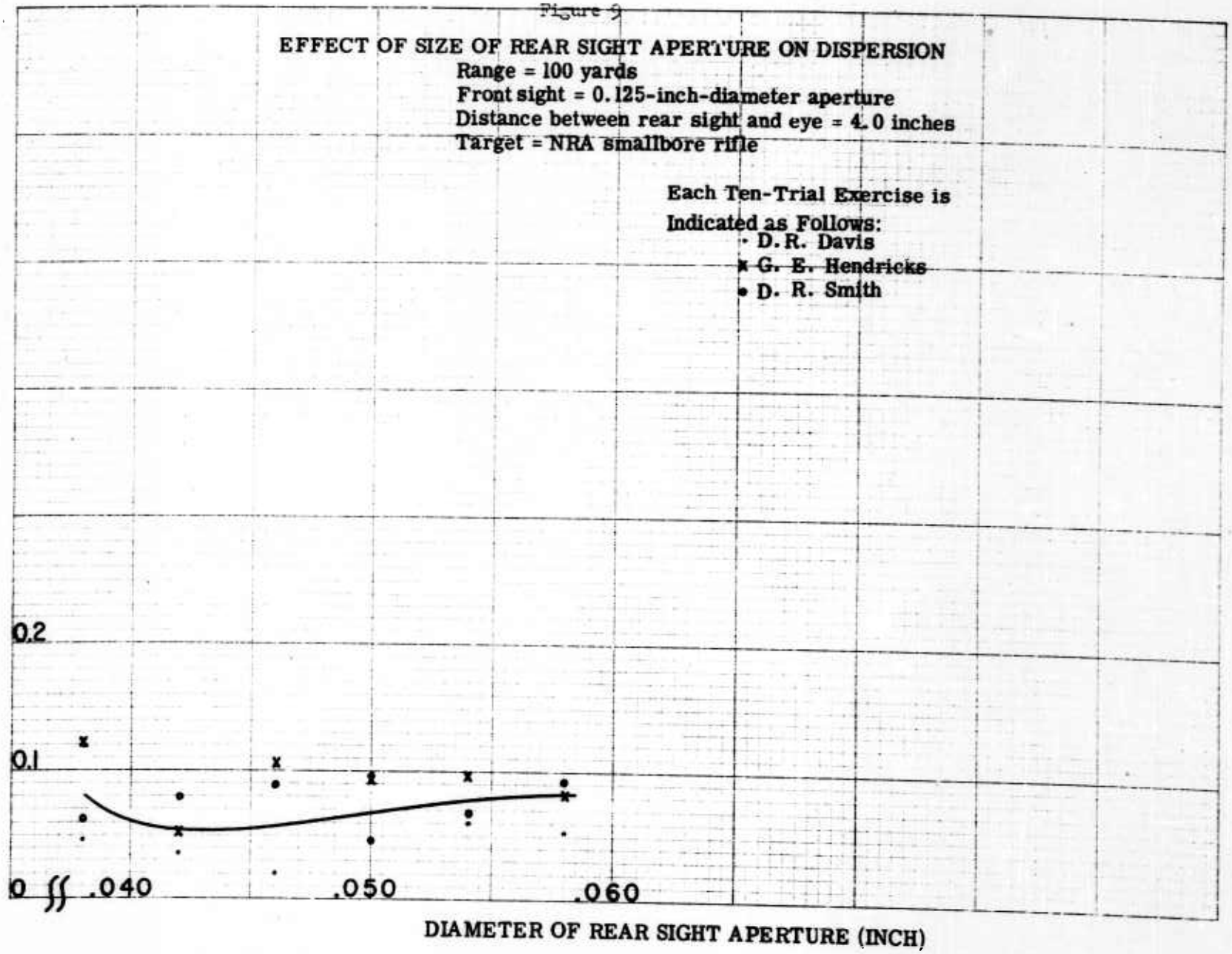
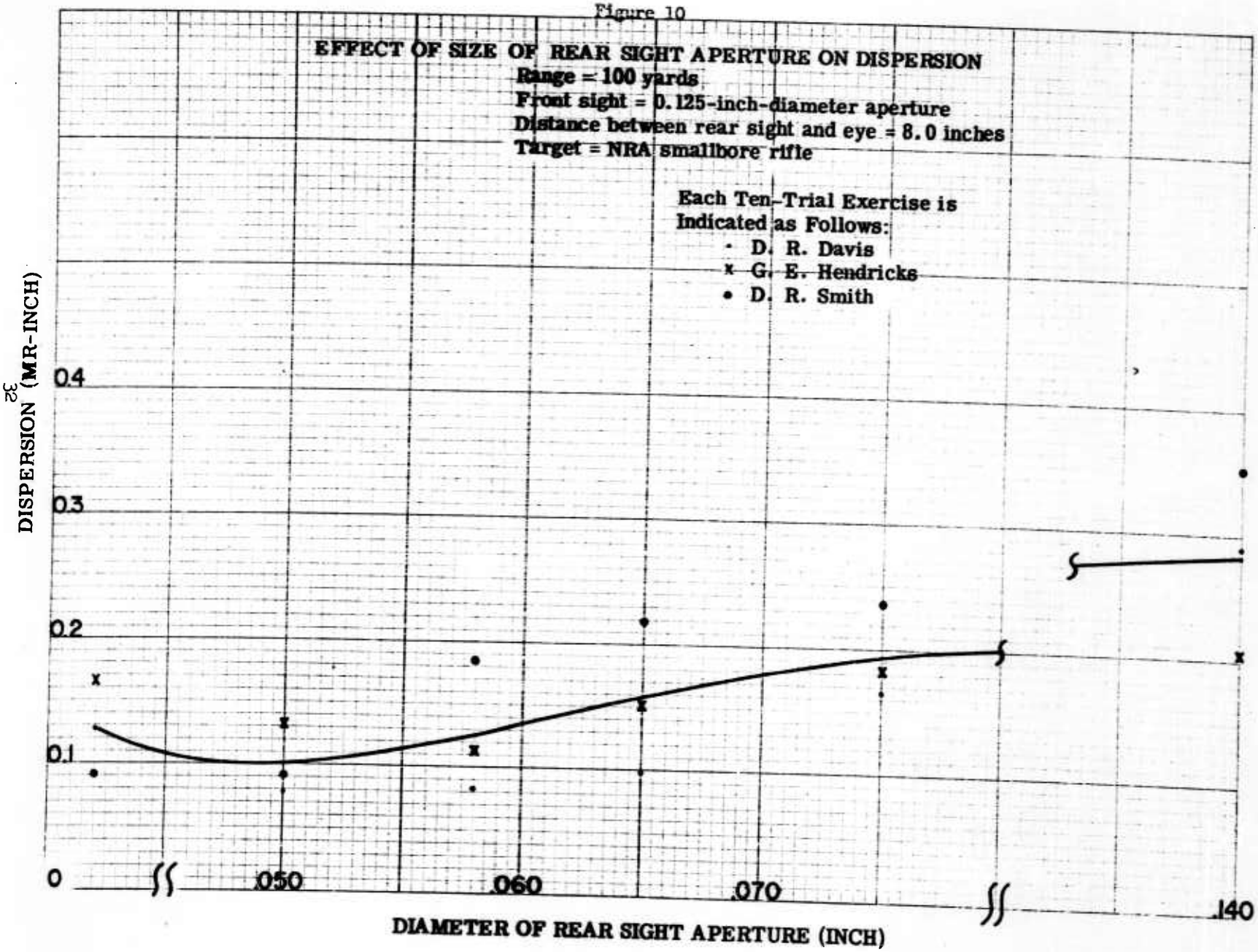


Figure 10


EFFECT OF SIZE OF REAR SIGHT APERTURE ON DISPERSION
Range = 100 yards
Front sight = 0.125-inch-diameter aperture
Distance between rear sight and eye = 8.0 inches
Target = NRA smallbore rifle
Each Ten-Trial Exercise is Indicated as Follows:
· D. R. Davis
x G. E. Hendricks
• D. R. Smith
DISPERSION (MR-INCH)
0.4
0.3
0.2
0.1
0
.050
.060
.070
.140
DIAMETER OF REAR SIGHT APERTURE (INCH)

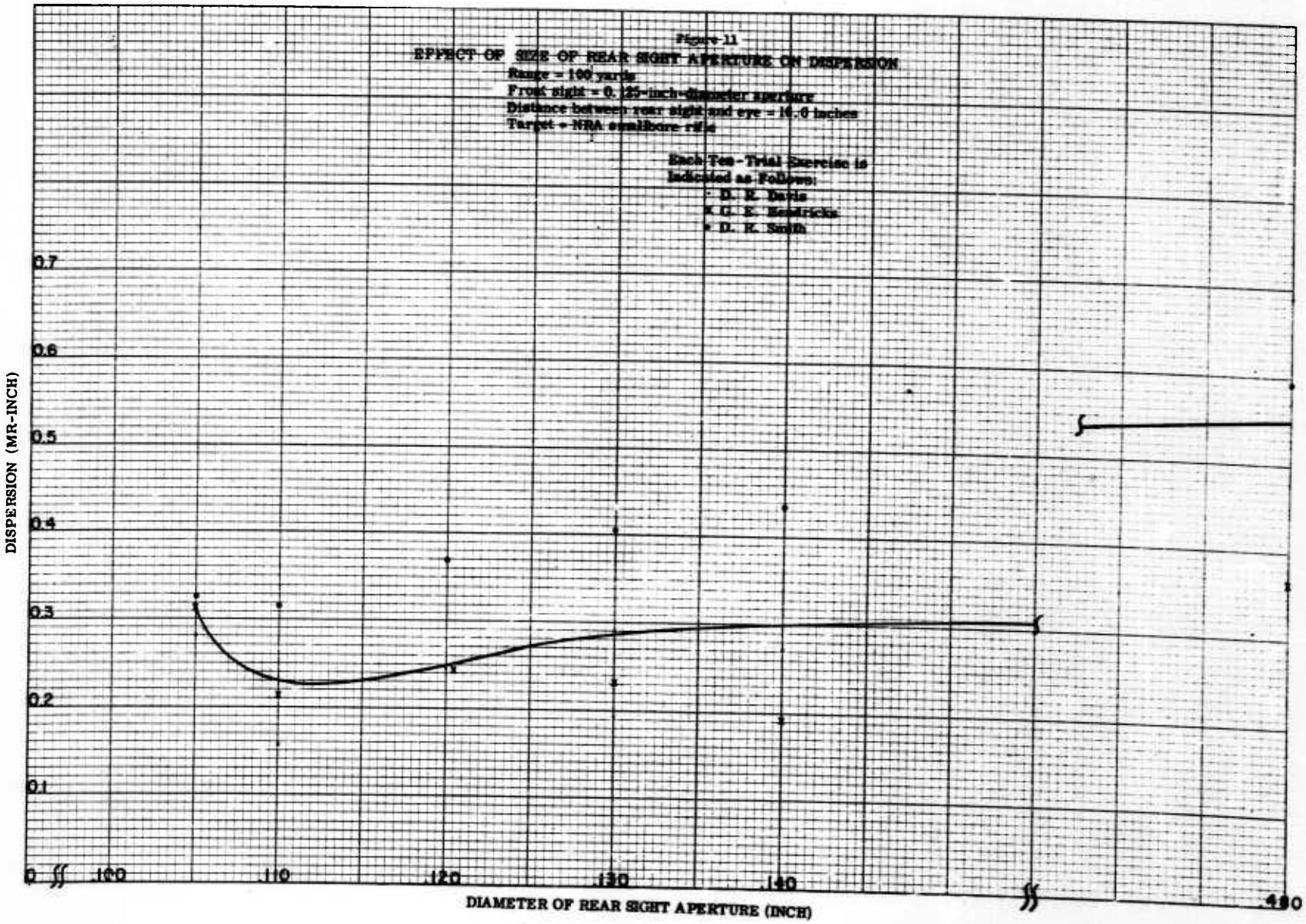


Figure 11
EFFECT OF SIZE OF REAR SIGHT APERTURE ON DISPERSION
Range = 100 yards
Front sight = 0.125-inch-diameter aperture
Distance between rear sight and eye = 16.6 inches
Target = NRA smallbore rifle
Each Ten-Trial Exercise is Indicated as Follows:
D. R. Davis
G. E. Kendricks
D. R. Smith
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
.100
.110
.120
.130
.140
.150
DISPERSION (MR-INCH)
DIAMETER OF REAR SIGHT APERTURE (INCH)

3.2.6 Test 6. Effect of Distance of Front Sight from Eye. Three individuals each conducted one ten-trial exercise at each of six sight positions on each of four days under the following conditions:

Range - 100 yards.
Light - natural daylight.
Rear Sight - 0.046-inch-diameter aperture.
Distance Between Rear Sight and Eye - 2 inches.
Target - 100-yard NRA smallbore rifle (6-inch-diameter aiming point).

A summary of results is given in Table VIII.

Table VIII. Test 6. Effect of Distance of Front Sight from Eye

By Day:

Day	Front-Sight Aperture from Eye	Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
1	10.0	0.035	0.321	0.199	0.214	0.78	0.80	0.99
	20.0	.075	.151	.070	.116	.29	.43	.50
	30.0	.105	.082	.055	.048	.21	.20	.26
	34.0	.125	.075	.059	.034	.22	.15	.24
	40.0	.140	.056	.034	.034	.12	.13	.15
	48.0	.170	.060	.043	.028	.13	.15	.17
Average			.124	.077	.079	.29	.31	.38
2	10.0	.035	.340	.252	.179	.98	.72	1.11
	20.0	.075	.122	.060	.098	.26	.34	0.37
	30.0	.105	.081	.048	.056	.20	.23	0.25
	34.0	.125	.071	.035	.057	.15	.24	0.26
	40.0	.140	.049	.032	.030	.15	.12	0.17
	48.0	.170	.066	.025	.055	.11	.21	0.22
Average			.122	.075	.079	.31	.31	0.40
3	10.0	.035	.408	.270	.249	1.07	.90	1.14
	20.0	.075	.103	.059	.074	0.19	.32	0.35
	30.0	.105	.049	.026	.037	0.11	.13	0.15
	34.0	.125	.057	.030	.045	0.11	.17	0.18
	40.0	.140	.060	.030	.047	0.13	.19	0.21
	48.0	.170	.060	.027	.047	0.13	.18	0.20
Average			.123	.074	.083	0.29	.32	0.37
4	10.0	.035	.384	.303	.190	0.98	.82	1.09
	20.0	.075	.088	.063	.051	0.24	.24	0.31
	30.0	.105	.057	.037	.037	0.14	.15	0.18
	34.0	.125	.064	.034	.045	0.12	.18	0.19
	40.0	.140	.048	.026	.034	0.11	.12	0.15
	48.0	.170	.046	.024	.034	0.10	.13	0.16
Average			.114	.081	.065	0.28	.27	0.35

Table VIII (Cont'd)

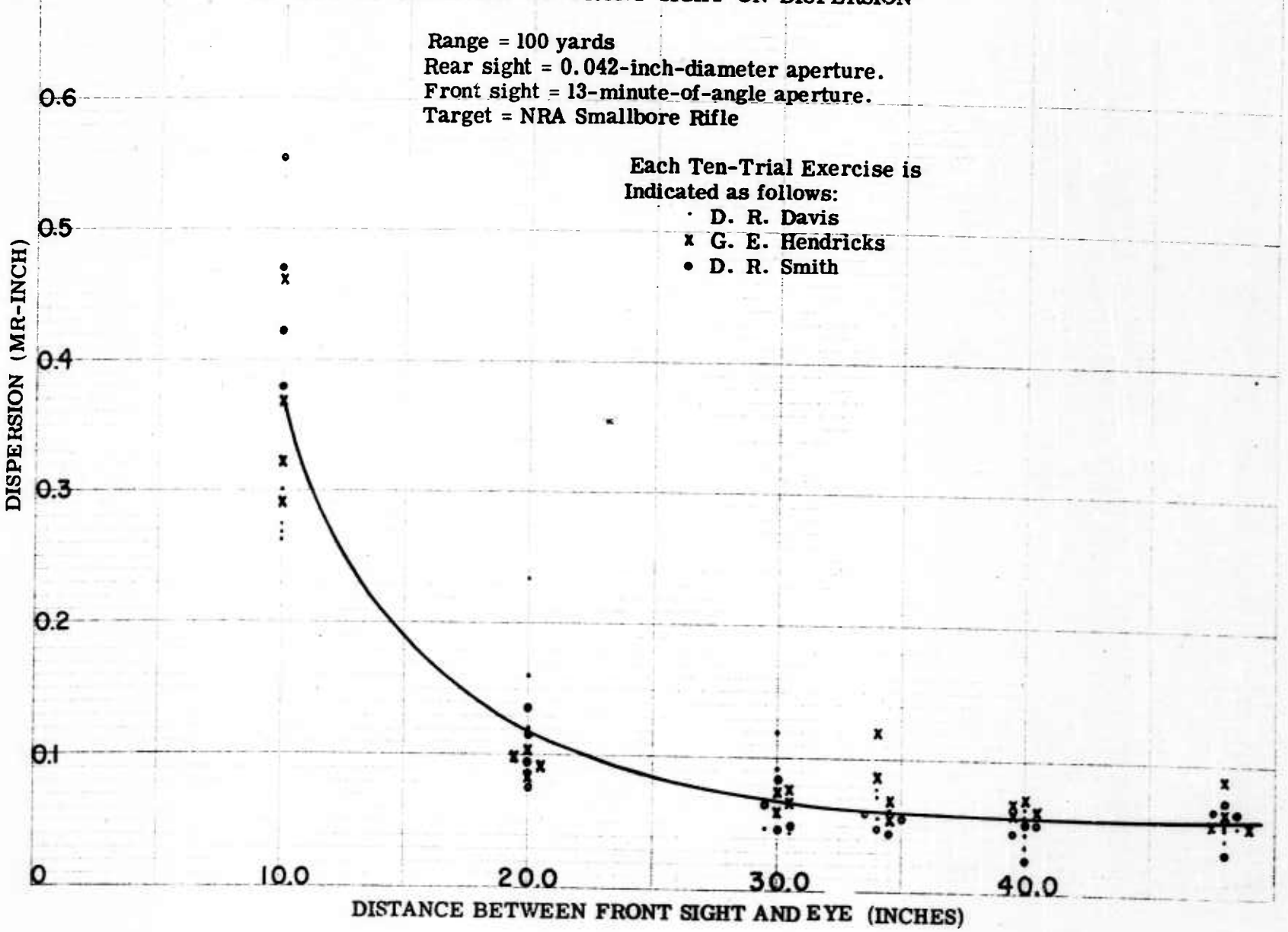
By Individual:

Individual	Front-Sight Aperture from Eye	Aperture Diameter	MR	MVD	MHD	EVD	EHD	ES
A	10.0	0.035	0.275	0.195	0.144	0.76	0.62	0.84
	20.0	.075	.150	.081	.114	.31	.42	.49
	30.0	.105	.075	.048	.047	.19	.20	.24
	34.0	.125	.066	.042	.044	.14	.19	.21
	40.0	.140	.051	.027	.036	.12	.14	.17
	48.0	.170	.052	.027	.034	.11	.14	.17
Average			.112	.070	.070	.27	.28	.35
B	10.0	.035	.358	.280	.171	.95	.70	1.07
	20.0	.075	.093	.055	.061	.23	.27	0.32
	30.0	.105	.067	.038	.048	.18	.17	0.22
	34.0	.125	.082	.050	.052	.19	.20	0.28
	40.0	.140	.064	.044	.036	.17	.16	0.19
	48.0	.170	.064	.034	.044	.14	.20	0.22
Average			.121	.084	.069	.31	.28	0.38
C	10.0	.035	.456	.293	.310	1.15	1.11	1.34
	20.0	.075	.105	.054	.079	0.19	0.30	0.34
	30.0	.105	.060	.040	.038	0.12	0.16	0.18
	34.0	.125	.052	.027	.040	0.11	0.16	0.17
	40.0	.140	.044	.020	.038	0.09	0.13	0.14
	48.0	.170	.058	.029	.044	0.10	0.16	0.17
Average			.129	.077	.092	0.29	0.34	0.39
Average for Three Individuals and Four Days:								
	10.0	.035	.363	.256	.208	0.96	0.81	1.08
	20.0	.075	.116	.063	.085	0.24	0.33	0.38
	30.0	.105	.067	.042	.044	0.16	0.18	0.21
	34.0	.125	.067	.040	.045	0.15	0.18	0.22
	40.0	.140	.053	.030	.036	0.13	0.14	0.17
	48.0	.170	.058	.030	.041	0.12	0.17	0.19
Average			.121	.077	.076	0.29	0.30	0.38

In this test phase the diameter of the front-sight aperture used for each sight distance was proportional with the distance from the eye to provide a uniform sight picture. A graph is attached (Figure 12) to show the effect of the distance of the front sight from the eye. The data show that the sighting error increases as the distance from the front sight is decreased from about 40 inches.

Figure 12

EFFECT OF LOCATION OF FRONT SIGHT ON DISPERSION



3.2.7 Test 7. Effectiveness of Various Sights. Three individuals each conducted four ten-trial exercises with each type of sight under the following conditions:

Range - 100 yards.
Light - natural daylight.
Target - 100-yard NRA smallbore rifle (6-inch-diameter aiming point).

A summary of results is given as Table IX.

Table IX. Test 7. Effectiveness of Various Sights

Exercise No.	Weapon	MR	MVD	MHD	EVD	EHD	ES
1	M1	0.217	0.150	0.137	0.50	0.54	0.67
2		.272	.217	.132	0.81	0.53	0.86
3		.247	.184	.109	1.05	0.42	1.08
4		.233	.189	.106	0.76	0.44	0.83
Average		.242	.185	.121	0.78	0.48	0.86
1	M2	.284	.220	.131	0.92	0.51	0.96
2		.366	.308	.152	1.29	0.65	1.34
3		.351	.265	.160	1.23	0.64	1.26
4		.353	.279	.170	1.30	0.74	1.41
Average		.338	.268	.153	1.18	0.64	1.24
1	M12	.680	.341	.489	1.48	1.81	1.99
2		.719	.352	.525	1.46	1.88	2.13
3		.691	.560	.301	1.98	1.38	2.31
4		.576	.301	.432	1.42	1.81	2.09
Average		.666	.388	.437	1.58	1.72	2.13
1	M14	.272	.214	.119	0.94	0.48	0.97
2		.296	.249	.125	0.91	0.43	0.95
3		.243	.191	.125	0.70	0.50	0.74
4		.228	.179	.106	0.73	0.41	0.75
Average		.260	.208	.119	0.82	0.46	0.85
1	M70	.556	.436	.241	1.90	0.93	1.98
2		.517	.400	.249	1.40	1.08	1.72
3		.459	.358	.195	1.73	0.85	1.76
4		.366	.252	.203	1.08	0.81	1.16
Average		.474	.362	.222	1.53	0.92	1.66
1	M94	.499	.334	.302	1.31	1.23	1.64
2		.344	.236	.187	1.01	0.79	1.08
3		.486	.394	.225	1.47	0.92	1.68
4		.547	.457	.211	2.00	0.82	2.08
Average		.469	.355	.231	1.45	0.94	1.62

Table IX (Cont'd)

Exercise No.	Weapon	MR	MVD	MHD	EVD	EHD	ES
1	M99	0.499	0.410	0.209	1.60	1.01	1.86
2		.452	.363	.208	1.29	0.80	1.40
3		.491	.393	.234	1.66	0.76	1.78
4		.513	.383	.275	1.54	1.01	1.69
Average		.489	.387	.232	1.52	0.99	1.68
1	M760	.540	.433	.244	1.87	1.06	2.01
2		.417	.344	.165	1.37	0.76	1.43
3		.490	.391	.204	1.42	0.78	1.45
4		.618	.512	.296	2.07	1.13	2.31
Average		.516	.420	.227	1.68	0.93	1.80
1	M760 with aperture sight	.326	1.73	.246	0.75	0.89	0.96
2		.240	.175	.122	0.79	0.52	0.82
3		.282	.194	.164	0.84	0.66	0.91
4		.291	.260	.107	0.83	0.39	0.91
Average		.285	.200	.160	0.80	0.62	0.90
1	M760 with 1X telescope	.179	.116	.118	0.46	0.51	0.59
2		.192	.149	.098	0.56	0.42	0.65
3		.228	.159	.138	0.61	0.57	0.72
4		.222	.138	.149	0.52	0.58	0.64
Average		.205	.140	.126	0.54	0.52	0.65
1	M760 with 2.5X telescope	.140	.086	.081	0.31	0.32	0.43
2		.076	.053	.043	0.25	0.20	0.26
3		.091	.041	.076	0.17	0.28	0.31
4		.110	.069	.070	0.29	0.34	0.43
Average		.104	.062	.068	0.26	0.28	0.36
1	M760 with 8X telescope	.058	.033	.042	0.12	0.15	0.17
2		.057	.037	.036	0.13	0.14	0.18
3		.050	.034	.030	0.15	0.12	0.16
4		.047	.026	.033	0.10	0.15	0.17
Average		.053	.032	.035	0.12	0.14	0.17

Table IX (Cont'd)

Individual	Weapon	MR	MVD	MHD	EVD	EHD	ES
A	M1	0.257	0.180	0.155	0.75	0.58	0.84
B		.216	.165	.110	0.62	0.48	0.68
C		.254	.210	.098	0.97	0.38	1.06
Average		.242	.185	.121	0.78	0.48	0.86
A	M2	.315	.232	.166	1.08	0.66	1.16
B		.389	.318	.149	1.33	0.61	1.38
C		.312	.254	.145	1.14	0.63	1.19
Average		.339	.268	.153	1.18	0.63	1.24
A	M12	.804	.392	.579	1.60	2.16	2.60
B		.573	.373	.333	1.46	1.46	1.81
C		.623	.401	.398	1.69	1.54	1.99
Average		.667	.389	.437	1.58	1.72	2.13
A	M14	.314	.259	.134	0.96	0.50	1.00
B		.222	.178	.106	0.73	0.42	0.77
C		.243	.187	.117	0.76	0.44	0.78
Average		.260	.208	.119	0.82	0.45	0.85
A	M70	.371	.238	.234	0.96	0.90	1.16
B		.645	.534	.238	2.26	1.08	2.39
C		.406	.311	.194	1.37	0.78	1.42
Average		.474	.361	.222	1.53	0.92	1.66
A	M94	.384	.259	.223	1.09	0.91	1.34
B		.511	.411	.236	1.53	0.98	1.74
C		.512	.396	.234	1.72	0.92	1.78
Average		.469	.355	.231	1.45	0.94	1.62
A	M99	.427	.320	.236	1.22	0.88	1.35
B		.525	.422	.240	1.66	0.83	1.84
C		.514	.419	.218	1.70	0.98	1.86
Average		.489	.387	.231	1.53	0.90	1.68
A	M760	.585	.521	.210	2.14	0.86	2.27
B		.454	.333	.240	1.38	0.99	1.53
C		.510	.406	.232	1.52	0.94	1.60
Average		.516	.420	.227	1.68	0.93	1.80

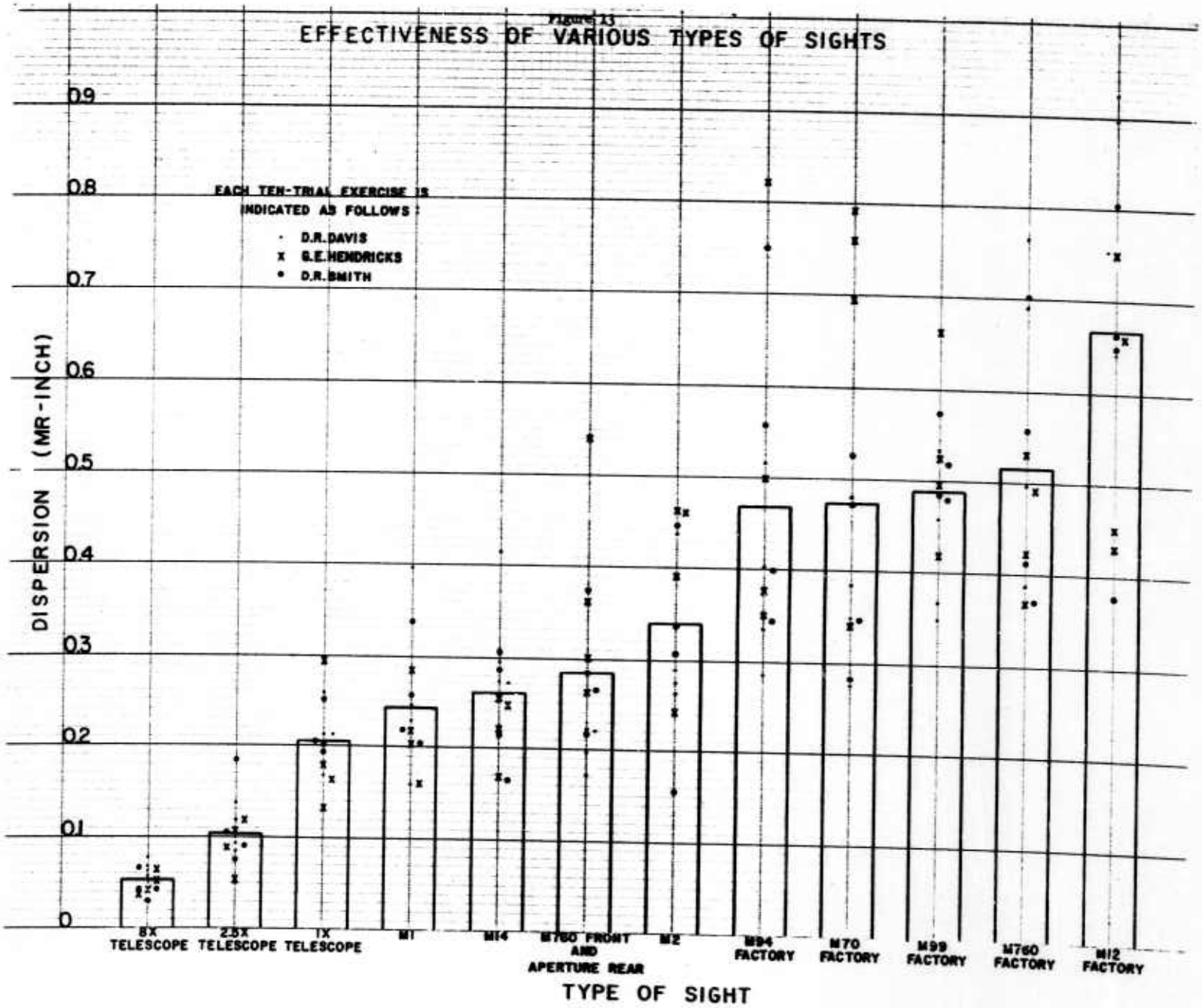
Table IX (Cont'd)

Individual	Weapon	MR	MVD	MHD	EVD	EHD	ES
A	M760 with aperture sight	0.202	0.114	0.144	0.52	0.54	0.66
B		.366	.273	.197	1.02	0.77	1.12
C		.285	.215	.138	0.87	0.54	0.92
Average		.284	.201	.160	0.80	0.62	0.90
A	M760 with 1X telescope	.212	.151	.128	0.59	0.52	0.68
B		.192	.124	.127	0.48	0.55	0.61
C		.212	.147	.122	0.54	0.50	0.66
Average		.205	.141	.126	0.54	0.52	0.65
A	M760 with 2.5X telescope	.108	.058	.079	0.24	0.32	0.35
B		.091	.064	.048	0.26	0.24	0.34
C		.114	.064	.076	0.26	0.29	0.38
Average		.104	.062	.068	0.25	0.28	0.36
A	M760 with 8X telescope	.065	.033	.050	0.12	0.18	0.20
B		.049	.033	.029	0.14	0.14	0.18
C		.045	.032	.026	0.12	0.11	0.14
Average		.053	.033	.035	0.13	0.14	0.17

A graph is attached (Figure 13) which shows a comparison of effectiveness of the various types of sights used in this test phase.

Figure 23

EFFECTIVENESS OF VARIOUS TYPES OF SIGHTS



3.2.8 Test 8. Effect of Illumination. Three individuals each conducted two 10-trial exercises with each of nine sights at six levels of illumination under the following conditions:

Range - 90 yards.
Target - reduced 100-yard NRA smallbore rifle (5.4-inch diameter aiming point).

A summary of results is given in Table X.

Table X. Test 8. Effect of Illumination

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M1 Rifle with Standard Sights							
1	0.3	0.688	0.474	0.405	1.63	1.72	2.10
2	0.3	.556	.440	.274	1.75	1.09	1.87
Average		.622	.457	.340	1.69	1.40	1.98
1	2.1	.232	.199	.092	0.71	0.34	0.74
2	2.1	.228	.178	.112	0.64	0.48	0.71
Average		.230	.188	.102	0.68	0.41	0.72
1	3.4	.257	.218	.115	0.76	0.45	0.84
2	3.4	.261	.231	.083	1.09	0.37	1.09
Average		.259	.224	.099	0.92	0.41	0.96
1	9.2	.311	.272	.098	1.15	0.39	1.16
2	9.2	.232	.207	.078	0.64	0.31	0.64
Average		.272	.240	.088	0.90	0.35	0.90
1	18.5	.178	.113	.115	0.45	0.52	0.60
2	18.5	.190	.151	.085	0.54	0.36	0.61
Average		.184	.132	.100	0.50	0.44	0.60
1	28.2	.181	.133	.099	0.54	0.33	0.61
2	28.2	.251	.208	.105	0.73	0.44	0.79
Average		.216	.170	.102	0.64	0.38	0.70

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M1 Rifle with Standard Sights							
A	0.3	0.568	0.467	0.285	1.68	1.30	2.07
B	0.3	.606	.454	.328	1.68	1.42	2.13
C	0.3	.691	.448	.406	1.71	1.50	1.76
Average		.622	.456	.340	1.69	1.41	1.99
A	2.1	.191	.158	.076	0.62	0.32	0.68
B	2.1	.246	.188	.129	0.70	0.55	0.73
C	2.1	.253	.219	.100	0.72	0.36	0.76
Average		.230	.188	.102	0.68	0.41	0.72

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
A	3.4	0.186	0.147	0.086	0.73	0.30	0.74
B	3.4	.296	.246	.126	0.94	0.51	1.01
C	3.4	.296	.280	.084	1.10	0.42	1.16
Average		.259	.224	.099	0.92	0.41	0.97
A	9.2	.190	.163	.070	0.68	0.26	0.68
B	9.2	.284	.239	.112	0.76	0.46	0.77
C	9.2	.340	.317	.084	1.24	0.34	1.26
Average		.271	.240	.089	0.89	0.35	0.90
A	18.5	.138	.102	.077	0.42	0.32	0.44
B	18.5	.164	.092	.112	0.29	0.50	0.54
C	18.5	.250	.202	.111	0.78	0.50	0.83
Average		.184	.132	.100	0.50	0.44	0.60
A	28.2	.136	.107	.065	0.38	0.26	0.42
B	28.2	.226	.162	.126	0.56	0.50	0.70
C	28.2	.288	.242	.116	0.98	0.38	0.98
Average		.217	.170	.102	0.64	0.38	0.70

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M1 Rifle with Standard Rear and Ithaca Post Front Sights							
1	0.3	.428	.294	.243	1.28	1.24	1.64
2	0.3	.602	.332	.443	1.25	1.65	1.82
Average		.515	.313	.343	1.26	1.44	1.73
1	2.1	.343	.248	.177	0.92	0.64	1.12
2	2.1	.300	.249	.133	0.98	0.51	1.04
Average		.322	.248	.155	0.95	0.58	1.08
1	3.4	.244	.178	.142	0.71	0.50	0.84
2	3.4	.215	.152	.126	0.58	0.45	0.62
Average		.230	.165	.134	0.64	0.48	0.73
1	9.2	.249	.215	.085	0.96	0.32	0.97
2	9.2	.244	.182	.127	0.75	0.49	0.79
Average		.246	.198	.106	0.86	0.40	0.88
1	18.5	.361	.328	.099	1.30	0.37	1.30
2	18.5	.250	.188	.130	0.82	0.56	0.94
Average		.306	.258	.114	1.06	0.46	1.12
1	28.2	.323	.306	.063	1.07	0.30	1.10
2	28.2	.258	.193	.121	1.00	0.42	1.02
Average		.290	.250	.092	1.04	0.36	1.06

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M1 Rifle with Standard Rear and Ithaca Post Front Sight							
A	0.3	0.471	0.294	0.283	1.26	1.33	1.58
B	0.3	.580	.285	.462	1.08	1.72	1.80
C	0.3	.494	.360	.284	1.45	1.28	1.80
Average		.515	.313	.343	1.26	1.44	1.73
A	2.1	.234	.188	.106	0.83	0.38	0.84
B	2.1	.367	.250	.228	0.78	0.74	1.11
C	2.1	.364	.308	.132	1.24	0.62	1.29
Average		.322	.249	.155	0.95	0.58	1.08
A	3.4	.158	.106	.090	0.46	0.32	0.46
B	3.4	.308	.214	.191	0.78	0.66	0.98
C	3.4	.224	.174	.120	0.70	0.45	0.74
Average		.230	.165	.134	0.65	0.48	0.73
A	9.2	.207	.176	.072	0.86	0.24	0.86
B	9.2	.258	.182	.138	0.80	0.52	0.84
C	9.2	.274	.238	.107	0.90	0.46	0.94
Average		.246	.199	.106	0.85	0.41	0.88
A	18.5	.224	.184	.086	0.88	0.38	0.88
B	18.5	.326	.268	.142	1.06	0.54	1.14
C	18.5	.365	.320	.116	1.24	0.47	1.33
Average		.305	.257	.115	1.06	0.46	1.12
A	28.2	.315	.292	.064	1.20	0.31	1.20
B	28.2	.309	.268	.090	1.13	0.33	1.16
C	28.2	.248	.188	.122	0.78	0.45	0.82
Average		.291	.249	.092	1.04	0.36	1.06

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M1 Rifle with Standard Rear and Ithaca Bead Front Sights							
1	0.3	.712	.605	.283	2.57	1.03	2.58
2	0.3	.551	.434	.256	1.57	1.03	1.83
Average		.632	.520	.270	2.07	1.03	2.20
1	2.1	.348	.295	.120	1.02	0.54	1.09
2	2.1	.242	.168	.137	0.64	0.66	0.79
Average		.295	.232	.128	0.83	0.60	0.94
1	3.4	.257	.192	.128	0.71	0.58	0.82
2	3.4	.252	.187	.132	0.78	0.50	0.87
Average		.254	.190	.130	0.74	0.54	0.84
1	9.2	.217	.167	.101	0.78	0.43	0.83
2	9.2	.227	.169	.126	0.66	0.52	0.79
Average		.222	.168	.114	0.72	0.48	0.81
1	18.5	.233	.162	.128	0.73	0.57	0.92
2	18.5	.231	.132	.156	0.56	0.75	0.81
Average		.232	.147	.142	0.64	0.66	0.86
1	28.2	.231	.140	.149	0.59	0.51	0.74
2	28.2	.163	.103	.090	0.55	0.39	0.56
Average		.197	.122	.120	0.57	0.45	0.65

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M1 Rifle with Standard Rear and Ithaca Bead Front Sights							
A	0.3	0.473	0.446	0.126	1.52	0.46	1.54
B	0.3	.720	.513	.374	2.28	1.50	2.68
C	0.3	.701	.600	.310	2.41	1.12	2.41
Average		.631	.520	.270	2.07	1.03	2.21
A	2.1	.342	.306	.096	1.11	0.46	1.12
B	2.1	.302	.214	.162	0.66	0.73	0.82
C	2.1	.241	.174	.128	0.72	0.60	0.90
Average		.295	.231	.129	0.83	0.60	0.95
A	3.4	.290	.264	.080	0.92	0.36	0.93
B	3.4	.215	.141	.143	0.54	0.54	0.66
C	3.4	.260	.163	.166	0.76	0.72	0.96
Average		.255	.189	.130	0.74	0.54	0.85
A	9.2	.140	.110	.074	0.46	0.32	0.50
B	9.2	.236	.154	.158	0.58	0.66	0.81
C	9.2	.290	.241	.108	1.12	0.45	1.14
Average		.222	.168	.113	0.72	0.48	0.82
A	18.5	.157	.115	.079	0.66	0.35	0.68
B	18.5	.295	.160	.208	0.61	0.97	0.98
C	18.5	.244	.166	.139	0.68	0.67	0.94
Average		.232	.147	.142	0.65	0.66	0.87
A	28.2	.128	.074	.082	0.38	0.34	0.44
B	28.2	.198	.084	.152	0.43	0.54	0.58
C	28.2	.267	.207	.125	0.91	0.47	0.92
Average		.198	.122	.120	0.57	0.45	0.65

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M1 Rifle with Multilite Sights							
1	0.3	.906	.676	.502	2.56	1.98	3.00
2	0.3	.815	.577	.515	2.18	2.20	2.91
Average		.860	.626	.508	2.37	2.09	2.96
1	2.1	.478	.333	.279	1.34	1.03	1.51
2	2.1	.435	.293	.262	1.21	1.22	1.43
Average		.456	.313	.270	1.28	1.12	1.47
1	3.4	.541	.372	.334	1.24	1.35	1.62
2	3.4	.522	.353	.292	1.47	1.01	1.59
Average		.532	.362	.313	1.36	1.18	1.60
1	9.2	.596	.434	.298	1.84	1.28	1.96
2	9.2	.595	.409	.343	1.72	1.21	1.75
Average		.596	.422	.320	1.78	1.24	1.86
1	18.5	.556	.398	.301	1.74	1.20	1.87
2	18.5	.504	.286	.344	1.09	1.41	1.54
Average		.530	.342	.322	1.42	1.30	1.70
1	28.2	.557	.344	.337	1.34	1.64	1.85
2	28.2	.457	.206	.354	0.91	1.37	1.44
Average		.507	.275	.346	1.12	1.50	1.64

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M1 Rifle with Multilite Sights							
A	0.3	0.544	0.310	0.395	1.24	1.50	1.70
B	0.3	0.938	.736	.504	2.42	2.32	3.21
C	0.3	1.100	.832	.625	3.44	2.45	3.95
Average		0.861	.626	.508	2.37	2.09	2.95
A	2.1	.388	.248	.238	1.12	1.10	1.30
B	2.1	.350	.207	.248	0.82	0.92	1.06
C	2.1	.632	.484	.325	1.90	1.36	2.06
Average		.457	.313	.270	1.28	1.13	1.47
A	3.4	.516	.399	.252	1.44	0.96	1.48
B	3.4	.384	.198	.271	0.76	1.20	1.20
C	3.4	.694	.490	.416	1.86	1.38	2.12
Average		.531	.362	.313	1.35	1.18	1.60
A	9.2	.586	.474	.262	1.76	1.00	1.76
B	9.2	.408	.228	.291	1.00	1.14	1.20
C	9.2	.792	.564	.409	2.60	1.60	2.60
Average		.595	.422	.321	1.79	1.25	1.85
A	18.5	.530	.264	.393	1.20	1.54	1.71
B	18.5	.272	.177	.180	0.60	0.74	0.88
C	18.5	.788	.585	.394	2.46	1.64	2.53
Average		.530	.342	.322	1.42	1.31	1.71
A	28.2	.460	.180	.360	0.94	1.61	1.63
B	28.2	.404	.240	.280	0.98	0.96	1.19
C	28.2	.658	.406	.398	1.46	1.95	2.12
Average		.507	.275	.346	1.13	1.51	1.65

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M94 Rifle with Open Hunting Sights							
1	0.3	0.890	0.731	0.365	3.17	1.36	3.22
2	0.3	1.158	.960	.537	3.87	1.92	3.88
Average		1.024	.846	.451	3.52	1.64	3.55
1	2.1	0.436	.370	.165	1.45	0.62	1.51
2	2.1	.424	.373	.144	1.84	0.69	1.88
Average		.430	.372	.154	1.64	0.66	1.70
1	3.4	.452	.409	.143	1.40	0.59	1.45
2	3.4	.521	.459	.199	1.57	0.75	1.64
Average		.486	.434	.171	1.48	0.67	1.54
1	9.2	.326	.254	.149	1.10	0.63	1.22
2	9.2	.459	.405	.166	1.41	0.63	1.42
Average		.392	.330	.158	1.26	0.63	1.32
1	18.5	.345	.283	.124	1.31	0.58	1.49
2	18.5	.508	.477	.129	1.64	0.62	1.66
Average		.426	.380	.126	1.48	0.60	1.58
1	28.2	.335	.275	.153	1.08	0.54	1.10
2	28.2	.334	.277	.150	1.00	0.55	1.07
Average		.334	.276	.152	1.04	0.54	1.08

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M94 Rifle with Open Hunting Sights							
A	0.3	0.932	0.706	0.466	2.82	1.66	2.84
B	0.3	1.116	.976	.424	4.06	1.63	4.06
C	0.3	1.023	.856	.463	3.69	1.64	3.75
Average		1.024	.846	.451	3.52	1.64	3.55
A	2.1	0.354	.311	.131	1.28	0.56	1.30
B	2.1	.418	.323	.191	1.69	.86	1.78
C	2.1	.518	.482	.140	1.96	.56	2.00
Average		.430	.372	.154	1.64	.66	1.69
A	3.4	.410	.386	.114	1.45	.49	1.47
B	3.4	.542	.451	.234	1.44	.82	1.48
C	3.4	.508	.464	.165	1.57	.70	1.68
Average		.487	.434	.171	1.49	.67	1.54
A	9.2	.353	.326	.110	1.18	.46	1.20
B	9.2	.321	.247	.158	0.93	.65	1.08
C	9.2	.503	.416	.204	1.65	.74	1.68
Average		.392	.330	.157	1.25	.62	1.32
A	18.5	.396	.374	.082	1.50	.46	1.50
B	18.5	.498	.413	.194	1.41	.90	1.67
C	18.5	.386	.353	.104	1.52	.45	1.56
Average		.427	.380	.127	1.48	.60	1.58
A	28.2	.319	.278	.125	1.03	.52	1.08
B	28.2	.316	.260	.141	1.05	.46	1.07
C	28.2	.370	.290	.189	1.04	.65	1.10
Average		.335	.276	.152	1.04	.54	1.08

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M12 Shotgun							
1	0.3	0.754	0.573	0.395	2.00	1.39	2.14
2	0.3	1.061	.888	.434	3.33	2.08	3.59
Average		0.908	.730	.414	2.66	1.74	2.86
1	2.1	.884	.596	.530	2.09	1.92	2.65
2	2.1	.594	.426	.314	1.65	1.23	1.84
Average		.739	.511	.422	1.87	1.58	2.24
1	3.4	.732	.567	.344	1.98	1.44	2.13
2	3.4	.442	.340	.236	1.38	0.84	1.42
Average		.587	.454	.290	1.68	1.14	1.78
1	9.2	.536	.370	.282	1.65	1.12	1.71
2	9.2	.378	.241	.238	1.02	0.88	1.28
Average		.457	.306	.260	1.34	1.00	1.50
1	18.5	.609	.325	.432	1.31	1.76	2.08
2	18.5	.492	.378	.250	1.64	0.99	1.88
Average		.550	.352	.341	1.48	1.38	1.98
1	28.2	.451	.301	.304	1.12	1.06	1.32
2	28.2	.466	.316	.270	1.24	1.11	1.55
Average		.458	.308	.287	1.18	1.08	1.44

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M12 Shotgun							
A	0.3	0.719	0.486	0.436	1.98	1.78	2.26
B	0.3	0.612	.456	.325	1.58	1.32	1.72
C	0.3	1.392	1.250	.483	4.43	2.10	4.62
Average		0.908	0.731	.415	2.66	1.73	2.87
A	2.1	.776	.575	.400	2.46	1.68	2.66
B	2.1	.542	.324	.375	1.16	1.26	1.47
C	2.1	.898	.635	.490	1.99	1.79	2.60
Average		.739	.511	.422	1.87	1.58	2.24
A	3.4	.586	.472	.258	1.75	0.94	1.76
B	3.4	.484	.338	.288	1.30	1.05	1.51
C	3.4	.690	.550	.325	1.98	1.42	2.05
Average		.587	.453	.290	1.68	1.14	1.77
A	9.2	.495	.275	.344	1.24	1.42	1.58
B	9.2	.362	.234	.205	1.16	0.76	1.22
C	9.2	.513	.406	.231	1.60	0.82	1.69
Average		.457	.305	.260	1.33	1.00	1.50
A	18.5	.730	.384	.540	1.42	2.16	2.70
B	18.5	.368	.253	.227	1.02	0.76	1.22
C	18.5	.554	.416	.256	2.00	1.21	2.02
Average		.551	.351	.341	1.48	1.38	1.98
A	28.2	.611	.446	.366	1.68	1.20	1.90
B	28.2	.325	.166	.242	0.70	0.94	1.00
C	28.2	.440	.314	.252	1.16	1.10	1.40
Average		.459	.309	.287	1.18	1.08	1.43

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M760 Rifle with 1-X Telescope							
1	0.3	0.458	0.329	0.266	1.29	1.10	1.48
2	0.3	.381	.269	.233	0.99	0.93	1.25
Average		.420	.299	.250	1.14	1.02	1.36
1	2.1	.204	.116	.143	0.51	0.58	0.69
2	2.1	.191	.124	.111	.47	.51	.57
Average		.198	.120	.127	.49	.54	.63
1	3.4	.244	.162	.145	.63	.52	.77
2	3.4	.189	.105	.131	.46	.48	.59
Average		.217	.134	.138	.54	.50	.68
1	9.2	.220	.121	.151	.43	.69	.73
2	9.2	.173	.097	.131	.38	.63	.71
Average		.197	.109	.141	.40	.66	.72
1	18.5	.208	.136	.137	.53	.55	.70
2	18.5	.160	.090	.107	.31	.54	.55
Average		.184	.113	.122	.42	.54	.62
1	28.2	.280	.180	.172	.78	.67	1.02
2	28.2	.184	.133	.095	.45	.41	0.55
Average		.232	.156	.134	.62	.54	.78

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M760 Rifle with 1-X Telescope							
A	0.3	0.338	0.234	0.216	1.02	0.78	1.04
B	0.3	.602	.432	.376	1.52	1.51	2.10
C	0.3	.319	.231	.158	0.90	0.76	0.95
Average		.420	.299	.250	1.15	1.02	1.36
A	2.1	.190	.104	.126	0.49	0.58	0.61
B	2.1	.240	.169	.136	.64	.58	.72
C	2.1	.162	.086	.118	.34	.48	.54
Average		.197	.120	.127	.49	.55	.62
A	3.4	.264	.214	.114	.88	.46	.90
B	3.4	.222	.116	.162	.47	.62	.70
C	3.4	.164	.070	.138	.29	.43	.45
Average		.216	.133	.138	.55	.50	.68
A	9.2	.218	.153	.138	.56	.71	.86
B	9.2	.199	.116	.136	.44	.54	.56
C	9.2	.174	.058	.149	.21	.73	.74
Average		.197	.109	.141	.40	.66	.72
A	18.5	.276	.177	.182	.66	.84	1.02
B	18.5	.144	.102	.080	.36	.40	0.44
C	18.5	.132	.060	.104	.25	.40	.40
Average		.184	.113	.122	.42	.55	.62
A	28.2	.348	.242	.202	.86	.82	1.08
B	28.2	.196	.160	.079	.74	.31	0.77
C	28.2	.152	.068	.120	.24	.48	.50
Average		.232	.157	.134	.61	.54	.78

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M760 Rifle with 2.5-X Telescope							
1	0.3	0.142	0.110	0.066	0.42	0.25	0.43
2	0.3	.117	.102	.042	.38	.22	.41
Average		.130	.106	.054	.40	.24	.42
1	2.1	.057	.047	.024	.18	.09	.20
2	2.1	.062	.044	.036	.16	.13	.18
Average		.060	.046	.030	.17	.11	.19
1	3.4	.071	.049	.041	.22	.16	.25
2	3.4	.068	.052	.031	.26	.16	.30
Average		.070	.050	.036	.24	.16	.28
1	9.2	.078	.043	.055	.18	.25	.28
2	9.2	.073	.063	.027	.26	.13	.28
Average		.076	.053	.041	.22	.19	.28
1	18.5	.059	.042	.027	.14	.13	.18
2	18.5	.066	.053	.028	.21	.14	.22
Average		.062	.048	.028	.18	.14	.20
1	28.2	.084	.056	.054	.25	.18	.28
2	28.2	.055	.049	.022	.17	.08	.18
Average		.070	.052	.038	.21	.13	.23

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M760 Rifle with 2.5-X Telescope							
A	0.3	0.118	0.100	0.039	0.40	0.22	0.42
B	0.3	.112	.094	.046	.35	.14	.37
C	0.3	.160	.123	.078	.46	.34	.48
Average		.130	.106	.054	.40	.23	.42
A	2.1	.046	.038	.020	.14	.06	.14
B	2.1	.076	.066	.028	.26	.10	.26
C	2.1	.058	.032	.041	.12	.16	.17
Average		.060	.045	.030	.17	.11	.19
A	3.4	.054	.040	.021	.21	.10	.22
B	3.4	.082	.062	.038	.30	.16	.32
C	3.4	.074	.048	.048	.22	.22	.28
Average		.070	.050	.036	.24	.16	.27
A	9.2	.060	.050	.023	.22	.10	.24
B	9.2	.068	.052	.032	.21	.14	.23
C	9.2	.098	.056	.068	.23	.33	.37
Average		.075	.053	.041	.22	.19	.28
A	18.5	.043	.030	.021	.14	.11	.14
B	18.5	.061	.051	.020	.16	.08	.18
C	18.5	.084	.061	.042	.22	.20	.28
Average		.062	.047	.028	.17	.13	.20
A	28.2	.047	.038	.025	.18	.10	.20
B	28.2	.080	.070	.034	.26	.12	.26
C	28.2	.080	.050	.055	.20	.18	.24
Average		.069	.053	.038	.21	.13	.23

Exercise No.	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M760 Rifle with 8-X Telescope							
1	0.3	0.065	0.038	0.043	0.16	0.23	0.26
2	0.3	.052	.027	.040	.10	.13	.15
Average		.058	.032	.042	.13	.18	.20
1	2.1	.039	.021	.026	.10	.11	.15
2	2.1	.049	.021	.038	.09	.14	.16
Average		.044	.021	.032	.10	.12	.16
1	3.4	.058	.022	.045	.09	.18	.22
2	3.4	.025	.020	.013	.08	.05	.09
Average		.042	.021	.029	.08	.12	.16
1	9.2	.031	.020	.017	.09	.08	.11
2	9.2	.042	.035	.016	.15	.07	.15
Average		.036	.028	.016	.12	.08	.13
1	18.5	.030	.020	.019	.08	.08	.11
2	18.5	.035	.025	.021	.10	.07	.10
Average		.032	.022	.020	.09	.08	.10
1	28.2	.023	.013	.016	.05	.06	.08
2	28.2	.036	.023	.022	.09	.11	.16
Average		.030	.018	.019	.07	.08	.12

Table X (Cont'd)

Individual	Light Intensity (Candles/sq ft)	MR	MVD	MHD	EVD	EHD	ES
M760 Rifle with 8-X Telescope							
A	0.3	0.048	0.032	0.028	0.14	0.09	0.15
B	0.3	.061	.039	.043	.12	.18	.19
C	0.3	.066	.026	.054	.12	.27	.28
Average		.058	.032	.042	.13	.18	.21
A	2.1	.028	.024	.011	.10	.05	.10
B	2.1	.042	.023	.030	.10	.14	.16
C	2.1	.062	.017	.056	.08	.20	.20
Average		.044	.021	.032	.09	.13	.15
A	3.4	.032	.026	.016	.10	.06	.11
B	3.4	.028	.022	.015	.09	.06	.10
C	3.4	.064	.015	.056	.06	.22	.25
Average		.041	.021	.029	.08	.11	.15
A	9.2	.032	.024	.014	.09	.06	.10
B	9.2	.038	.028	.016	.15	.08	.16
C	9.2	.040	.031	.020	.12	.10	.12
Average		.036	.028	.017	.12	.08	.13
A	18.5	.034	.026	.022	.08	.06	.10
B	18.5	.034	.024	.018	.12	.06	.12
C	18.5	.030	.017	.022	.06	.10	.10
Average		.033	.022	.021	.09	.07	.11
A	28.2	.036	.028	.016	.12	.06	.14
B	28.2	.018	.010	.013	.04	.06	.08
C	28.2	.034	.016	.028	.05	.14	.14
Average		.029	.018	.019	.07	.09	.12

Graphs are attached (Figures 14 through 22) which show the effect of illumination on dispersion.

Figure 14

EFFECT OF ILLUMINATION ON DISPERSION
Standard Sights on M1 Rifle
Dispersion at 90 yards using a 5.4-inch-diameter aiming point.

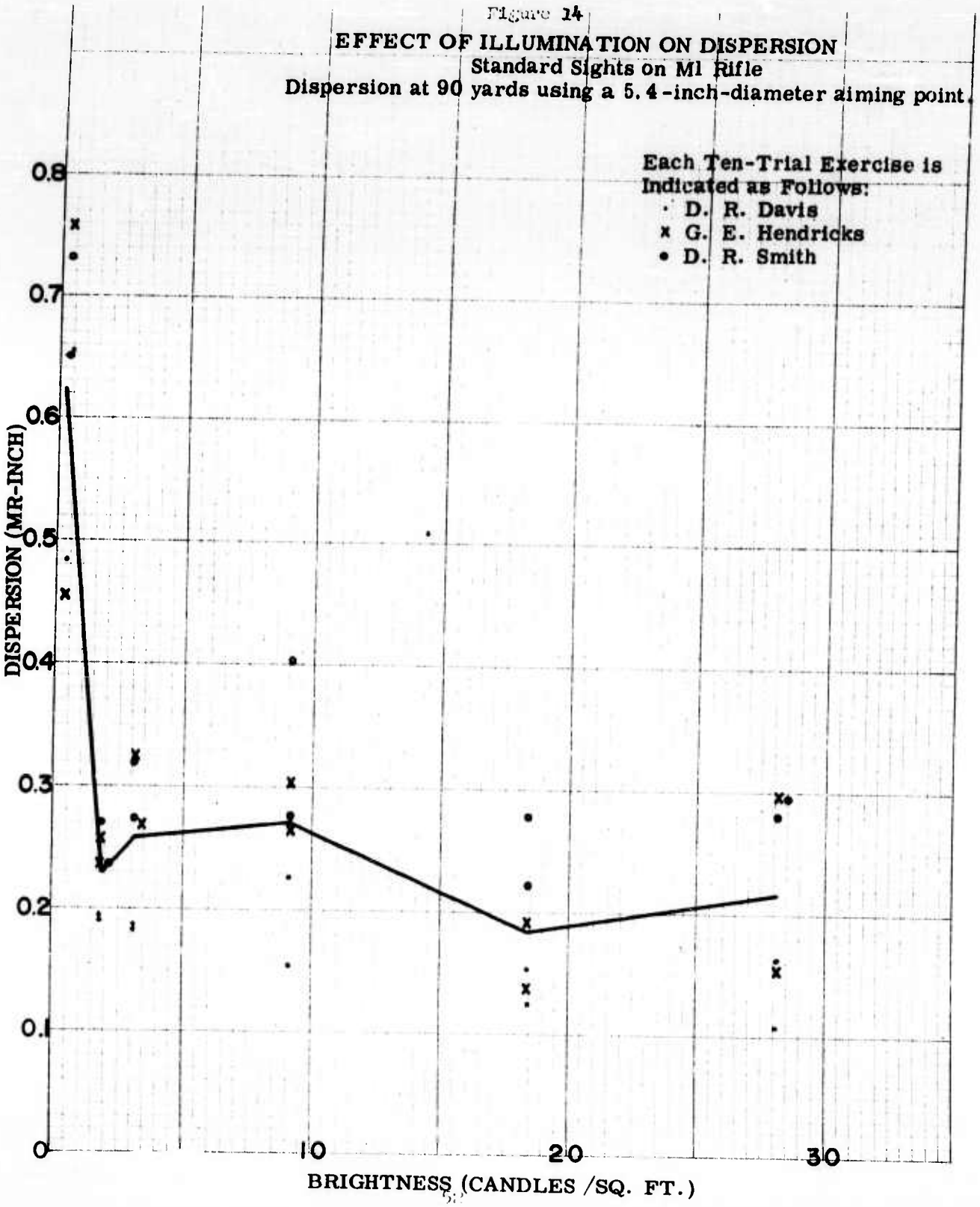


Figure 15

EFFECT OF ILLUMINATION ON DISPERSION
Ithaca Post Front and Standard Rear Sight on M1 Rifle
Dispersion at 90 yards using a 5.4-inch-diameter aiming point.

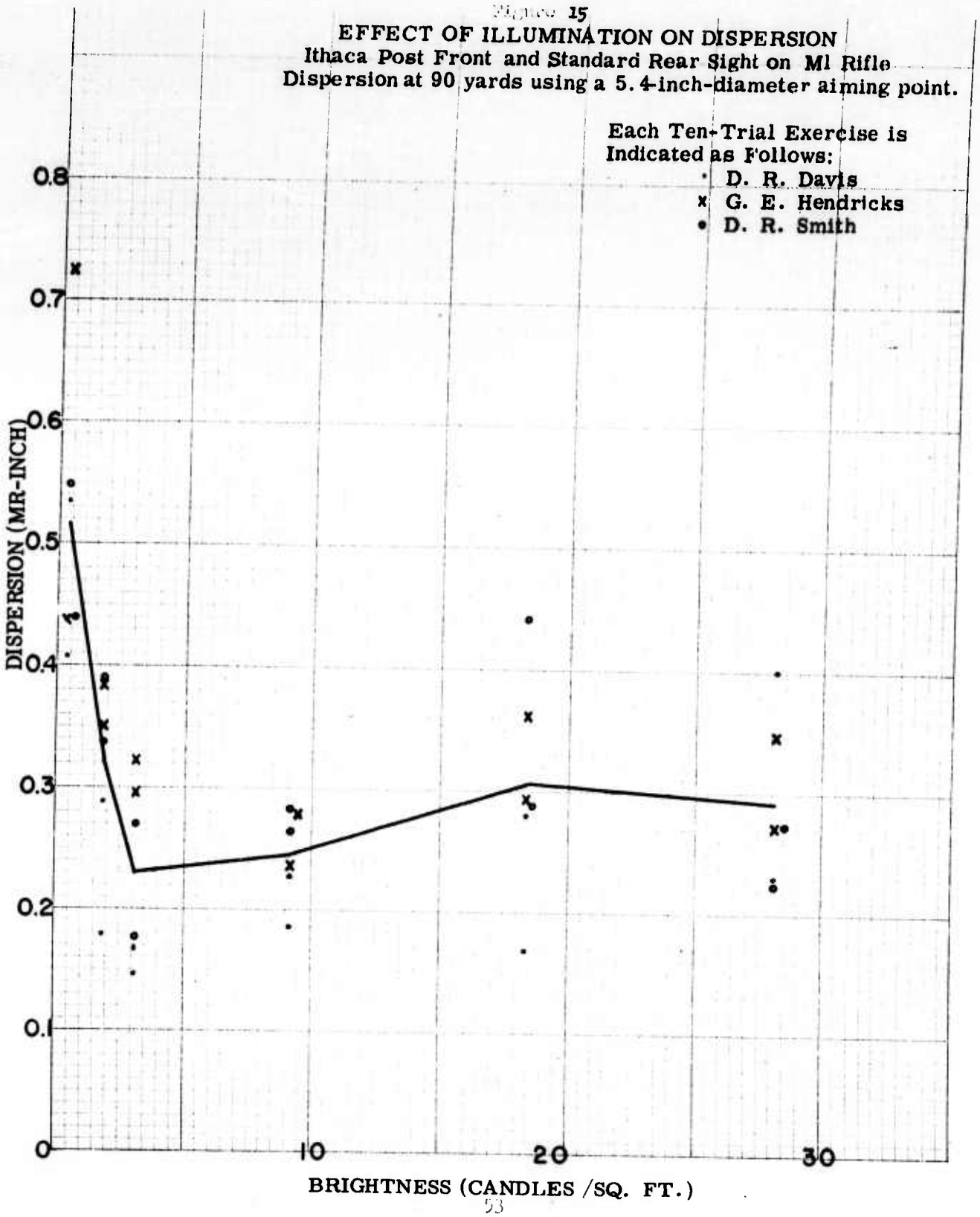


Figure 16

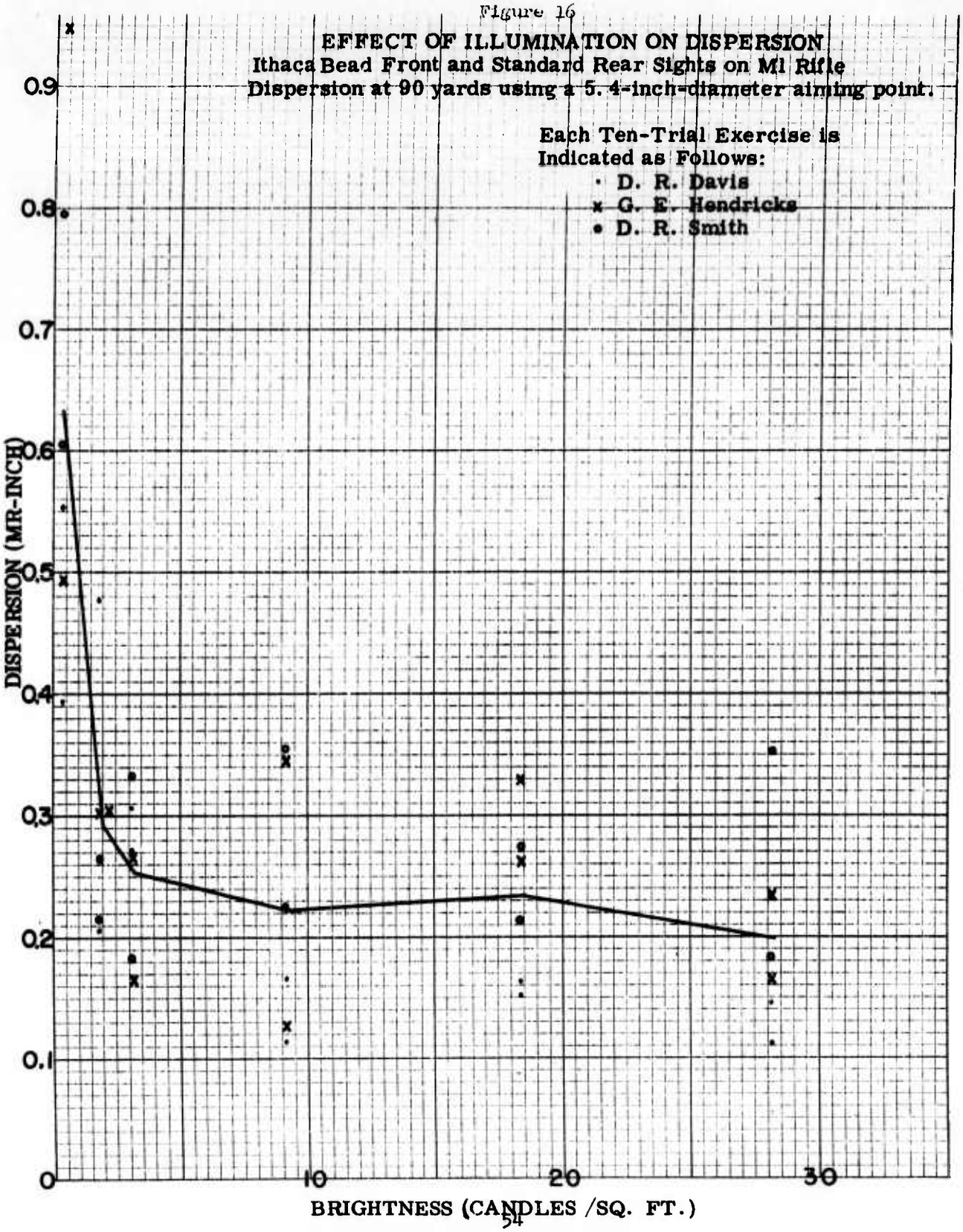

EFFECT OF ILLUMINATION ON DISPERSION
Ithaca Bead Front and Standard Rear Sights on M1 Rifle
Dispersion at 90 yards using a 5.4-inch-diameter aiming point.
Each Ten-Trial Exercise is Indicated as Follows:
· D. R. Davis
x G. E. Hendricks
• D. R. Smith
DISPERSION (MR-INCH)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
20
30
BRIGHTNESS (CANDLES /SQ. FT.)

Figure 17

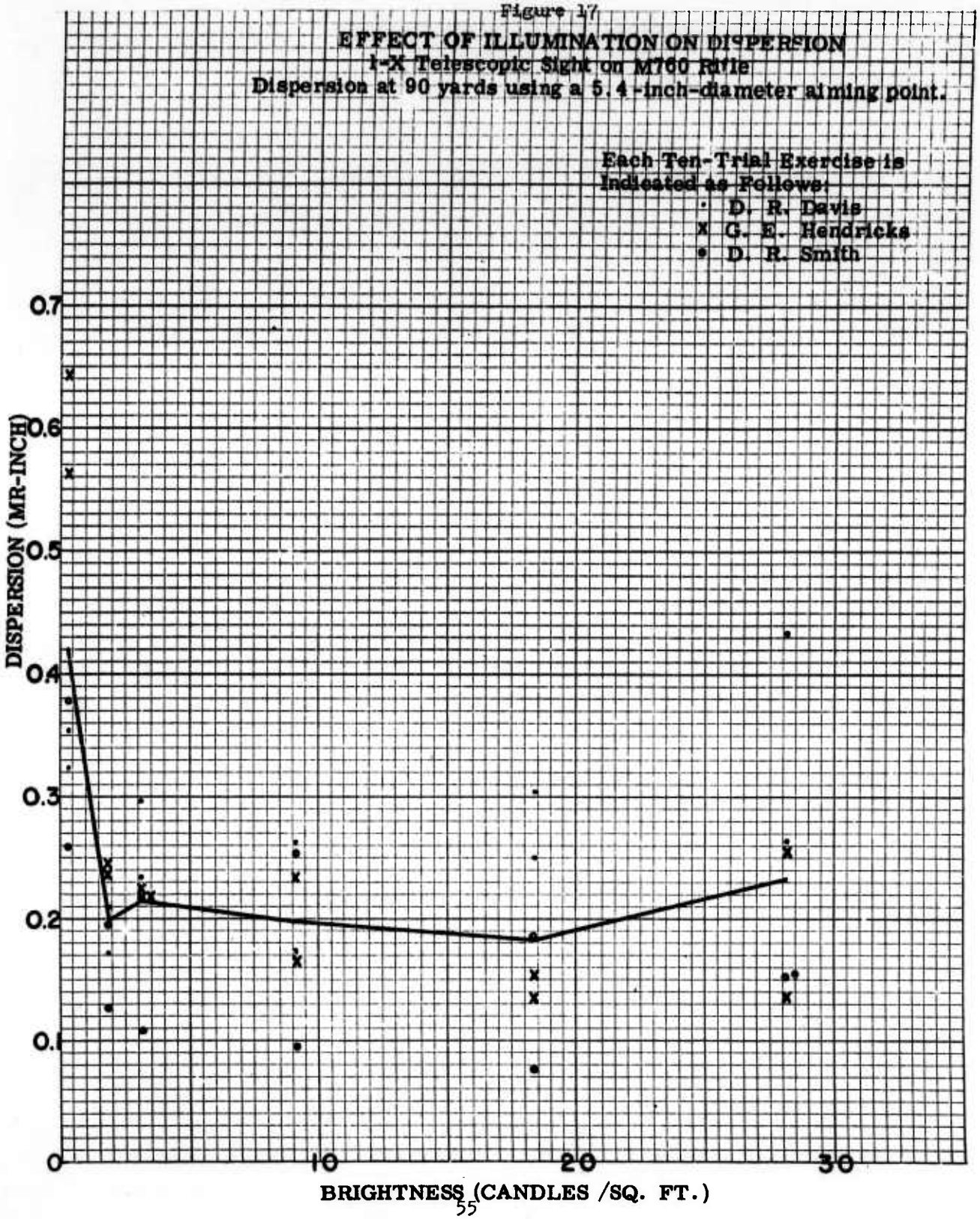

EFFECT OF ILLUMINATION ON DISPERSION
1-X Telescopic Sight on M700 Rifle
Dispersion at 90 yards using a 5.4-inch-diameter aiming point.
Each Ten-Trial Exercise is Indicated as Follows:
· D. R. Davis
x G. E. Hendricks
• D. R. Smith
DISPERSION (MR-INCH)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
20
30
BRIGHTNESS (CANDLES /SQ. FT.)

Figure 18

EFFECT OF ILLUMINATION ON DISPERSION

2.5-X Telescopic Sight on M780 Rifle

Dispersion at 90 yards using a 5.4-inch-diameter aiming point.

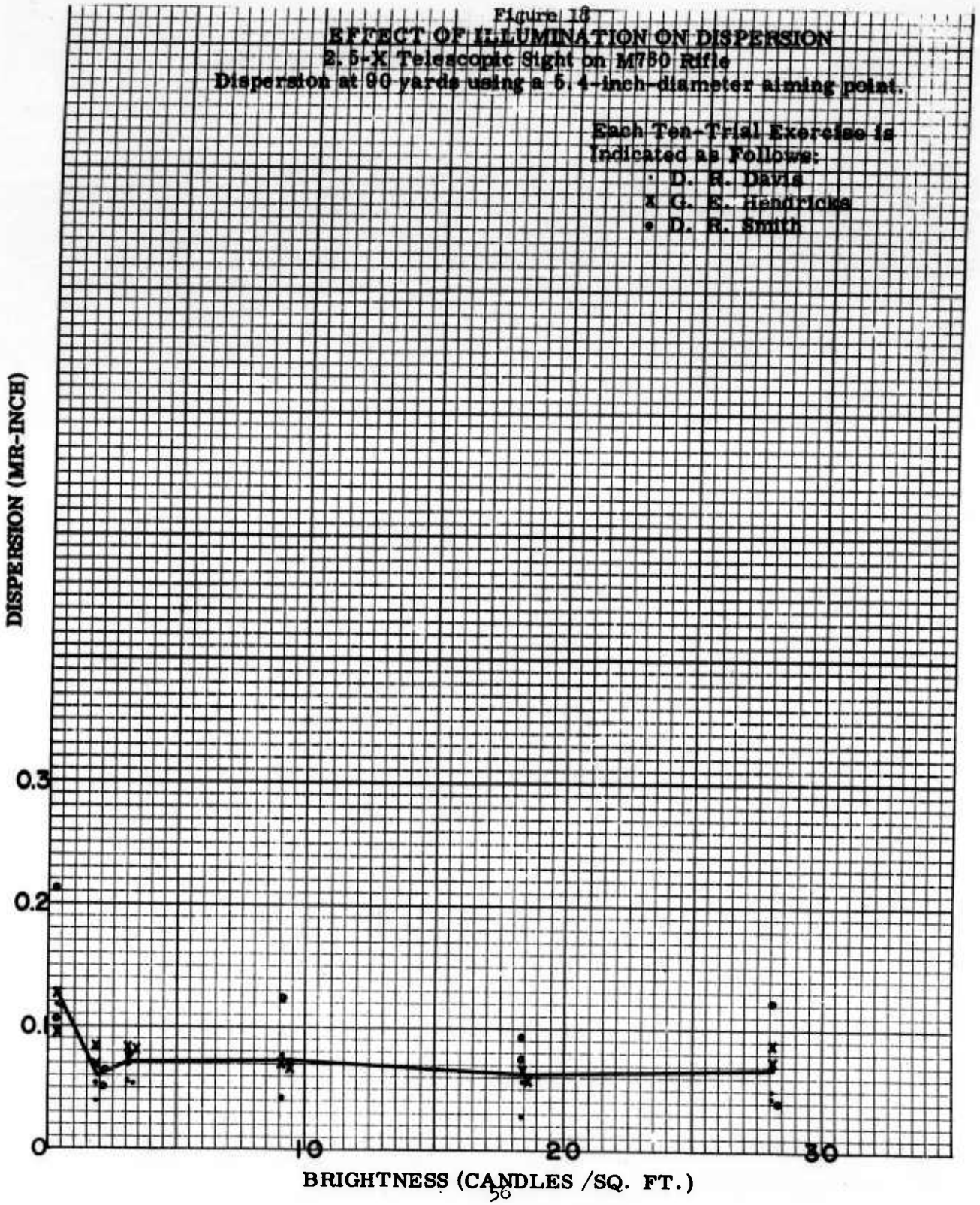


Figure 19

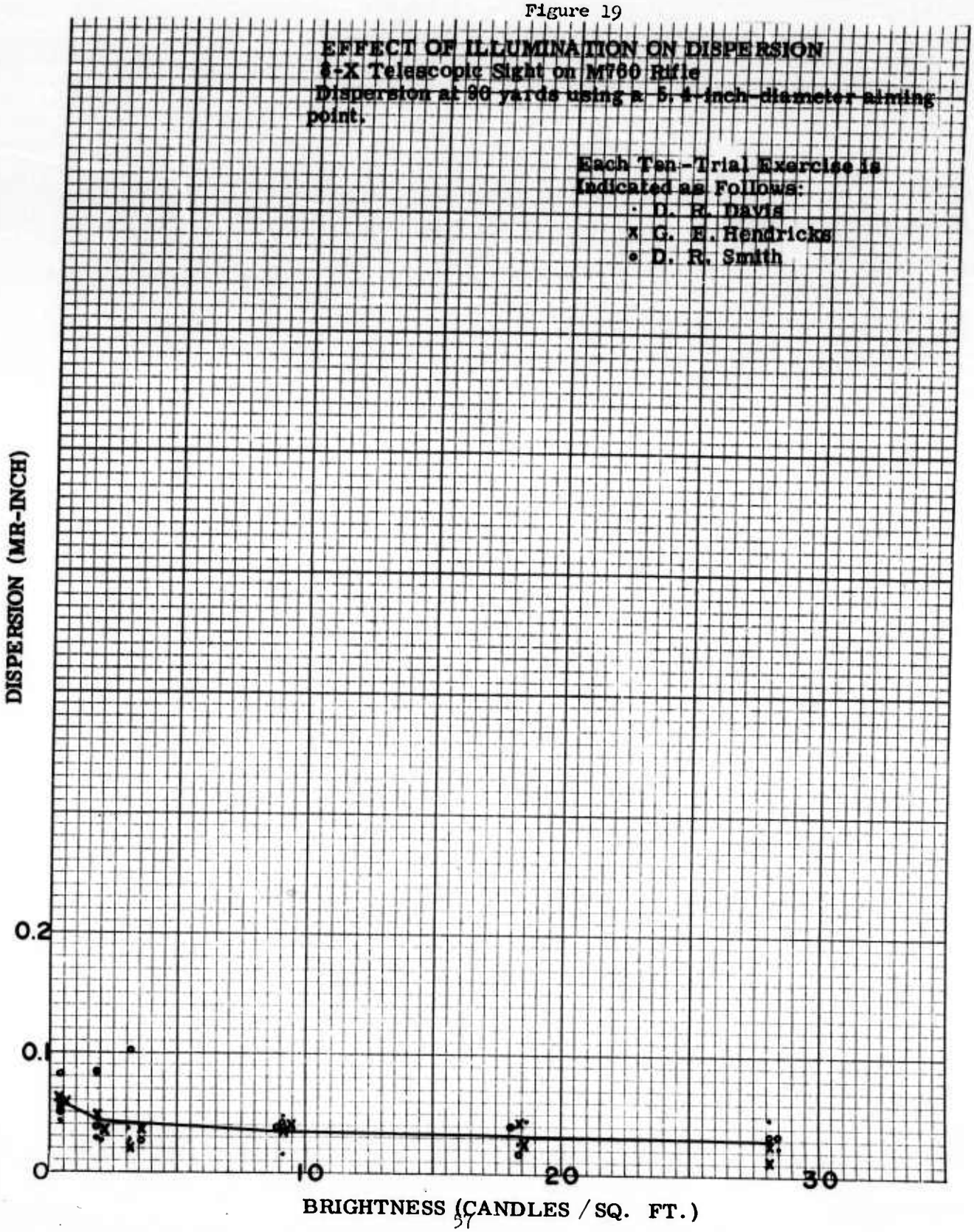

EFFECT OF ILLUMINATION ON DISPERSION
8-X Telescopic Sight on M700 Rifle
Dispersion at 90 yards using a 5, 8-inch-diameter aiming point.
Each Ten-Trial Exercise is Indicated as Follows:
· D. R. Davis
x G. E. Hendricks
• D. R. Smith
DISPERSION (MR-INCH)
0.2
0.1
0
10
20
30
BRIGHTNESS (CANDLES / SQ. FT.)

Figure 20

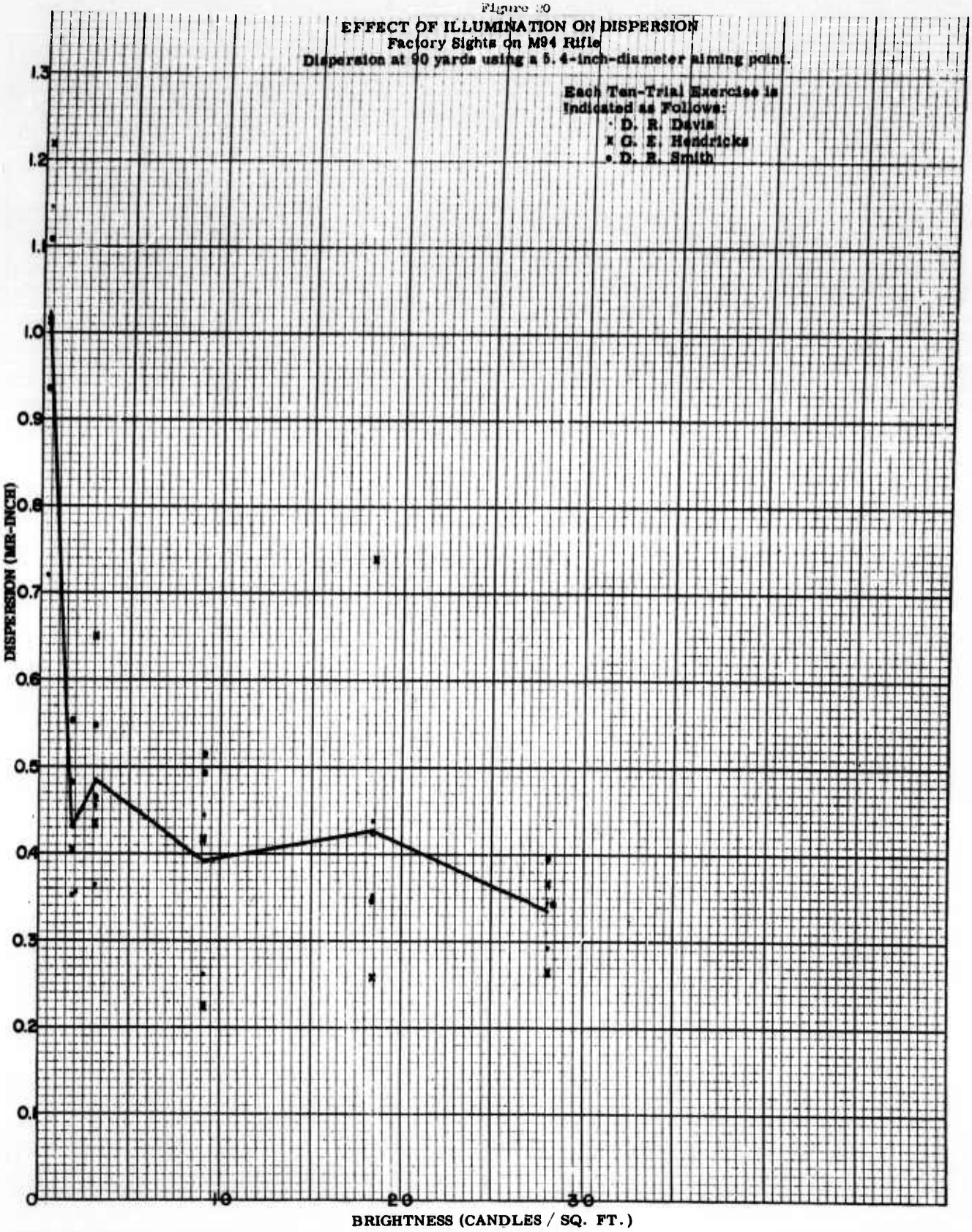

EFFECT OF ILLUMINATION ON DISPERSION
Factory Sights on M94 Rifle
Dispersion at 90 yards using a 5.4-inch-diameter aiming point.
Each Ten-Trial Exercise is Indicated as Follows:
· D. R. Davis
x G. E. Hendricks
• D. R. Smith
DISPERSION (MR-INCH)
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
20
30
BRIGHTNESS (CANDLES / SQ. FT.)

Figure 23

EFFECT OF ILLUMINATION ON DISPERSION
Multilite Sights on M1 Rifle
Dispersion at 90 yards using a 5.4-inch-diameter aiming point.

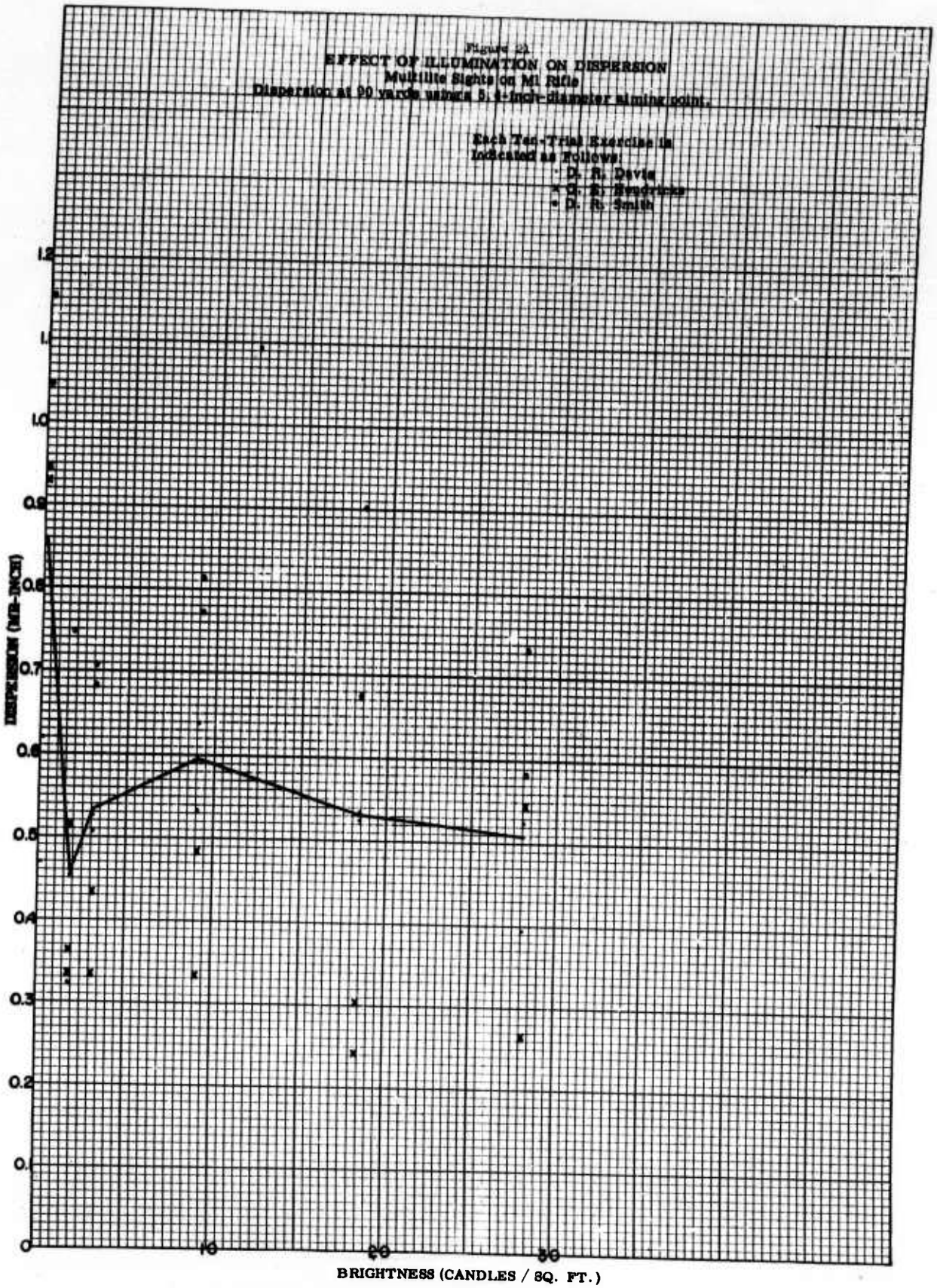
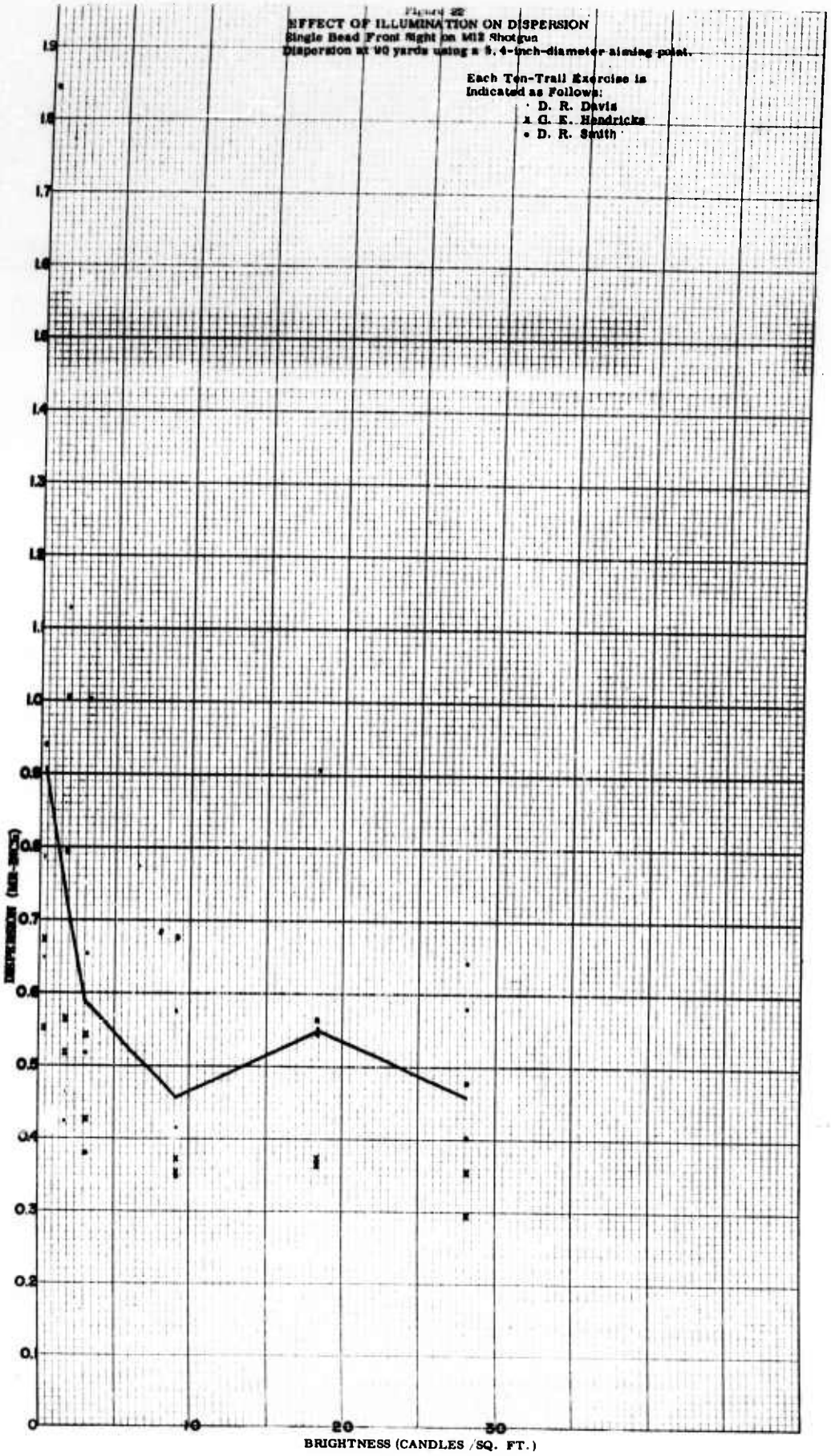


Figure 22

EFFECT OF ILLUMINATION ON DISPERSION
Single Bead Front Sight on M12 Shotgun
Dispersion at 90 yards using a 5.4-inch-diameter aiming point.



The sighting error is closely related to the visibility of sights and target. The telescope sights gave the smallest sighting error under all levels of illumination because of superior visibility of sights and target. When the magnification of a telescope is reduced and other conditions remain constant, the image becomes brighter. A valid comparison of brightness cannot be made in this test between the 1-X and 2-1/2 X magnifications because, while the 2-1/2 X and 8-X magnifications were obtained with a single telescope, the 1-X magnification was obtained with a smaller telescope. Therefore, a smaller sighting error than that obtained in this test would be expected were a 1-X telescope with the size of the variable-power sight used.

The Ithaca bead front sight was comparable in effectiveness with the standard M1 front sight. A slightly smaller dispersion was obtained when using the Ithaca post front sight then when using the standard M1 sight at the lowest levels of illumination, but it was inferior at the higher levels. The top of this front sight was on a line with the line of sight and this design permitted a glare which was advantageous at the lowest levels of illumination but undesirable at the higher levels. The angle of the blade was altered to eliminate this glare and an additional test was conducted at one light level. The modification eliminated the glare but no improvement in performance was observed at the level of illumination used.

The Multilite sights were less effective at all levels of illumination used in this test than the standard M1 rifle sights. Glare at the higher levels of illumination caused an increase in dispersion. The dispersion obtained with the Multilite sights was comparable with that obtained with the single bead on an M12 Winchester shotgun. A test was conducted with an M70 Winchester rifle with neither front nor rear sight for an additional comparison. The dispersion obtained was only slightly greater than that obtained with the Multilite sights. A change in alignment of about 6 feet at 90 yards was observed between the Multilite and regular sights provided on the Multilite sights. When the regular sights on the Multilite sights were used, an objectionable glare was caused by the rear Multilite sight, especially at the lower elevations.

The highly polished receiver of the M12 shotgun caused an objectionable glare.

While the M94 Winchester carbine was provided with a hood for the front sight, a glare was observed at the top of the sight.

3.2.9 Test 9. Effect of Target. Three individuals each conducted two ten-trial exercises with each combination of sight and target under the following conditions:

Range - 100 yards.
Light - direct natural daylight.

A summary of results is given as Table XI.

Table XI. Test 9. Effect of Target

Target	MR	MVD	MHD	EVD	EHD	ES
Standard Sights for M1 Rifle						
NRA Smallbore Rifle	0.275	0.228	0.118	0.87	0.46	0.93
Reduced U.S. Military B	.348	.292	.139	1.10	.60	1.16
Reduced Canadian Military	.274	.231	.118	0.83	.44	0.88
Game	.380	.289	.178	1.22	.74	1.30
Standard Rear and Modified Ithaca Post for M1 Rifle						
NRA Smallbore Rifle	.292	.238	.120	0.98	.56	1.04
Match Sights (0.042-inch-diameter aperture rear, 0.125-inch-diameter aperture front, 34 inches between sights, and 2 inches between eye and rear sight)						
NRA Smallbore Rifle	.068	.051	.034	.22	.15	0.24
Red Fluorescent (6-inch-diameter aiming point)	.088	.058	.052	.26	.20	.29
Reduced U.S. Military B	.092	.060	.055	.24	.22	.27
Reduced Canadian Military	.113	.085	.063	.34	.24	.38
Game	.152	.104	.092	.44	.36	.54
Match Sights (0.042-inch-diameter aperture rear, 0.074-inch-wide post front, 34 inches between sights, and 2 inches between eye and rear sight)						
Standard NRA Smallbore Rifle	.134	.106	.060	.42	.24	.46
Red Fluorescent (6-inch-diameter aiming point)	.198	.144	.105	.50	.44	.58
Reduced U.S. Military B	.129	.094	.072	.36	.28	.40
Reduced Canadian Military	.152	.107	.085	.44	.34	.50
Game	.250	.168	.144	.60	.58	.79

Table XI (Cont'd)

Target	MR	MVD	MHD	EVD	EHD	ES
Factory Sights for M94 Rifle (open rear and bead front)						
NRA Smallbore Rifle	0.335	0.262	0.162	1.14	0.65	1.17
Game	.456	.306	.274	1.28	1.19	1.54
8-X Telescopic Sight						
NRA Smallbore Rifle	.062	.047	.032	0.18	0.13	0.21
Game	.086	.052	.062	0.18	0.22	0.28

Graphs are attached (Figures 23 through 27) which show that the sighting error for a given sight or set of sights is related to the target.

This test phase further demonstrated that the sighting error is closely related to the visibility of sights and target. The variations of target had the least effect on the sighting error when the telescope sight was used. The greatest effect of the variations of target was observed when sights were used which covered a large part of the target area. The sights on the M94 rifle, which consist of an open rear and a bead front, gave the greatest increase in dispersion when changing from the NRA smallbore rifle to the game target (the two targets used in this test which gave the extremes of visibility). The sights which used a post front sight with an aperture rear also gave a large increase in dispersion when changing from the NRA smallbore rifle to the game target.

The smallest dispersion obtained with the aperture front and rear sights was obtained with a round aiming point, and it approaches the dispersion obtained on this target with the 8-X telescope sight. The half-bull-type target (Canadian Military) may permit a smaller sighting error than a round bull's-eye when using some military sights which employ a post front. The individuals employed in this test had extensive previous experience with a round bull's-eye but no experience with a half-bull and therefore some bias to favor the round bull's-eye is expected.

It was demonstrated in this test as well as in test 4 that the most advantageous size of aiming point is dependent on the sights used. It is expected that a smaller dispersion would have been obtained with the telescope sight had a smaller aiming point been used. A smaller aiming point would permit more accurate centering of the cross hairs.

Figure 23

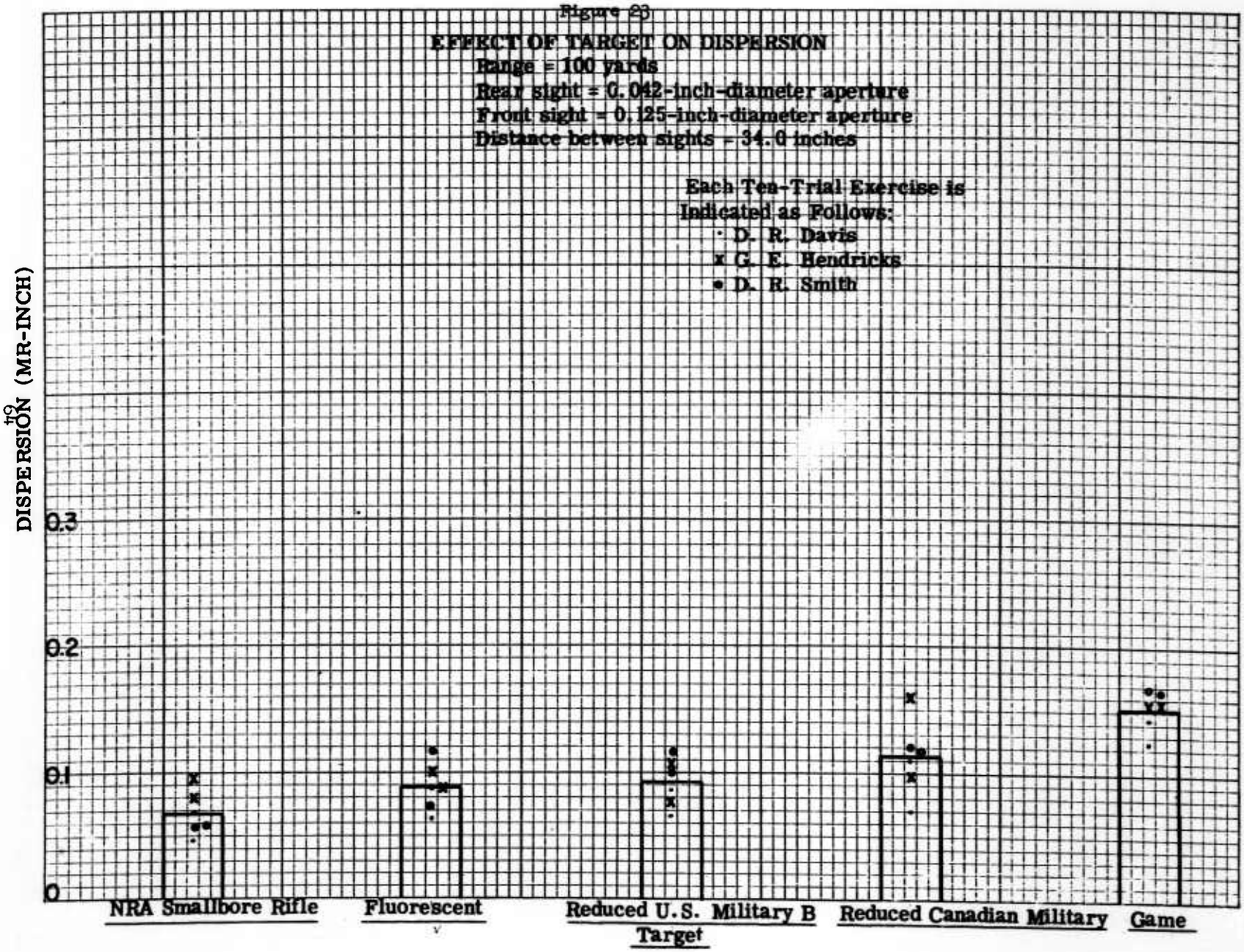

EFFECT OF TARGET ON DISPERSION
Range = 100 yards
Rear sight = 0.042-inch-diameter aperture
Front sight = 0.125-inch-diameter aperture
Distance between sights = 34.0 inches
Each Ten-Trial Exercise is Indicated as Follows:
· D. R. Davis
x G. E. Hendricks
• D. R. Smith
DISPERSION (MR-INCH)
0.3
0.2
0.1
0
NRA Smallbore Rifle
Fluorescent
Reduced U.S. Military B Target
Reduced Canadian Military
Game

Figure 24

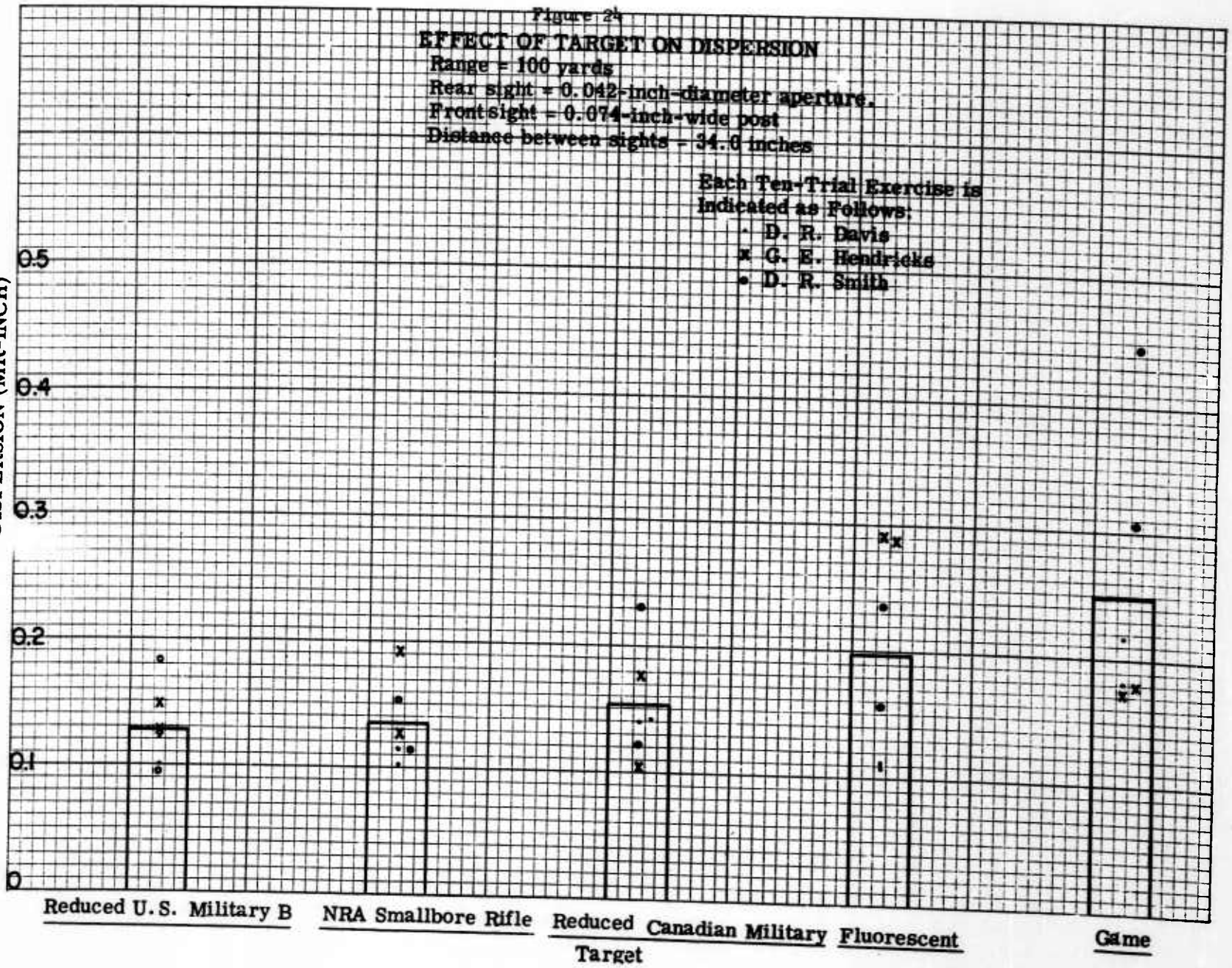

EFFECT OF TARGET ON DISPERSION
Range = 100 yards
Rear sight = 0.042-inch-diameter aperture.
Front sight = 0.074-inch-wide post
Distance between sights = 34.0 inches
Each Ten-Trial Exercise is Indicated as Follows:
D. R. Davis
G. E. Hendricks
D. R. Smith
DISPERSION (MR-INCH)
0.5
0.4
0.3
0.2
0.1
0
Reduced U.S. Military B
NRA Smallbore Rifle
Reduced Canadian Military Target
Fluorescent
Game

Figure 25

EFFECT OF TARGET ON DISPERSION

Range = 100 yards
Rear sight = M1 rifle (standard)
Front sight = M1 rifle (standard)
Distance between sights = 27.9 inches

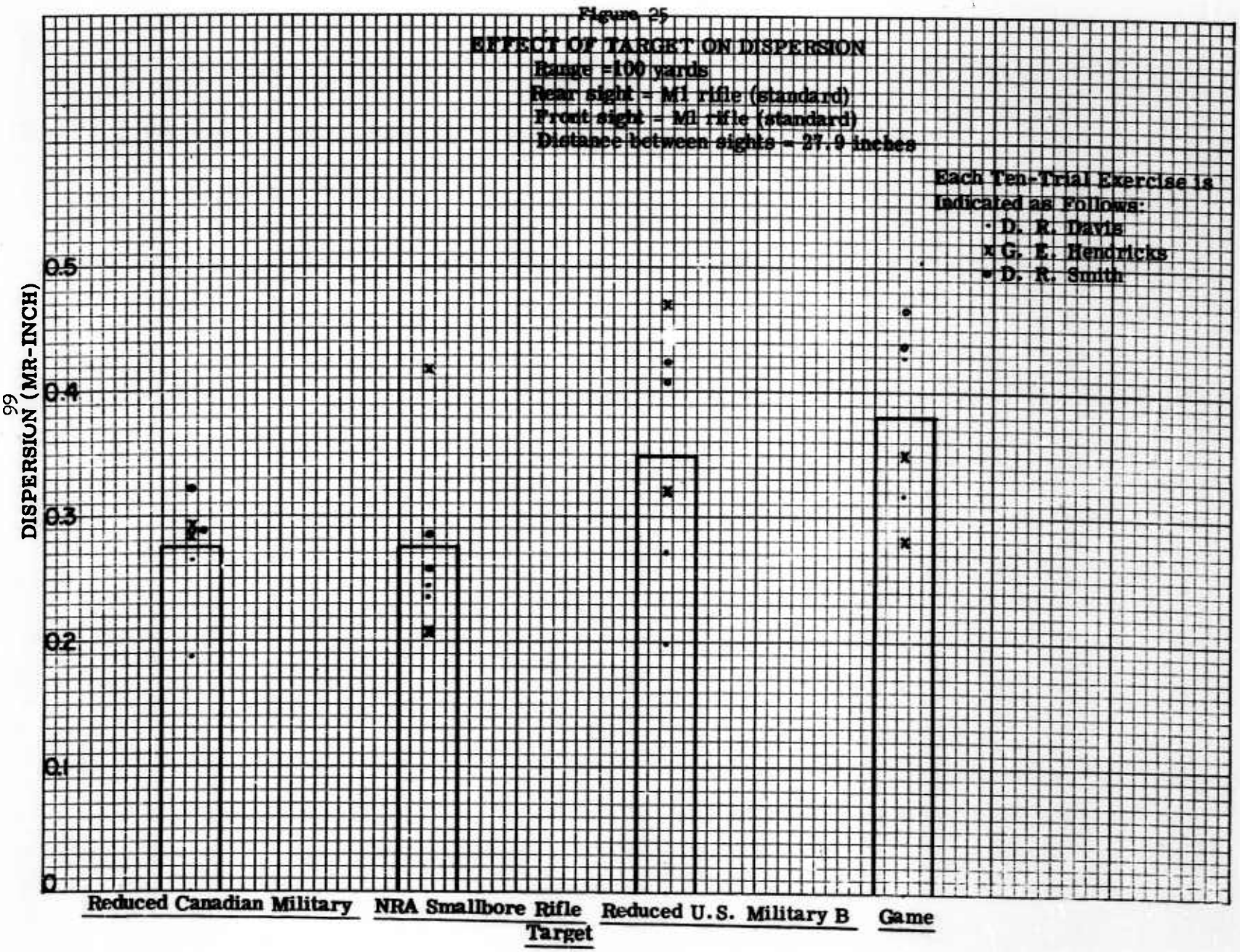


Figure 26

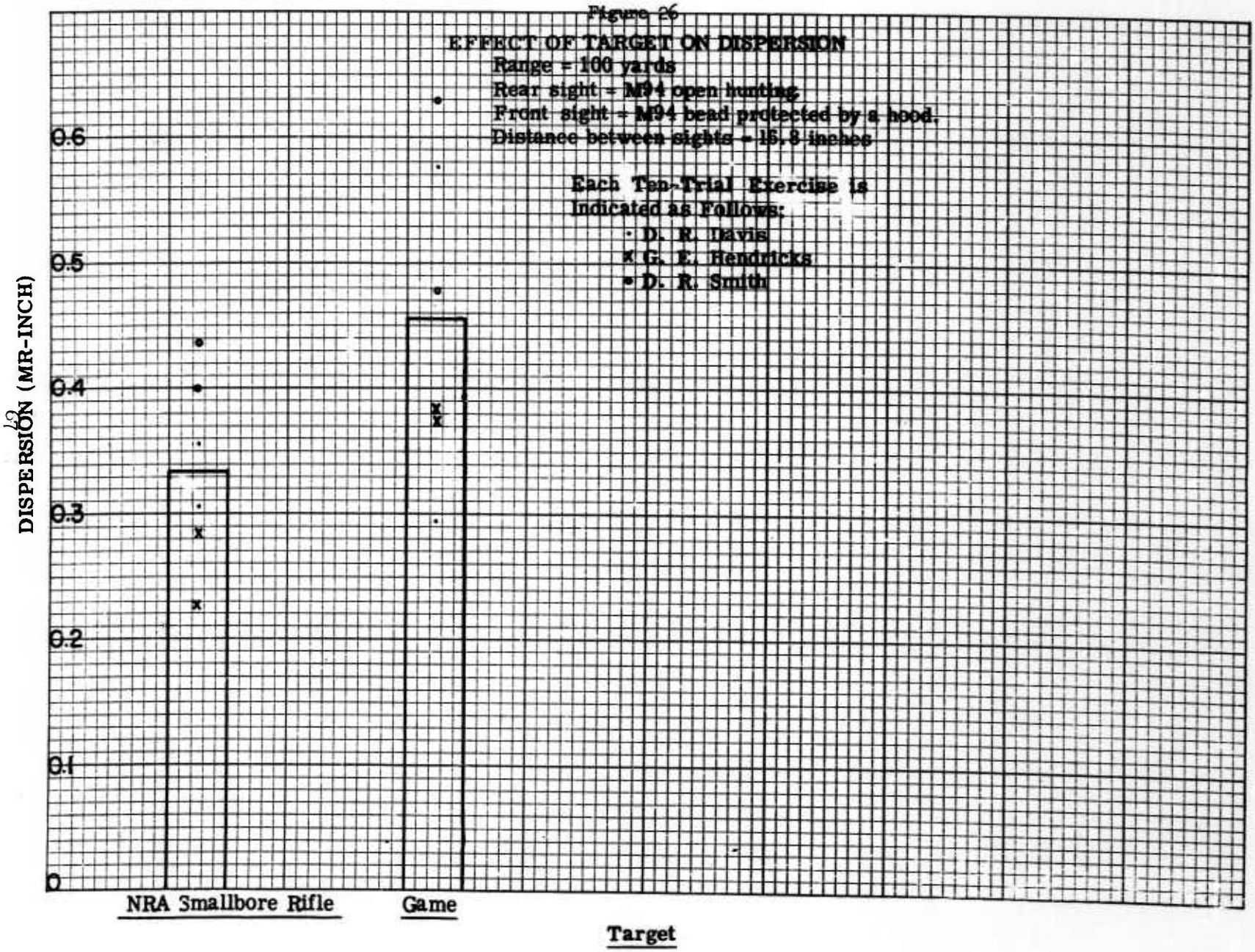
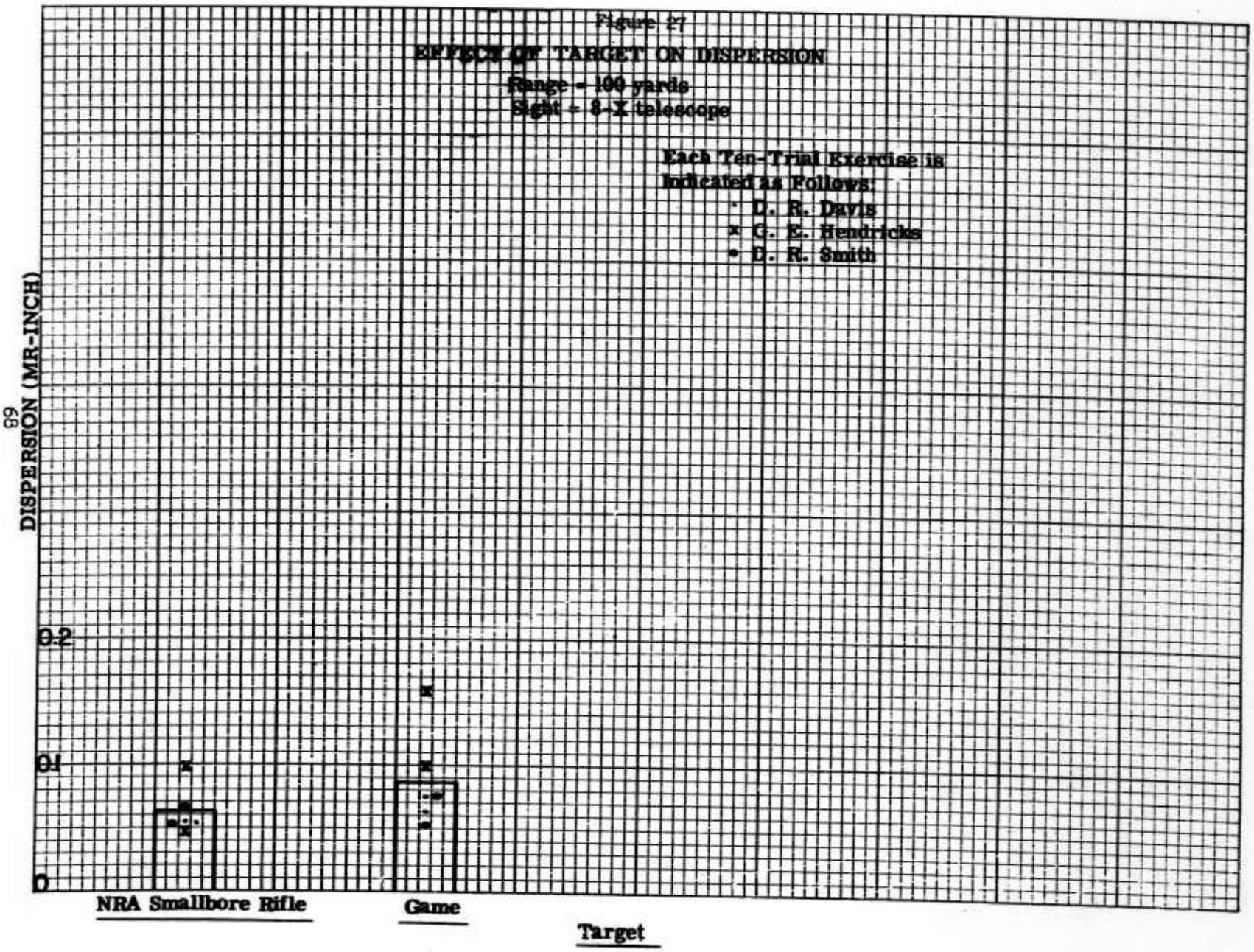

EFFECT OF TARGET ON DISPERSION
Range = 100 yards
Rear sight = M94 open hunting
Front sight = M94 bead protected by a hood.
Distance between sights = 15.8 inches
Each Ten-Trial Exercise is Indicated as Follows:
· D. R. Davis
x G. E. Hendricks
• D. R. Smith
DISPERSION (MR-INCH)
0.6
0.5
0.4
0.3
0.2
0.1
0
NRA Smallbore Rifle
Game
Target

Figure 27

EFFECT OF TARGET ON DISPERSION

Range = 100 yards
Sight = 8-X telescope



3.2.10 Test 10. Effect of Sight Finish. Three individuals each conducted one ten-trial exercise with each sight on each of three days under the following conditions:

Range - 100 yards.
Light - direct natural daylight.
Target - 100-yard NRA smallbore rifle (6-inch-diameter aiming point).

Results are summarized in Table XII.

Table XII. Test 10. Effects of Sight Finish

By Day:

Day	Sight Finish	MR	MVD	MHD	EVD	EHD	ES
1	Normal	0.290	0.244	0.122	0.91	0.40	0.94
2	Normal	.309	.230	.148	1.07	.66	1.10
3	Normal	.226	.174	.118	0.62	.43	0.68
Average		.275	.216	.129	0.87	.50	0.91
1	Blueing removed	.290	.251	.109	0.94	.49	0.99
2	Blueing removed	.230	.161	.128	0.60	.62	0.73
3	Blueing removed	.334	.274	.151	1.18	.58	1.26
Average		.285	.229	.129	0.91	.56	0.99
1	Soot applied with carbide lamp	.255	.195	.120	0.81	.54	0.89
2	Soot applied with carbide lamp	.259	.236	.066	0.95	.29	0.96
3	Soot applied with carbide lamp	.307	.269	.104	1.13	.45	1.14
Average		.274	.233	.097	0.96	.43	1.00
1	Jet black	.279	.231	.125	.84	.50	.91
2	Jet black	.262	.218	.097	.87	.45	.94
3	Jet black	.224	.164	.109	.66	.43	.68
Average		.255	.204	.110	.79	.46	.84
1	Normal M1 rear and modified Ithaca post	.242	.190	.107	.76	.50	.78
2	Normal M1 rear and modified Ithaca post	.265	.188	.156	.71	.55	.74
3	Normal M1 rear and modified Ithaca post	.355	.306	.130	1.43	.53	1.51
Average		.287	.228	.131	0.97	.53	1.01

Table XII (Cont'd)

By Individual:

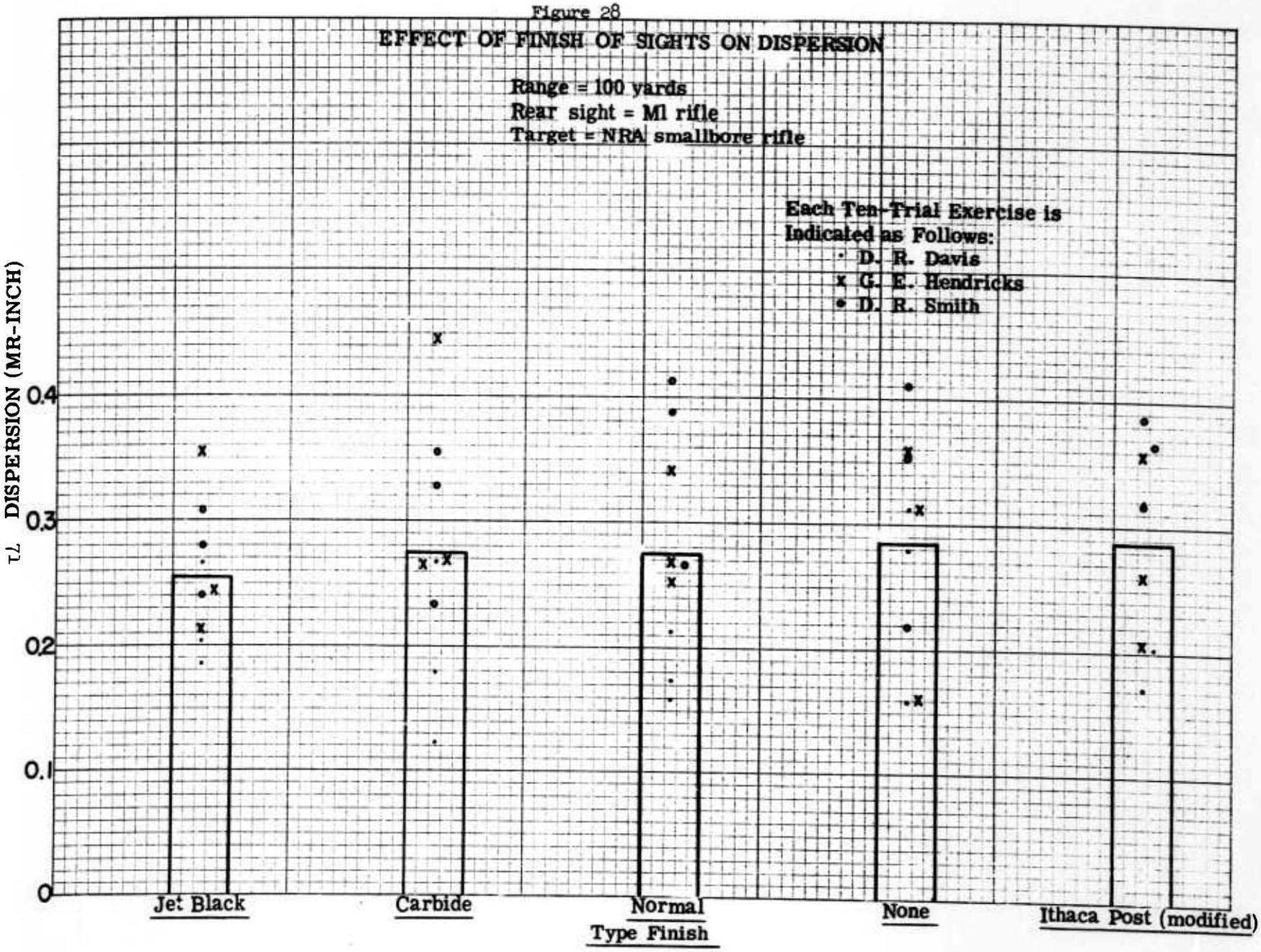
Individual	Sight Finish	MR	MVD	MHD	EVD	EHD	ES
A	Normal	0.182	0.130	0.109	0.57	0.41	0.63
B	Normal	.288	.235	.125	0.88	.47	0.92
C	Normal	.356	.282	.155	1.15	.61	1.17
Average		.275	.216	.130	0.87	.50	0.91
A	Blueing removed	.250	.177	.141	0.68	.65	0.86
B	Blueing removed	.277	.236	.105	0.94	.42	0.97
C	Blueing removed	.327	.273	.142	1.10	.61	1.14
Average		.285	.229	.129	0.91	.56	0.99
A	Soot applied with carbide lamp	.190	.169	.062	0.60	.27	0.62
B	Soot applied with carbide lamp	.326	.279	.104	1.25	.53	1.26
C	Soot applied with carbide lamp	.305	.251	.123	1.04	.47	1.12
Average		.274	.233	.096	0.96	.42	1.00
A	Jet black	.218	.182	.089	0.76	.39	0.79
B	Jet black	.271	.208	.121	0.80	.47	0.88
C	Jet black	.276	.223	.121	0.80	.52	0.87
Average		.255	.204	.110	0.79	.46	0.85
A	Normal M1 rear and modified Ithaca post	.231	.181	.111	0.68	.49	0.76
B	Normal M1 rear and modified Ithaca post	.275	.202	.143	0.89	.57	0.91
C	Normal M1 rear and modified Ithaca post	.356	.301	.140	1.34	.52	1.35
Average		.287	.228	.131	0.97	.53	1.01

A graph is attached (Figure 28) which shows that the finish of the sight has little effect on dispersion under the conditions of this test.

It is observed that the dispersion with the sights and target exposed to direct sunlight is greater than when both are shaded in natural illumination or when used under a high level of artificial illumination (comparison of results of tests 7 and 8 with 9 and 10).

Figure 28

EFFECT OF FINISH OF SIGHTS ON DISPERSION



3.2.11 Test 11. Effect of Firing Position and Distance between Line of Sight and Stock. Three individuals each conducted one ten-trial exercise under each condition on each of three days with metallic sights and on one day with a telescopic sight.

Range - 100 yards.
Light - natural daylight.
Sights - 1. metallic match sights (aperture front and rear).
2. 8-X telescope sight.
Position - prone with tight comb[a].
sitting with tight comb[a].
prone with loose comb[b].
sitting with loose comb[b].
Target - 100-yard NRA smallbore rifle (6-inch-diameter bull's-eye).

Results are summarized in Table XIII.

Table XIII. Test 11. Effect of Firing Position and Distance between Line of Sight and Stock

Individual	Condition	MR	MVD	MHD	EVD	EHD	ES
Metallic Sights							
A	Prone with tight comb[c]	0.052	0.038	0.029	0.15	0.12	0.17
B	Prone with tight comb	.078	.045	.051	.20	.21	.25
C	Prone with tight comb.	.059	.046	.029	.19	.12	.21
Average		.063	.043	.036	.18	.15	.21
A	Sitting with tight comb	.069	.041	.048	.19	.21	.26
B	Sitting with tight comb	.072	.050	.042	.23	.17	.29
C	Sitting with tight comb.	.042	.026	.028	.11	.11	.14
Average		.061	.039	.039	.18	.16	.23
A	Prone with loose comb.	.060	.046	.029	.19	.13	.22
B	Prone with loose comb	.066	.046	.042	.17	.15	.21
C	Prone with loose comb.	.054	.034	.033	.14	.15	.16
Average		.060	.042	.035	.17	.14	.20
A	Sitting with loose comb	.063	.045	.037	.16	.14	.20

[a]Distance between line of sight and stock = Davis 1.4 in., Hendricks 1.6 in., and Smith 1.5 in.
[b]Distance between line of sight and stock = 2.5 in.
[c]The comb is the top of the butt stock which provides a support for the face during firing.

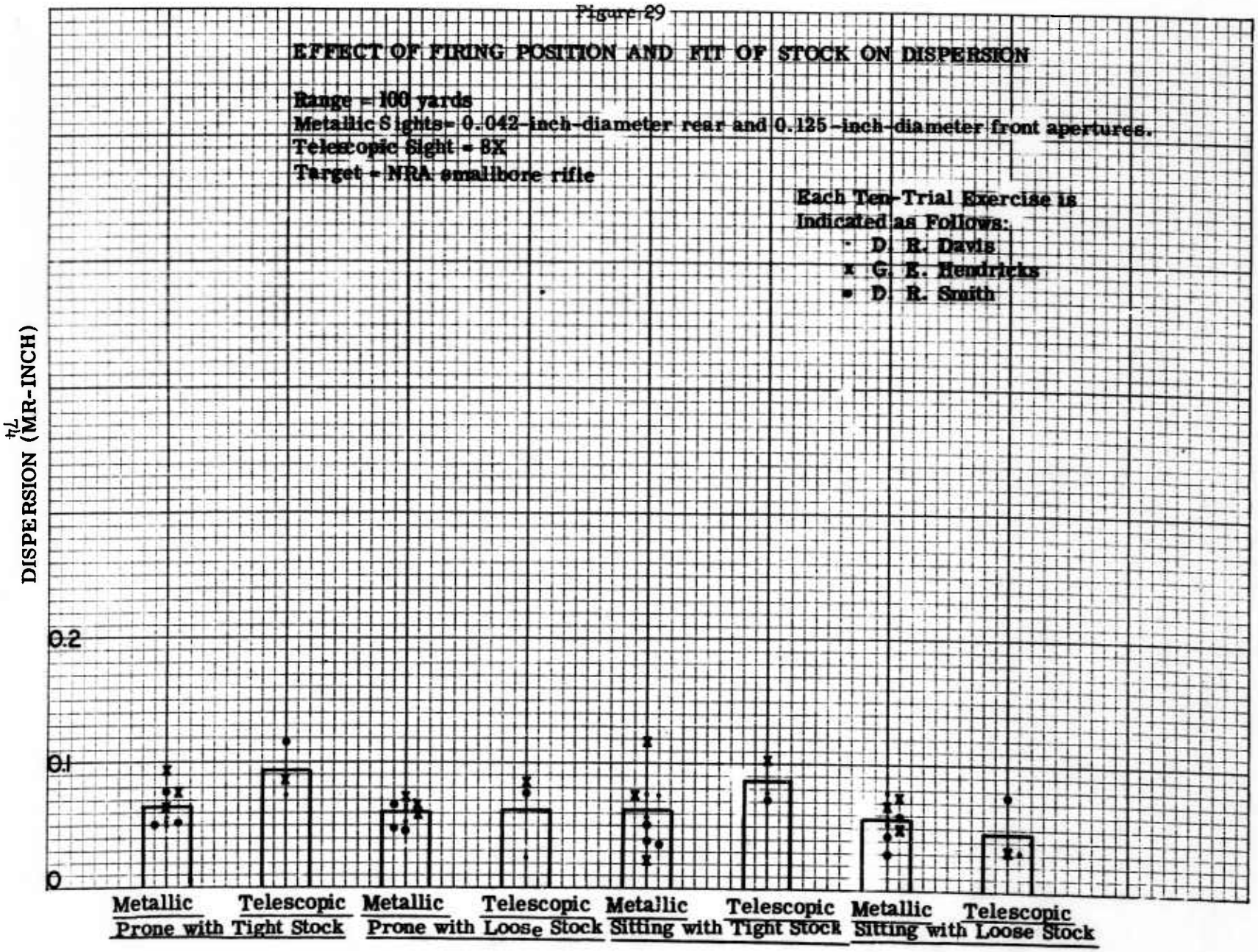
Table XIII (Cont'd)

Individual	Condition	MR	MVD	MHD	EVD	EHD	ES
B	Sitting with loose comb	0.063	0.050	0.031	0.19	0.13	0.20
C	Sitting with loose comb	.044	.024	.033	.09	.12	.14
Average		.057	.040	.034	.15	.13	.18
8-X Telescopic Sight							
A	Prone with tight comb	.073	.050	.045	.20	.11	.22
B	Prone with tight comb	.086	.067	.041	.24	.12	.24
C	Prone with tight comb	.118	.104	.045	.29	.18	.32
Average		.092	.074	.044	.24	.14	.26
A	Sitting with tight comb	.077	.057	.044	.23	.13	.24
B	Sitting with tight comb	.103	.057	.078	.26	.32	.41
C	Sitting with tight comb	.071	.060	.029	.34	.12	.35
Average		.084	.058	.050	.28	.19	.33
A	Prone with loose comb	.024	.010	.019	.04	.07	.07
B	Prone with loose comb	.083	.045	.059	.14	.24	.25
C	Prone with loose comb	.076	.062	.032	.26	.13	.26
Average		.061	.039	.037	.15	.15	.19
A	Sitting with loose comb	.031	.029	.008	.16	.06	.17
B	Sitting with loose comb	.032	.016	.024	.06	.09	.09
C	Sitting with loose comb	.074	.050	.044	.21	.16	.21
Average		.046	.032	.025	.14	.10	.16

Figure 29 shows the effect of firing position and distance between line of sight and stock on dispersion.

Figure 29

EFFECT OF FIRING POSITION AND FIT OF STOCK ON DISPERSION



A distance between line of sight and comb was selected by each individual to give a tight fit yet which would permit a normal position when sighting. This distance varied between 1.4 and 1.6 inches and it demonstrates the variation in physique between individuals. Furthermore, it demonstrates that this distance has the greatest effect on sighting error when a high comb is used. The tightness of comb is further affected by the firing position when using a conventional stock because the distance between the line of sight and the cheek bone is somewhat less when firing from the prone position than from a sitting position since the head is inclined forward to a greater extent. The comparative fit of the stock when firing from different positions is also dependent on the stock configuration. The stock used was that for the M1903A3 rifle.

The difference in dispersion between the prone and sitting groups was small, but a large difference in dispersion was observed between the groups made with a tight comb and those made with a loose comb. The greater increase in dispersion when changing from the loose to the tight stock with the telescope sight can be attributed to parallax. This change would not be expected with a telescope of proper design which had been properly adjusted. It is probable that this telescope was not adjusted precisely for this range.

3.2.12 Test 12. Effect of Mirage. Three individuals each conducted two ten-trial exercises with each type of sight in both light and heavy mirage[a] under the following conditions:

Range - 100 yards
Light - direct natural daylight
Target - 100-yard NRA smallbore rifle (6-inch-diameter aiming point) with a 1-inch white square in the center
Sights - 1. metallic match sights (aperture front and rear)
2. 20-X telescope sight

Results are summarized in Table XIV.

Table XIV. Test 12. Effects of Mirage

Individual	Mirage	Sight	MR	MVD	MHD	EVD	EHD	ES
A	Light	Metallic	0.048	0.033	0.031	0.12	0.10	0.15
B	Light	Metallic	.080	.064	.040	.24	.16	.26
C	Light	Metallic	.103	.062	.068	.26	.34	.37
Average			.077	.053	.046	.21	.20	.26
A	Heavy	Metallic	.060	.044	.031	.17	.12	.18
B	Heavy	Metallic	.072	.064	.022	.27	.08	.28
C	Heavy	Metallic	.104	.077	.057	.32	.19	.34
Average			.079	.062	.037	.25	.13	.27

[a]Mirage is defined in paragraph 3.3.6.1 as a phenomenon of the atmosphere in which the light rays are distorted.

Table XIV (Cont'd)

Individual	Mirage	Sight	MR	MVD	MHD	EVD	EHD	ES
A	Light	20-X	0.021	0.016	0.012	0.06	0.04	0.06
B	Light	20-X	.024	.006	.021	.03	.10	.10
C	Light	20-X	.025	.014	.018	.06	.08	.08
Average			.023	.012	.017	.05	.07	.08
A	Heavy	20-X	.078	.043	.057	.15	.22	.24
B	Heavy	20-X	.035	.008	.032	.03	.10	.11
C	Heavy	20-X	.060	.028	.044	.14	.16	.18
Average			.058	.026	.044	.11	.16	.18

The dispersion obtained with the 20-X telescope sight on some exercises was so small that it was necessary to estimate the location of individual trials on some targets when preparing a plot of the target with a 10-X viewer.

A graph is attached (Figure 30) which shows the effect of mirage on dispersion.

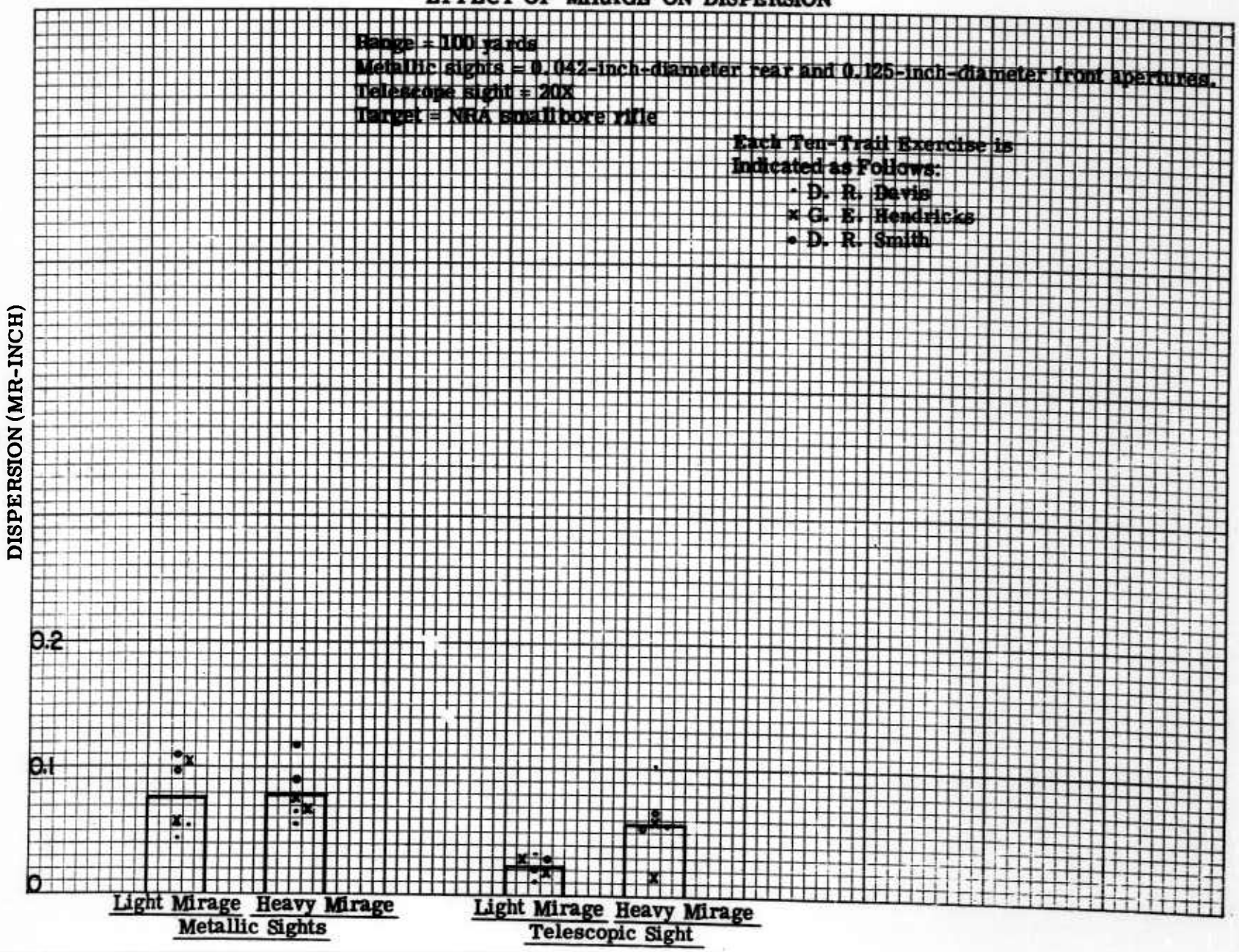
The effect of mirage was most readily observed when using the 20-X telescope sight because of a comparatively large dispersion when using metallic sights. The data also show a vertical displacement of the center of impact between the two conditions of mirage. The displacement of the center of impact is in the direction opposite that of the direction of movement of the mirage. Since the sights were fixed, this demonstrates that the mirage causes the target to appear to be displaced in the direction of the movement of the mirage. The wind direction during this test was close to the line of sight, and therefore, since the direction of mirage was not constant, a corresponding displacement of the center of impact in the horizontal direction was not observed.

3.3 Observations

3.3.1 Factors Investigated. The complexity of an investigation of sighting error was appreciated at the outset. An attempt was made to obtain information on various factors which were believed to have a major effect on sighting error. Because various factors of sighting error are interrelated, the investigation consisted of a number of individual tests. In each test all except one or two conditions were held as nearly constant as possible. The effect of the following factors of sighting error was demonstrated:

Figure 30

EFFECT OF MIRAGE ON DISPERSION



a. The individual.
b. Intensity of illumination.
c. Atmospheric conditions.
d. Target.
e. Type of rear sight.
f. Diameter of rear-sight aperture.
g. Distance between rear sight and eye.
h. Type of front sight.
i. Diameter of front-sight aperture.
j. Distance between front sight and eye.
k. Magnification of telescopic sight.
l. Firing position.
m. Relation between sights and stock.

3.3.2 Individual. In the test covered in the 44th A.P.G. Report on Project No. TS2-2015, in which five individuals having various amounts of marksmanship training were employed, the average mean radius of four ten-trial exercises conducted on one day for the least skilled individual was 2.9 times that for the most skilled individual. Individuals were selected for the test covered in this report who were moderately experienced in marksmanship in order to eliminate a wide variation in dispersion. However, a variation in performance was observed among individuals as well as for a particular individual from exercise to exercise and from test to test. Differences in experience and physical characteristics among the participants are expected to cause a variation in performance.

3.3.3 Effect of Learning on Dispersion. It was demonstrated in a test of the sighting-error recorder that the sighting error decreases in magnitude with experience (Reference 2). On the first day of that test the least-experienced individual[a] had an average dispersion 2.6 times that of the most experienced individual. However, while the most experienced individual reduced his average dispersion by only 6 per cent in three days, the least experienced individual reduced his average dispersion by 33 per cent.

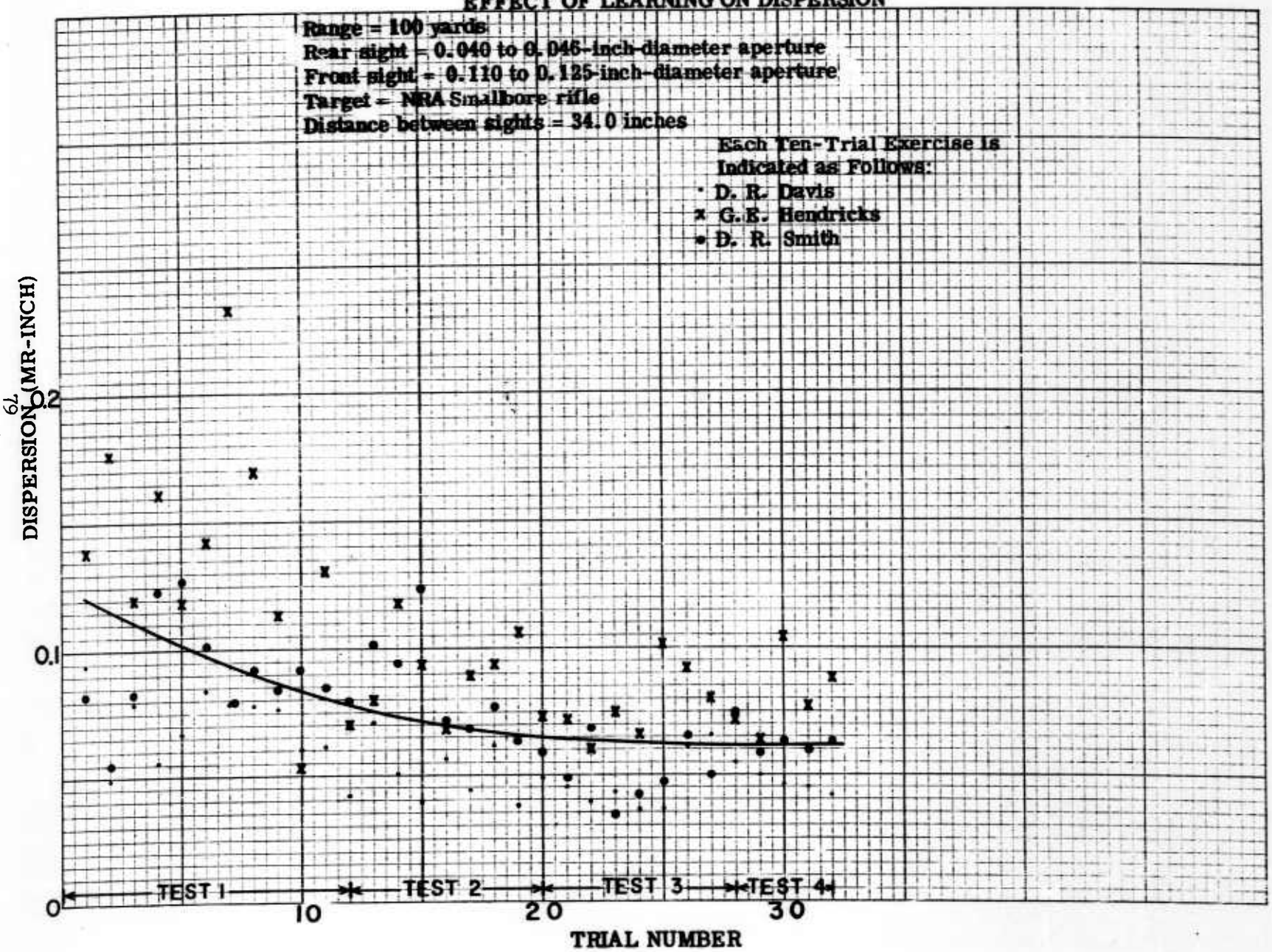
The individuals employed in this test had a moderate amount of experience with various types of sights prior to the 1960 test. Individual A had also been employed in the previous test. A fair level of skill was expected at the start of the test but it was expected that the dispersion would be reduced as the test progressed. Therefore each test phase was planned to minimize the effect of learning on the test data. The effect of learning on dispersion can be observed by comparing the results obtained under comparable conditions in various test phases. Figure 31 shows the effect of learning on dispersion when using metallic aperture sights. While experienced individuals were employed in this test, the data show that their sighting error was reduced by one half in the conduct of the first four test phases. A greater reduction in sighting error would be expected for untrained individuals.

It appears that a device similar to the sighting-error recorder could be used advantageously for training purposes, as well as for selecting and testing sights.

[a]The least experienced individual had a slightly smaller error on the first test date than one other individual.

Figure 31

EFFECT OF LEARNING ON DISPERSION



3.3.4 Variation in Visual Characteristics. These data demonstrate a variation in order of effectiveness for the participants when using different sights. This is probably associated with variations in visual characteristics as well as experience. The size of the pupil varies among individuals exposed to the same light conditions (Reference 3). A study was reported in which the relative pupil areas of 16 adult persons were measured while reading a book illuminated at 10 foot candles with all other conditions constant. The area of the largest pupils was 6.5 times that of the smallest.

3.3.5 Visibility of Sights and Target. The sighting error is closely related to the visibility of sights and target. The visibility of sights and target are dependent on factors of time, intensity of illumination, brightness contrast and size (Reference 3).

3.3.5.1 Time. This test was accomplished without imposing a time limit on the trials conducted although it was appreciated that time is an important factor. A firing test was previously conducted at this station in which a time limit was imposed (Reference 1).

In this test the individual was given an unlimited time to conduct each exercise and he was expected to obtain the smallest dispersion that he was capable of producing. However, there is frequently a correlation between time and dispersion for individual exercises. It is expected that when conducting an exercise under adverse conditions, such as in cold weather, the individual will tend to hurry without being conscious of it. Also, should the sight picture be poorly defined, the individual will probably spend less time sighting because he is uncertain that a greater amount of sighting will produce a smaller dispersion. Furthermore, the individual may attempt to minimize fatigue caused by eyestrain which is more severe under conditions of low illumination and when using sights of unfavorable design, by expediting the exercise.

The time intervals required for seeing under several conditions of brightness of background and brightness contrast have been reported (Reference 3). The time required to recognize a black object on a white background having a brightness of 100 foot lamberts with 100 per cent certainty was reported to be about 0.04 second. The minimum period of time required for the eyes to fix on an object was reported to be from 0.075 to 0.3 second.

3.3.5.2 Level of Illumination. For maximum effectiveness metallic sights must be used in a comparatively high level of illumination. Furthermore, to be equally effective at various high levels of illumination encountered in natural daylight these sights must not cause glare. Glare is a term applied to light entering the eye from any visible light source or bright area (Reference 3). It reduced the sensitivity of the visual

sense and, therefore, reduces the visibility of the object or task. Glare may be caused by an unfavorable configuration or finish of sight, barrel or receiver. The most objectionable glare is that on the line of sight. Frequently glare is caused by a sight which has edges parallel with the line of sight. This permits light from the front to be reflected into the eye while sighting. A hood is frequently used on the front sight to reduce glare.

The telescope sight showed the greatest effectiveness of the various types of sights at the lowest levels of illumination, as well as at the higher levels, because a telescope of proper design with low magnification and a large objective lens permits the target to be seen when it would no longer be visible with the unaided eye.

3.3.5.3 Brightness Contrast. A high brightness contrast between the aiming point and its background and between the sights and target is necessary to obtain a small sighting error with metallic sights. When using aperture sights with the NRA-type target there was a high brightness contrast between sights and target background as well as between aiming point and its background. However, when a post or bead front sight is used the sight is aligned with the aiming point and the brightness contrast is reduced. When sighting through the notch of an open rear sight the brightness contrast is further reduced. The brightness contrast of natural targets would be much less than that of the NRA-type targets and therefore the sighting error would be greater when using metallic sights in the field than when using them on well defined targets. A front sight having a distinctive color such as that of the Ithaca post may show an advantage over a black front sight under field conditions. While the front sight having a distinctive color would not give a high brightness contrast on any target, it would give a fair contrast under most conditions. The black front sight would be most effective on light-colored targets and least effective on dark targets.

The brightness contrast of the target has a smaller effect on the sighting error when using the telescope sight than when using metallic sights because of the magnification and relative illumination of the telescope. Therefore, the telescope sight would be expected to show a further improvement over metallic sights when used in the field.

3.3.5.4 Size of Sight and Target. The most effective type and size of metallic sights are dependent on the target used, and conversely the most effective target is dependent on the sights used. The data indicate that there is an optimum size of target for a particular dimension of front-sight aperture and an optimum size of front-sight aperture for a given target.

While the sighting error is affected less by the target when using a telescope sight than when using metallic sights, the characteristics of the telescope sight and target are important for obtaining maximum effectiveness. Magnification is obtained in a telescope of given size and design at the expense of illumination, field and eye relief. Therefore, the optimum magnification is dependent on the use of the sight. Also, an optimum reticle must be determined which can be clearly visible over a

wide range of illumination yet which does not cover an excessive amount of target area. The apparent movement of the field through the sight is equal to its magnification multiplied by the actual movement, and therefore consideration must be given to the steadiness of the firing position as well as to the movement of the target.

3.3.6 Weather.

3.3.6.1 Mirage. Mirage is a phenomenon of the atmosphere in which the light rays are distorted. The earth absorbs heat from the sun's rays, and therefore there is a difference in temperature between the earth and the atmosphere. The air near the earth is heated, causing it to rise. The currents of warm air moving upward can be seen under some conditions with the unaided eye. With a 20-X telescope the striae are clearly visible and they bend with the wind. The striae are greatest near the ground and become smaller at greater distances above the ground because the hot air mixes with the cooler air as it rises. The greater the difference in temperature between the earth and the atmosphere, the greater will be the mirage seen when other conditions are the same. The mirage causes the target to appear to be displaced in the direction of movement of the mirage and, because the mirage changes with the wind, it also causes an increase in dispersion.

3.3.6.2 Other Weather Factors. It was observed in the conduct of these tests that light and fog reduced the visibility of the target. No tests were conducted in rain or snow, but it is obvious that these conditions would also reduce the visibility of the target. Comfort of the shooter depends on the temperature and wind. Maximum effectiveness of the shooter would not be expected if he were uncomfortable.

3.3.7 Firing Position. A change in firing position affects the sight picture or field of view. The field of view of the telescope sight is affected as the eye position is changed on the line of sight. The change in width of field is greater for a given change in eye position when the magnification of the telescope is higher and other telescope characteristics are the same. When using the telescope sight in fixed mounts the individual generally positions the sight for the most frequently used firing position and then adjusts the position of his face on the stock to obtain a usable field of view when using other firing positions. When the telescope is used on a rifle having a heavy recoil the individual must assure that he is far enough from the sight to avoid being hit during recoil, and this may reduce the width of field. When firing a rifle equipped with metallic sights the shooter can generally assume normal positions, but the sight picture will change as the distance between the rear sight and the eye is changed. Some observations were made on firing position with respect to rifle effectiveness in a previous test (Reference 1). A change in center of impact with a change in firing position was observed which could be attributed to sighting error when using an open rear and a bead front.

3.3.8 Relation between Sights and Stock. The purpose of the stock is to transfer the recoil from the rifle mechanism to the shoulder and to provide a support for the head and grips for the hands. For maximum effectiveness the comb of the stock should fit the face in a manner to provide steadiness to the rifle yet not cause discomfort to the shooter either while sighting or during recoil. A comb which is too high or improperly shaped causes discomfort to the shooter and one which is too low does not provide support for the face. The stocks generally provided on military rifles are designed for ease of production and durability rather than for effectiveness in support for the head. Furthermore, there is a large physical difference among individuals and it is impossible to have a single stock size which will fit all individuals.

3.3.9 Fatigue. Fatigue is undoubtedly a factor of sighting error and, while an attempt was made to use a test plan which would minimize its effect, it undoubtedly caused an increase in dispersion. Poor seeing conditions may cause fatigue. Such conditions as low level of illumination, size of sight or target too small, glare, or sight too near the eye can cause fatigue (Reference 4). Fatigue was most noticeable by the participants when using metallic sights under low levels of illumination.

Greater visual effort is required when using metallic sights than when using a telescope sight. When sighting on a target with metallic sights the eye can be focused at the front sight with some blurring of the target and rear sight, or the point of focus can be changed repeatedly among the three points. Some competitive riflemen focus on the front sight in order to minimize fatigue. The field of view of the telescope sight is flat and therefore the eye is not required to change its focus when sighting through it.

3.3.10 Magnitude of Sighting Error. The sighting error is composed of two parts, the dispersion about the group center and the displacement of the group center. For example, when the 20-X telescope sight was used in test 12, there was a dispersion and a change in the group center caused by a change in atmospheric conditions. In these tests it was more convenient to consider dispersion only, since it was not possible to maintain a constant alignment of sights and aiming point because the schedule frequently required a change of sights between exercises and because of errors in instrumentation. Therefore, while dispersion does not represent the total sighting error, it is used as a measure of sighting error.

It was desired to determine the magnitude of the sighting error of experienced individuals when using various metallic and telescope sights. It was expected initially that the aperture would be the most effective type of metallic sight and for this reason aperture sights were used in the initial test phases. The dispersion when using aperture-type metallic sights was much smaller than that obtained with any other type of metallic sight.

Furthermore, the dispersion under the most favorable conditions with aperture-type metallic sights is smaller than that obtained with a 2-1/2 power telescope sight and it compares with that obtained with an 8-power telescope when using a well-defined, stationary aiming point. When the target is poorly defined the aperture-type sight is less effective than the telescopic sight.

It is expected that an average mean radius of 0.05 inch[a] approaches the minimum possible dispersion with any design of metallic sights. This figure provides a level of effectiveness for comparing other types of sights. The average dispersion obtained when using the M1 rifle sights, for example, was 4.6 times greater than that obtained with the aperture sights mentioned. The average mr with the 20-X sight was 0.023 inch when used in a light mirage on the NRA target with a one-inch white square in its center.

3.3.11 More Effective Sights. These data can be used advantageously for selecting or designing sights. A sight giving the smallest sighting error on well-defined stationary targets may not be equally effective on poorly-defined moving targets, and therefore it may be desirable to consider its effectiveness under various conditions. The procedure used in the test covered in Report No. DPS-87 (Reference 1) permits an evaluation of sights on short-exposure-time targets. The data obtained in the two tests permit a fair evaluation of sight effectiveness. The sights which were the most effective in the previous test also permitted the smallest sighting error in this test. The telescope sight was found to be the most effective type. However, while a telescope with a high magnification gave the smallest sighting error in this test, a sight of lower magnification (2-1/2 X) was found to be more effective in the previous test than one with a higher and one with a lower magnification. This indicates that there is an optimum magnification for a particular application. Variable-power telescopes, such as the one used in these tests, are available but the field of view may be somewhat smaller than that for single-power telescopes of comparable power and size. While the telescope sight has the advantage of permitting better visibility of sighting point and target it has the disadvantages of larger configuration, greater weight, and a more critical eye relief for maintaining an effective field of view when compared with metallic sights. The characteristics of magnification, width of field, eye relief, and illumination are interrelated in such a manner that a low magnification is accompanied with a wide field of view, a long eye relief, and good illumination. Development may result in further improvements in the telescope sight and its mount.

The selection of a sight is frequently based on economical factors. The post or bead front and an open rear sight is the cheapest type of sight to produce and it is commonly supplied on hunting rifles. However, provision is generally made for attaching a more effective sight. Undesirable characteristics of these sights were covered in detail in Report No. DPS-87 (Reference 1). The effectiveness of this type of sight can be improved by using a configuration which permits maximum visibility of sights and target and one which eliminates glare.

[a]An average mr = 0.053 inch was obtained in test 6 using an 0.042-inch-diameter rear aperture, an 0.140-inch-diameter front aperture, a distance of 2.0 inches between rear sight and eye, a distance of 40 inches between front sight and eye, and a 6-inch-diameter aiming point.

Should metallic sights be used for reasons other than maintaining a small sighting error it is advantageous to position the front sight as far from the eye as the configuration of the weapon will permit, and to use an aperture rear sight at a distance of between two and four inches from the eye. Further study may show it possible to design an aperture front sight suitable for field use which permits a smaller sighting error than that obtainable with the post or bead. It is probable that an aperture front sight of the type used in the match sight but with a smaller web so as to obscure a smaller part of the field would be suitable. Tests would be required to determine the optimum size of aperture and web. Such a sight would be expected to permit better visibility of sight and target and to eliminate glare.

The visibility of the target is dependent on its brightness contrast (Reference 3). Therefore, the most favorable target, and the one with the greatest brightness contrast, would be a black aiming point on a white background. The NRA target, while employing neither a completely black aiming point nor a white background, does give a high level of brightness contrast. The most favorable target size and shape are dependent on the sights used. These data show that it is possible to design a more effective target for use with sights similar to those on the M1 rifle than the present military targets. A target having the shape of the Canadian military has the added advantage of permitting impact of the bullets at the aiming point.

4. CONCLUSIONS

The effect of the following factors on sighting error was demonstrated: individual, intensity of illumination, atmospheric conditions, target, type of rear sight, diameter of rear-sight aperture, distance between rear sight and eye, type of front sight, diameter of front-sight aperture, distance between front sight and eye, magnification of telescopic sight, firing position, and relation between sights and stock.

5. RECOMMENDATIONS

It is recommended that these data be considered in marksmanship training and in weapon design, and that further tests be conducted in areas where quantitative data are desired.

SUBMITTED:

L. F. Moore

L. F. MOORE
Project Engineer

REVIEWED:

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APPROVED:

H. A. Noble

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

REFERENCES

1. Moore, L. F. "A Comparison of Rifle Effectiveness When Firing at Short-Exposure-Time Targets." Aberdeen Proving Ground, Maryland. Report No. DPS-87, December 1960.

2. Moore, L. F. "A Test of a Sighting Error Recorder." Aberdeen Proving Ground, Maryland. Project No. TS2-2015, March 1956.

3. Light, Vision and Seeing by Matthew Luckiesh.

4. Fatigue and Impairment in Man by S. Howard Bartley and Eloise Chute.

APPENDICES

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APPENDIX A

Correspondence

ORDTS
00/6UI 14123
APG 400.112/1036 (1956)

1st Ind ACBonkemeyer/mmm/53085

SUBJECT: Report on Test of Sighting Error Recorder

DA, ORD O, Washington 25, D.C., 27 Apr 56

TO: CG, Aberdeen Proving Ground, Md

1. The test program recommended in the basic communication is approved. Costs are chargeable to Project TS2-2015.

2. It is the opinion of this office that the tests should be conducted under controlled light conditions. It is not believed desirable to construct a second sighting error recorder unless the validity of the data obtained in the tests makes such action necessary.

FOR THE CHIEF OF ORDNANCE:

G. P. Grant

G. P. GRANT
Lt Col, Ord Corps
Assistant

1 Incl
w/d

ORDNANCE CORPS
ABERDEEN PROVING GROUND MrLFMoore/ps/32134
MARYLAND
DEVELOPMENT AND PROOF SERVICES

IN REPLY REFER TO
Opg 400.112/1036(1956)
ORDBG-DP-TI

SUBJECT: Report on Test of Sighting Error Recorder

TO: Chief of Ordnance
Department of the Army
Washington 25, D.C.

ATTN: ORDTS

1. Attached is a copy of the Forty-fourth Report on Project TS2-2015 covering a test of a sighting error recorder as requested in Teletype ORD 21807 dated 5 December 1955.

2. The sighting error recorder provides a facility with which the sighting error for a given set of conditions can be determined conveniently. Since little data are available for use in sight design or marksmanship training it would appear advantageous to conduct tests using this device to determine the effect of the following conditions on the sighting error.

a. The size and shape of the front sight.

b. The size and shape of the rear sight.

c. The size, shape and color of the target.

d. The distance between the sights and the distance from the rear sight to the eye.

e. The front sight finish.

f. Atmospheric conditions.

g. Light conditions.

3. Tests can be conducted at this station using the facilities employed for the test of the sighting error recorder. However, the test data obtained show that it is desirable to conduct some tests under controlled light conditions. One of the 100-yard closed ranges could be used after the installation of adequate lights. Also, the test could be conducted more rapidly using two sighting error recorders.

FOR THE DIRECTOR:

BENJAMIN S. GOODWIN
Assistant

1 Incl
1. 44th Rept on Proj. No. TS2-2015

A-2

ATBC 474 (9 Oct 56) 4th Ind
SUBJECT: Night Firing Sight for the M1 Rifle
474.1/425 (1956)
BOARD NR 3, CONARC (7103), Fort Benning, Georgia

TO: Commanding General, Aberdeen Proving Ground, Maryland
ATTN: Small Arms (L. F. Moore)

Ithaca Gun Company sights are attached.

FOR THE ACTING PRESIDENT:

JAMES B. EDWARDS
CWO, USA
Secretary

1 Incl
2 M1 Rifle Sights

Copy furnished:
CG, CONARC, ATTN: ATDEV-3

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ORDNANCE
WASHINGTON 25, D. C.

MMLadigan/53085

IN REPLY REFER TO:

ORDTS

9 October 1956

SUBJECT: Night Firing Sight for the M1 Rifle

TO: Commanding General
Continental Army Command
Fort Monroe, Virginia

REFERENCES: a. Ltr, 23 May 55, OO/500 19899

b. 7th Ind to CONARC, OO 474.1/50; ATDEV-11 474 (3 Oct 52)

As inclosure to Ref. a above, this office forwarded to your headquarters two front sights for the M1 Rifle which were submitted for evaulation by the Ithaca Gun Company. Since the manufacturer is now inquiring with respect to these sights, it is requested that this office be advised whether the Ithaca sights were included in the tests referred to in Ref. b above, and if so what conclusions were reached with respect thereto.

FOR THE CHIEF OF ORDNANCE:

A. C. BONKEMEYER
Assistant

ATDEV-474(9 Oct 56) 1st Ind
Headquarters Continental Army Command, Fort Monroe, Virginia

TO: Chief of Ordnance, Department of the Army, Washington 25, DC

1. The test referred to in basic letter (Bd Nr 3, CONARC, project 2707) was cancelled 12 June 1956.

2. This headquarters was informed that the Office of Chief of Ordnance had directed Aberdeen Proving Ground to conduct tests to determine effect of various conditions on sighting error. It appeared that this test duplicated the one planned by Board Nr 3, CONARC, which was to determine an optimum sight combination for field use under various light conditions.

ATDEV-474(9 Oct 56) 1st Ind
SUBJECT: Night Firing Sight for the M1 Rifle

3. It was felt that results obtained at Aberdeen Proving Ground would be more conclusive than those which would result from a Board Nr 3, CONARC, test since facilities for measuring low level illumination are extremely limited at Fort Benning, Georgia. Therefore the Board Nr 3, CONARC, test was cancelled with the intent to establish a new testing project to evaluate only those sight combinations determined by the Ordnance Corps to most warrant further consideration after conclusion of the Aberdeen Proving Ground test.

4. It is requested that this headquarters be informed of the status of tests being conducted at Aberdeen Proving Ground.

FOR THE COMMANDER:

SAMUEL J. CHILK
Lt Col AGC
Asst Adj General

Cy furnished:
Pres, Bd Nr 3, CONARC

ORDTS
00/6UO 40621
ATDEV-474(9 Oct 56)
SUBJECT: Night Firing Sight for the M1 Rifle

2d Ind

ACBonkemeyer/mmm/53085

WPR 474.1/425 (1956)

DA, ORD 0, Washington 25, D.C., 30 Oct 56

TO: OG, Continental Army Command, Fort Monroe, Virginia

1. Preparation of the test facility at Aberdeen Proving Ground which will be used to conduct tests to determine the effect of various conditions on sighting error is nearing completion. The tests should get underway within the near future.

2. Inasmuch as the tests originally scheduled at Board No. 3 CONARC have been canceled, it is requested that the Ithaca Gun Company sights referred to in the basic communication be forwarded to Aberdeen Proving Ground, Attention, Small Arms (L.F. Moore) in order that these sights may be included in the Ordnance tests.

FOR THE CHIEF OF ORDNANCE:

F. H. Carten

F. H. CARTEN
Assistant
G. P. GRANT
Lt Col, Ord Corps
Assistant

ATDEV-3 474(9 Oct 56)

3d Ind

WPR 474.1/425 (1956)

Headquarters Continental Army Command, Fort Monroe, Virginia 8 NOV 1956

TO: President, Board Nr 3, CONARC, Fort Benning, Georgia

It is desired that the Ithaca Gun Company sights be returned as requested in paragraph 2, 2nd Ind.

FOR THE COMMANDER:

A T Cauley

ARTHUR T. CAULEY
Major, AGC
Asst Adj Gen

Cy furnished:
Chief of Ordnance, DA

NOV 1 17 53

NNNN

ET069EUA226

RR RUETGH

DE RUEPC 73G

R 011712Z

FM COFORD DA WASHDC

TO CG ABERDEEN PG MD

DA GRNC

BT

FOR D AND PS L F MOORE FROM ORDTS BONKEMYER TT ORD19473 RE 1ST IND

1Z96G 00/6UI 14123 CMM DTD 27 APR APG 400.112/1036 PAREN 1956 PAREN WHICH DIRECTED TESTS TO EVALUATE RIFLE SIGHTS PD IN THE NEAR FUTURE ADDITIONAL SIGHTS FOR INCLUSION IN PROGRAM WILL BE FORWARDED YOUR STATION FROM BD 3 CONARC FT BENNING PD RQST INITIATION OF THIS PROGRAM BE

EXPEDITED.

BT

CFN ORD19473 1ST 00/6UI 14123 27 400.112/1036 1956 3

01/1712Z

FILE -------400.112/

DATE -------1 NOV 56

ACTION -----D&PS

ORDTS
OO
ORDBG-DP-TI 400.112/2776 (1957)

1st Ind

Mr Cosgrove/mmm/53085

SUBJECT: Test of Jet Black

DA, ORD O, WASHINGTON 25, D.C., 9 December 1957

TO: Commanding General, Aberdeen Proving Ground, Md

1. This office has no objection to the inclusion of subject material in the sighting error test as outlined in the basic letter.

2. A sample of this material has been considered by USCONARC. The comments of that headquarters are contained in the attached file.

FOR THE CHIEF OF ORDNANCE:

G. R. GRANT
Lt Col, Ord Corps
Assistant

2 Incl
1. N/c
Added 1 Incl - 2
2. Cy file OO/7UO 32236
basic and 1st Ind

U. S. ARMY ORDNANCE
DEVELOPMENT AND PROOF SERVICES
ABERDEEN PROVING GROUND
MARYLAND

Mr Moore/hlo/51240

IN REPLY REFER TO
ORDBG-DP-TI 400.112/2776

SUBJECT: Test of Jet Black

TO: Chief of Ordnance
Department of the Army
Washington 25, D. C.
ATTENTION: Mr. A. C. Bonkemeyer

The attached letter (with inclosure) has been received and it is requested that this station be advised of the desirability of conducting a test on this product. If a test is desired, it can be incorporated in a sighting error test, scheduled at this station, with little additional cost to the program.

FOR THE DIRECTOR:

Claude E. Brown
CLAUDE E. BROWN
Assistant

1 Incl
1. Ltr fr Kenfields Products

KENFIELDS PRODUCTS
134 CALLE DE LOS MOLINOS
SAN CLEMENTE, CALIFORNIA

4 October 57

Bldg #350

Commanding General
Aberdeen Proving Grounds
Aberdeen, Maryland

Dear Sir:

The enclosed letter is self-explanatory.

As suggested, we are sending you several samples of JET-BLACK and would deeply appreciate hearing from you regardless of your reaction to this product.

Sincerely,

KENFIELDS PRODUCTS

Ken Nolan

Ken Nolan
General Manager

jr

Enclosure

TELEPHONE HYACINTH 2-5197

COPY/nw

HEADQUARTERS FORT LEWIS

OFFICE OF THE ORDNANCE OFFICER

FORT LEWIS, WASHINGTON

2 October 1957

Mr. Ken Nolan, General Manager
Kenfields Products
134 Calle De Los Molinos
San Clemente, California

Dear Mr. Nolan:

We received your sample of Jet Black together with your letter of 4 September 57 and distributed the four samples in our shops and to the troops on the firing range. Both the shops and the troops have nothing but praise for your product.

May I recommend that you send a suitable sample to the Commanding General, Aberdeen Proving Ground, Aberdeen, Maryland. If they concur in our findings it is probable that they might initiate action to have your Jet Black placed in our supply channels.

Sincerely,

t/ LELAND F. ADAIR
Colonel, Ord Corps
Ordnance Officer

COPY/nw

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ORDNANCE
WASHINGTON 25, D. C.

Mr Cosgrove/mmm/53085

00/7U032236
IN REPLY REFER TO:
ORDTS

17 September 1957

SUBJECT: Sight Blackening Material for Small Arms Submitted by Kenfields Products

TO: Commanding General
U. S. Continental Army Command
Fort Monroe, Virginia
ATTN: ATTNF

1. Two spray cans of the material referred to in the subject (known commercially as JET BLACK) are being forwarded under separate cover for your consideration.

2. Material of this type may be useful as a replacement or substitute for the carbide lamp listed in TA60-18.

FOR THE CHIEF OF ORDNANCE:

1 Incl
1. Cans (2)

t/ J. F. KREITZER
Lt Col, Ord Corps
Assistant

COPY/nw

ATINF 474.8 (17 Sep 57) 1st Ind
SUBJECT: Sight Blackening Material for Small Arms Submitted by Kenfields Products

00/7U0-32236 10 OCT 1957

Headquarters, United States Continental Army Command, Fort Monroe, Virginia

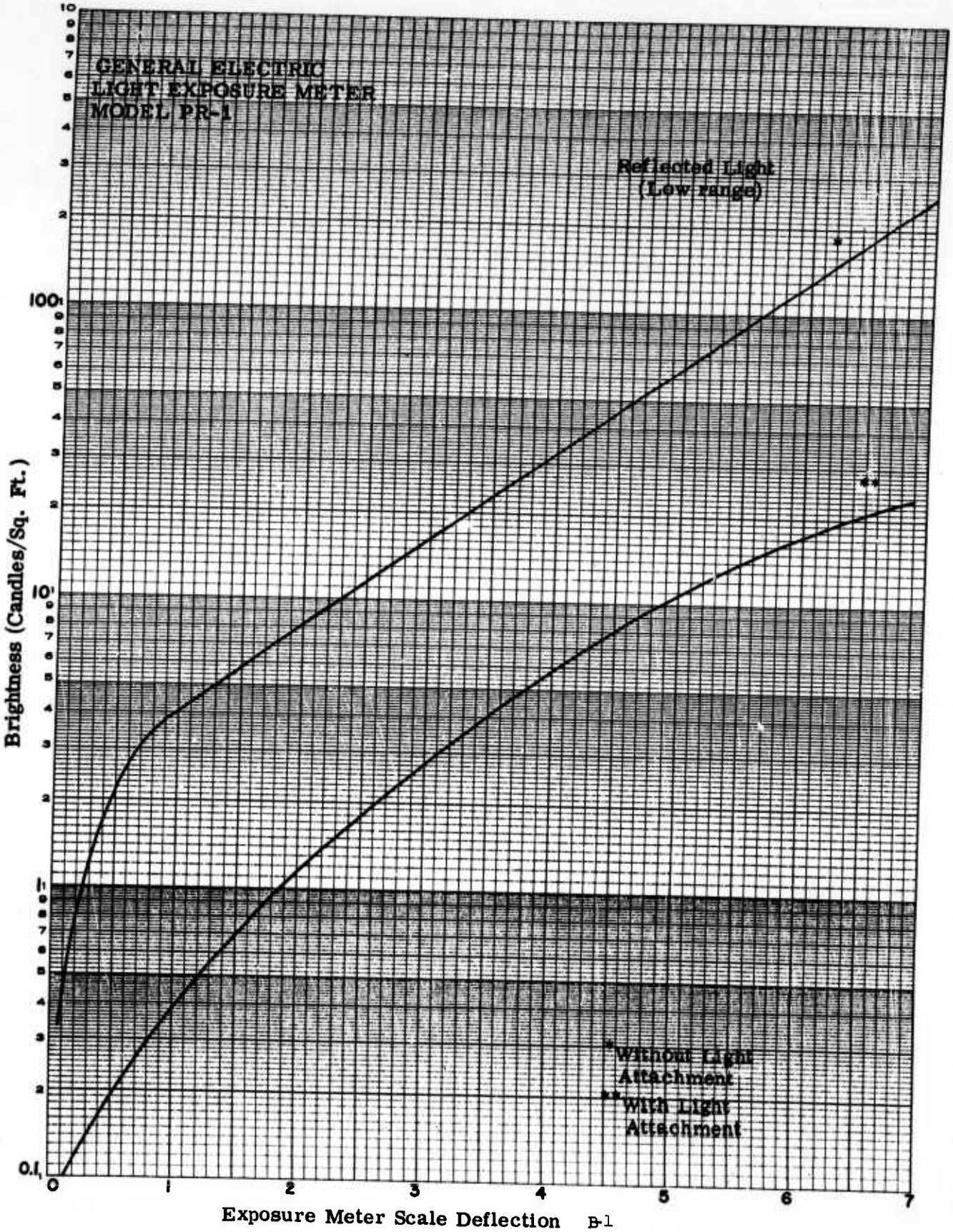
TO: Chief of Ordnance, Department of the Army, Washington 25, D. C.

Results of inquiries as to the merits of "Jet Black" as a sight blackener indicate this item is not acceptable as a substitute for the carbide lamp. The material reportedly "turns gray," has a "shine" and tends to "build-up". Any of these conditions limit its use to emergency situations only.

FOR THE COMMANDER:

1 Incl
w/d

t/ LEONARD S. LEE
Major, AGC
Asst Adj General


GENERAL ELECTRIC
LIGHT EXPOSURE METER
MODEL PR-1
Reflected Light
(Low range)
*Without Light Attachment
**With Light Attachment
Brightness (Candles/Sq. Ft.)
Exposure Meter Scale Deflection
0.1
1
10
100
0
1
2
3
4
5
6
7

B-1

SIGHTING ERROR TEST NO. 1

Date: 6 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.3	3.0	Overcast	64	SW, 12	1.002
0900	0.5	4.1	Broken	65	WSW, 13	1.000
1000	0.9	4.5	Broken	66	S, 12	0.998
1100	1.5	5.3	Overcast	68	SW, 13	0.994
1200	1.3	5.2	Overcast	68	SSW, 10	0.993

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture)
Front Sight: Redfield International Match (0.110-inch-diameter aperture)
Sight Radius: 34 inches
Distance-Rear Sight to Eye: 2 inches
Target: N.R.A. 100-yard small bore rifle
Range: 100 yards

Trial No.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis									
1[b]	0811 to 0828	0.35B	0.10L	0.094	0.067	0.052	0.32	0.21	0.34
2	0925 to 0938	0.42B	0.09L	0.049	0.033	0.035	0.15	0.13	0.17
3	1033 to 1045	0.30B	0.15L	0.079	0.050	0.050	0.16	0.22	0.22
4	1134 to 1146	0.26B	0.07L	0.056	0.027	0.045	0.10	0.13	0.14
Average	14 min	0.33B	0.10L	0.070	0.044	0.046	0.18	0.17	0.22
Rifleman: Hendricks									
1	0839 to 0852	0.27B	0.41L	0.138	0.119	0.047	0.44	0.25	0.44
2	0945 to 0958	0.17B	0.45L	0.176	0.154	0.066	0.66	0.26	0.68
3	1049 to 1103	0.10B	0.66L	0.120	0.070	0.087	0.29	0.37	0.45
4	1150 to 1202	0.07B	0.44L	0.161	0.131	0.069	0.68	0.29	0.68
Average	13 min	0.15B	0.49L	0.149	0.118	0.067	0.52	0.29	0.56

[b]The exact location of several shot holes within the group was estimated.

Trial No.	Time	C. I. from Index Point	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Smith								
1[b]	0902 to 0922	0.38B	0.32L	0.082	0.056	0.060	0.13	0.13	0.17
2	1002 to 1029	0.28B	0.34L	0.055	0.032	0.039	0.18	0.15	0.20
3	1111 to 1128	0.16B	0.30L	0.081	0.059	0.048	0.25	0.18	0.30
4	1204 to 1224	0.06B	0.37L	0.123	0.063	0.100	0.23	0.40	0.42
Average	21 min	0.22B	0.33L	0.085	0.052	0.062	0.20	0.22	0.27
Average for All Individuals	16 min	0.23B	0.31L	0.101	0.071	0.058	0.30	0.23	0.35

[b]The exact location of several shot holes within the group was estimated.

Date: 7 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.5	3.6	Clear	52	NW, 4	1.035
0900	0.9	5.0	Clear	58	NW, 8	1.024
1000	1.0	5.0	Clear	60	NW, 10	1.021
1100	1.2	5.3	Clear	63	NW, 9	1.015
1200	1.4	5.1	Clear	64	N, 5	1.012

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture)
Front Sight: Redfield International Match (0.110-inch-diameter aperture)
Sight Radius: 34 inches
Distance-Rear Sight to Eye: 2 inches
Target: N.R.A. 100-yard small bore rifle
Range: 100 yards

Trial No.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis									
1	0807 to 0822	0.60B	0.03R	0.067	0.061	0.032	0.21	0.12	0.21
2	0919 to 0931	0.56B	0.05L	0.084	0.059	0.058	0.21	0.17	0.23
3	1016 to 1027	0.55B	0.13L	0.079	0.057	0.043	0.16	0.15	0.18
4	1107 to 1116	0.43B	0.10L	0.078	0.053	0.042	0.26	0.19	0.26
Average	12 min	0.54B	0.06L	0.077	0.058	0.044	0.21	0.16	0.22
Rifleman: Hendricks									
1	0825 to 0844	0.37B	0.46L	0.119	0.071	0.088	0.34	0.34	0.43
2	0933 to 0943	0.36B	0.50L	0.141	0.096	0.086	0.42	0.31	0.43
3	1029 to 1037	0.24B	0.46L	0.233	0.197	0.116	0.84	0.47	0.85
4	1118 to 1127	0.04B	0.62L	0.169	0.141	0.069	0.47	0.33	0.49
Average	12 min	0.25B	0.51L	0.166	0.126	0.090	0.52	0.36	0.55
Rifleman: Smith									
1	0850 to 0914	0.63B	0.44L	0.126	0.092	0.081	0.31	0.23	0.32
2	0948 to 1011	0.48B	0.47L	0.101	0.036	0.087	0.14	0.30	0.30
3	1041 to 1104	0.29B	0.47L	0.079	0.052	0.048	0.18	0.21	0.23
4	1133 to 1154	0.21B	0.45L	0.092	0.054	0.064	0.20	0.25	0.26
Average	23 min	0.40B	0.46L	0.100	0.058	0.070	0.21	0.25	0.28
Average for All Individuals	16 min	0.40B	0.34L	0.114	0.081	0.068	0.31	0.26	0.35

Date: 10 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.6	3.8	Clear	50	0	1.037
0900	1.0	4.3	Clear	58	0	1.020
1000	1.2	5.0	Clear	62	NE, 3	1.011
1100	1.3	4.6	Clear	67	NE, 4	1.002
1200	1.2	4.6	Clear	71	NE, 4	0.995

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture)
Front Sight: Redfield International Match (0.110-inch-diameter aperture)
Sight Radius: 34 inches
Distance-Rear Sight to Eye: 2 inches
Target: N.R.A. 100-yard small bore rifle
Range: 100 yards

Trial No.	Time	C.I. from Index Point	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
1	0812 to 0827	0.43B 0.01R	0.076	0.057	0.044	0.23	0.15	0.24
2	0914 to 0921	0.50B 0.05L	0.060	0.051	0.024	0.22	0.09	0.22
3[b]	1007 to 1019	0.32B 0.08L	0.061	0.048	0.029	0.24	0.13	0.24
4[b]	1110 to 1122	0.20B 0.14L	0.042	0.030	0.024	0.16	0.11	0.17
Average	12 min	0.36B 0.06L	0.060	0.046	0.030	0.21	0.12	0.22
Rifleman: Hendricks								
1	0831 to 0843	0.44B 0.38L	0.113	0.059	0.082	0.33	0.29	0.34
2[b]	0926 to 0940	0.28B 0.36L	0.053	0.044	0.028	0.24	0.10	0.26
3	1023 to 1039	0.23B 0.47L	0.131	0.092	0.073	0.31	0.28	0.40
4	1127 to 1140	0.03A 0.55L	0.070	0.047	0.048	0.15	0.20	0.25
Average	14 min	0.23B 0.44L	0.092	0.060	0.058	0.26	0.22	0.31

[b]The exact location of several shot holes within the group was estimated.

Trial No.	Time	C. I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Smith									
1	0848 to 0907	0.44B	0.34L	0.083	0.052	0.049	0.26	0.26	0.26
2	0946 to 1002	0.28B	0.33L	0.092	0.055	0.062	0.27	0.25	0.32
3	1045 to 1107	0.16B	0.49L	0.084	0.057	0.047	0.24	0.20	0.30
4	1146 to 1207	0.09A	0.52L	0.079	0.057	0.041	0.28	0.20	0.28
Average	20 min	0.20B	0.42L	0.084	0.055	0.050	0.26	0.23	0.29
Average for all Individuals	15 min	0.26B	0.31L	0.079	0.054	0.046	0.24	0.19	0.27

SIGHTING ERROR TEST NO. 2

Date: 11 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.5	3.9	Clear	56	SW, 4	1.023
0900	1.1	4.6	Scattered clouds	61	WSW, 7	1.011
1000	1.5	5.3	Scattered clouds	66	SW, 8	1.001
1100	1.3	5.0	Scattered clouds	70	SW, 9	0.994
1200	1.3	5.0	Broken clouds	72	SW, 9	0.990
1300	1.3	5.0	Scattered clouds	77	WSW, 10	0.979
1400	1.4	5.0	Scattered clouds	79	W, 12	0.976
1500	1.4	5.2	Scattered clouds	80	W, 11	0.972

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: N.R.A. 100-yard small bore rifle.
Range: 100 yards.

Front Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis								
0.065	1417 to 1430	0.02A	0.49L	0.216	0.177	0.098	0.57	0.31	0.58
Rifleman:	Hendricks								
0.065	1150 to 1200	0.24B	0.43L	0.211	0.144	0.135	0.48	0.51	0.61
Rifleman:	Smith								
0.065	1005 to 1018	0.25B	0.15L	0.158	0.081	0.116	0.34	0.50	0.52
Average	12 min	0.16B	0.36L	0.195	0.134	0.116	0.46	0.44	0.57
Rifleman:	Davis								
0.085	0813 to 0827	0.51B	0.16R	0.110	0.087	0.063	0.40	0.22	0.40
Rifleman:	Hendricks								
0.085	1329 to 1342	0.26A	0.42L	0.136	0.105	0.059	0.49	0.25	0.49
Rifleman:	Smith								
0.085	1100 to 1127	0.10A	0.36L	0.092	0.049	0.066	0.17	0.27	0.[illegible]
Average	18 min	0.05B	0.21L	0.113	0.080	0.063	0.35	0.25	0.39
Rifleman:	Davis								
0.095	0925 to 0936	0.38B	0.03L	0.089	0.057	0.050	0.27	0.20	0.28
Rifleman:	Hendricks								
0.095	1434 to 1449	0.58A	0.27L	0.150	0.114	0.084	0.45	0.32	0.48
Rifleman:	Smith								
0.095	1244 to 1307	0.34A	0.38L	0.125	0.064	0.094	0.23	0.32	0.32
Average	16 min	0.18A	0.23L	0.121	0.078	0.076	0.32	0.28	0.36

Front Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis								
0.110	1024 to 1036	0.20B	0.21L	0.071	0.059	0.031	0.27	0.13	0.27
Rifleman:	Hendricks								
0.110	0834 to 0852	0.26B	0.42L	0.080	0.074	0.025	0.32	0.10	0.32
Rifleman:	Smith								
0.110	1345 to 1412	0.48A	0.70L	0.101	0.059	0.072	0.23	0.32	0.33
Average	19 min	0.01A	0.44L	0.084	0.064	0.043	0.27	0.18	0.31
Rifleman:	Davis								
0.125	1131 to 1145	0.05A	0.16L	0.051	0.044	0.024	0.17	0.09	0.17
Rifleman:	Hendricks								
0.125	0941 to 1000	0.02B	0.46L	0.118	0.104	0.036	0.34	0.16	0.34
Rifleman:	Smith								
0.125	1452 to 1518	0.75A	0.60L	0.094	0.059	0.062	0.24	0.20	0.25
Average	20 min	0.26A	0.41L	0.088	0.069	0.041	0.25	0.15	0.25
Rifleman:	Davis[b]								
0.140	1312 to 1325	0.32A	0.22L	0.053	0.036	0.034	0.13	0.14	0.15
Rifleman:	Hendricks								
0.140	1040 to 1057	0.14A	0.54L	0.092	0.065	0.049	0.24	0.21	0.28
Rifleman:	Smith								
0.140	0855 to 0920	0.01B	0.34L	0.078	0.048	0.053	0.18	0.22	0.23
Average	18 min	0.15A	0.37L	0.074	0.050	0.045	0.18	0.19	0.22

[b]The exact location of several shot holes within the group was estimated.

Date: 12 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.3	3.6	Clear	56	NW, 3	1.024
0900	0.9	4.5	Clear	62	N, 8	1.010
1000	1.1	4.9	Clear	65	N, 10	1.006
1100	1.1	5.0	Clear	67	N, 9	1.003
1200	1.2	5.0	Clear	69	NNE, 6	1.000
1300	1.1	5.0	Clear	73	W, 5	0.992
1400	1.0	4.9	Clear	74	NW, 8	0.990
1500	1.2	5.3	Clear	74	NW, 7	0.989
1600	1.2	5.0	Clear	74	W, 5	0.990

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: N.R.A. 100-yard small bore rifle.
Range: 100 yards.

Front Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis								
0.065	1543 to 1556	0.08A	0.47L	0.133	0.097	0.073	0.36	0.27	0.37
Rifleman:	Hendricks								
0.065	1242 to 1257	0.02B	0.38L	0.142	0.104	0.077	0.49	0.36	0.55
Rifleman:	Smith								
0.065	1001 to 1022	0.53B	0.34L	0.177	0.121	0.107	0.58	0.32	0.62
Average	16 min	0.16B	0.40L	0.151	0.107	0.086	0.48	0.32	0.51
Rifleman:	Davis								
0.085	0917 to 0935	0.37B	0.00	0.080	0.045	0.061	0.21	0.27	0.33
Rifleman:	Hendricks								
0.085	1352 to 1404	0.46A	0.52L	0.188	0.162	0.080	0.43	0.31	0.50
Rifleman:	Smith								
0.085	1108 to 1134	0.01B	0.22L	0.123	0.077	0.082	0.29	0.34	0.37
Average	19 min	0.03A	0.25L	0.130	0.095	0.074	0.31	0.31	0.40
Rifleman:	Davis								
0.095	1027 to 1044	0.30B	0.12L	0.046	0.038	0.024	0.14	0.11	0.15
Rifleman:	Hendricks								
0.095	1502 to 1520	0.61A	0.61L	0.098	0.068	0.057	0.28	0.27	0.29
Rifleman:	Smith								
0.095	1259 to 1325	0.40A	0.50L	0.088	0.056	0.051	0.26	0.27	0.28
Average	20 min	0.24A	0.41L	0.077	0.054	0.044	0.23	0.22	0.24
Rifleman:	Davis[b]								
0.110	1140 to 1200	0.08B	0.32L	0.039	0.024	0.025	0.09	0.07	0.09
Rifleman:	Hendricks								
0.110	0814 to 0841	0.28B	0.40L	0.094	0.081	0.034	0.43	0.09	0.44
Rifleman:	Smith								
0.110	1407 to 1435	0.62A	0.78L	0.123	0.097	0.065	0.37	0.20	0.39
Average	25 min	0.09A	0.50L	0.085	0.067	0.041	0.30	0.12	0.31
Rifleman:	Davis								
0.125	1329 to 1348	0.48A	0.39L	0.057	0.034	0.044	0.10	0.12	0.15
Rifleman:	Hendricks								
0.125	0940 to 0958	0.05B	0.49L	0.069	0.052	0.037	0.25	0.18	0.26
Rifleman:	Smith								
0.125	1523 to 1537	0.94A	0.67L	0.071	0.042	0.048	0.18	0.20	0.20
Average	17 min	0.46A	0.52L	0.066	0.043	0.043	0.18	0.17	0.20
Rifleman:	Davis[b]								
0.140	1441 to 1500	0.65A	0.32L	0.042	0.036	0.015	0.09	0.07	0.09
Rifleman:	Hendricks								
0.140	1049 to 1106	0.00	0.62L	0.102	0.052	0.074	0.19	0.33	0.34
Rifleman:	Smith								
0.140	0844 to 0912	0.03B	0.47L	0.064	0.027	0.058	0.11	0.26	0.26
Average	21 min	0.21A	0.47L	0.069	0.038	0.049	0.13	0.22	0.23

[b]The exact location of several shot holes within the group was estimated.

Date: 13 October 1960

Time	Light[a] High	Light[a] Low	Sky Conditions	Temperature, °F	Wind, mph	Density
0800	0.3	3.2	Overcast	55	NE, 4	1.028
0900	0.5	3.9	Overcast	57	NE, 7	1.025
1000	1.2	4.7	Overcast	59	NE, 4	1.021
1100	1.3	5.0	Overcast	64	SE, 4	1.011
1200	1.5	5.2	Scattered clouds	65	SE, 3	1.007
1300	1.7	5.3	Scattered clouds	72	SE, 4	0.994
1400	1.5	5.4	Scattered clouds	72	SE, 5	0.993
1500	1.6	5.3	Scattered clouds	74	SE, 5	0.989

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: N.R.A. 100-yard small bore rifle.
Range: 100 yards.

Front Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis									
0.065	1416 to 1428	0.20B	0.34L	0.137	0.072	0.096	0.38	0.32	0.38
Rifleman: Hendricks									
0.065	1242 to 1300	0.14B	0.74L	0.319	0.173	0.234	0.93	0.95	0.97
Rifleman: Smith									
0.065	0913 to 0930	0.44B	0.42L	0.148	0.130	0.057	0.51	0.25	0.54
Average	16 min	0.26B	0.50L	0.201	0.125	0.129	0.61	0.51	0.63
Rifleman: Davis									
0.085	0826 to 0841	0.51B	0.11R	0.074	0.028	0.065	0.15	0.23	0.24
Rifleman: Hendricks									
0.085	1338 to 1353	0.21A	0.44L	0.176	0.140	0.079	0.56	0.31	0.58
Rifleman: Smith									
0.085	1018 to 1041	0.26B	0.31L	0.106	0.060	0.080	0.21	0.40	0.45
Average	18 min	0.19B	0.21L	0.119	0.076	0.075	0.31	0.31	0.42
Rifleman: Davis									
0.095	0932 to 0953	0.40B	0.01L	0.081	0.074	0.031	0.22	0.09	0.22
Rifleman: Hendricks									
0.095	1431 to 1444	0.42A	0.70L	0.150	0.124	0.067	0.48	0.25	0.49
Rifleman: Smith									
0.095	1125 to 1149	0.08B	0.37L	0.094	0.067	0.048	0.30	0.22	0.32
Average	19 min	0.02B	0.36L	0.108	0.088	0.049	0.33	0.19	0.34

Front Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis[b]								
0.110	1044 to 1102	0.22B	0.22L	0.044	0.041	0.008	0.14	0.04	0.14
Rifleman:	Hendricks								
0.110	0848 to 0908	0.31B	0.49L	0.089	0.078	0.038	0.37	0.20	0.38
Rifleman:	Smith								
0.110	1302 to 1318	0.23A	0.57L	0.068	0.028	0.052	0.14	0.22	0.23
Average	18 min	0.10B	0.43L	0.067	0.049	0.033	0.22	0.15	0.25
Rifleman:	Davis								
0.125	1154 to 1204	0.05B	0.24L	0.062	0.042	0.041	0.14	0.09	0.15
Rifleman:	Hendricks								
0.125	0959 to 1015	0.01B	0.55L	0.094	0.062	0.057	0.29	0.25	0.31
Rifleman:	Smith								
0.125	1356 to 1412	0.50A	0.52L	0.077	0.048	0.048	0.19	0.24	0.25
Average	14 min	0.15A	0.44L	0.078	0.051	0.049	0.21	0.19	0.24
Rifleman:	Davis[b]								
0.140	1322 to 1335	0.26A	0.26L	0.102	0.084	0.044	0.25	0.18	0.26
Rifleman:	Hendricks								
0.140	1107 to 1122	0.10A	0.61L	0.078	0.048	0.050	0.26	0.20	0.29
Rifleman:	Smith								
0.140	0803 to 0820	0.01A	0.41L	0.102	0.084	0.048	0.34	0.22	0.38
Average	15 min	0.12A	0.43L	0.094	0.072	0.047	0.28	0.20	0.31

[b]The exact location of several shot holes within the group was estimated.

Date: 14 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.3	3.5	Broken	58	0	1.021
0900	0.8	4.3	Broken	61	0	1.015
1000	1.4	5.2	Broken	61	SE, 4	1.014
1100	1.5	5.2	Broken	63	SE, 7	1.011
1200	1.6	5.3	Broken	65	SE, 3	1.007
1300	1.3	5.2	Broken	70	SE, 4	0.996
1400	1.3	5.2	Scattered clouds	70	SSE, 5	0.995
1500	1.3	5.3	Scattered clouds	75	0	0.985

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: N.R.A. 100-yard small bore rifle.
Range: 100 yards.

Front Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis								
0.065	1419 to 1429	0.22B	0.25L	0.162	0.112	0.080	0.38	0.38	0.40
Rifleman:	Hendricks								
0.065	1231 to 1243	0.01B	0.40L	0.315	0.197	0.216	1.11	0.72	1.16
Rifleman:	Smith								
0.065	0955 to 1015	0.46B	0.00	0.148	0.086	0.116	0.31	0.40	0.44
Average	14 min	0.23B	0.22L	0.208	0.132	0.137	0.60	0.50	0.67
Rifleman:	Davis								
0.085	0807 to 0822	0.40B	0.04R	0.085	0.054	0.053	0.27	0.16	0.27
Rifleman:	Hendricks[b]								
0.085	1333 to 1349	0.32A	0.28L	0.040	0.031	0.019	0.15	0.09	0.15
Rifleman:	Smith								
0.085	1103 to 1124	0.14B	0.01L	0.093	0.061	0.051	0.23	0.27	0.28
Average	17 min	0.07B	0.08L	0.073	0.049	0.041	0.22	0.17	0.23
Rifleman:	Davis								
0.095	0911 to 0928	0.34B	0.07R	0.073	0.058	0.030	0.24	0.15	0.24
Rifleman:	Hendricks[b]								
0.095	1433 to 1450	0.31A	0.34L	0.097	0.057	0.073	0.14	0.38	0.41
Rifleman:	Smith								
0.095	1248 to 1312	0.11A	0.15L	0.104	0.069	0.061	0.26	0.24	0.27
Average	19 min	0.03A	0.14L	0.091	0.061	0.055	0.21	0.26	0.31
Rifleman:	Davis								
0.110	1020 to 1036	0.24B	0.16L	0.038	0.034	0.020	0.12	0.07	0.12
Rifleman:	Hendricks								
0.110	0827 to 0847	0.14B	0.59L	0.106	0.085	0.050	0.32	0.19	0.34
Rifleman:	Smith								
0.110	1354 to 1415	0.36A	0.46L	0.063	0.036	0.048	0.15	0.15	0.17
Average	19 min	0.01B	0.40L	0.069	0.052	0.039	0.20	0.14	0.21
Rifleman:	Davis[b]								
0.125	1128 to 1144	0.05B	0.13L	0.049	0.032	0.035	0.13	0.16	0.17
Rifleman:	Hendricks								
0.125	0934 to 0950	0.01B	0.54L	0.074	0.057	0.037	0.26	0.17	0.27
Rifleman:	Smith								
0.125	1455 to 1518	0.50A	0.41L	0.059	0.031	0.040	0.13	0.15	0.15
Average	18 min	0.15A	0.36L	0.061	0.040	0.037	0.17	0.16	0.20
Rifleman:	Davis								
0.140	1316 to 1330	0.31A	0.15L	0.038	0.025	0.024	0.10	0.07	0.11
Rifleman:	Hendricks								
0.140	1040 to 1058	0.04B	0.56L	0.097	0.082	0.040	0.30	0.11	0.31
Rifleman:	Smith								
0.140	0852 to 0907	0.05B	0.18L	0.073	0.056	0.034	0.21	0.14	0.22
Average	16 min	0.07A	0.30L	0.069	0.054	0.033	0.20	0.11	0.21

[b]The exact location of several shots within the group was estimated.

SIGHTING ERROR TEST NO. 3

Date: 17 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
1000	0.6	4.2	Clear	64	NNW, 6	1.004
1100	1.0	4.7	Clear	68	NNW, 8	1.000
1200	1.0	4.7	Clear	69	NNW, 10	0.995
1300	1.0	4.7	Scattered clouds	71	N, 10	0.992
1400	1.1	4.7	Scattered clouds	73	NNW, 9	0.989
1500	1.3	5.0	Scattered clouds	74	WNW, 4	0.983
1600	1.2	5.0	Scattered clouds	74	W, 7	0.989
1700	1.0	4.6	Scattered clouds	75	W, 5	0.985

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (Aperture - see each rifleman).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: N.R.A. 100-yd small bore rifle.
Range: 100 yards.

Rear Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis								
0.030	1540 to 1553	0.62A	0.45L	0.069	0.053	0.029	0.26	0.15	0.26
Rifleman:	Hendricks								
0.030	1333 to 1348	0.04A	0.82L	0.092	0.070	0.039	0.31	0.15	0.31
Rifleman:	Smith								
0.030	1130 to 1141	0.26B	0.64L	0.114	0.076	0.074	0.33	0.21	0.36
Average	13 min	0.13A	0.64L	0.092	0.066	0.047	0.30	0.17	0.31
Rifleman:	Davis								
0.038	0952 to 1006	0.04A	0.49L	0.068	0.033	0.054	0.10	0.18	0.19
Rifleman:	Hendricks[b]								
0.038	1458 to 1511	0.48A	0.92L	0.041	0.021	0.031	0.11	0.13	0.14
Rifleman:	Smith[b]								
0.038	1253 to 1311	0.59A	0.87L	0.040	0.011	0.032	0.02	0.12	0.12
Average	15 min	0.37A	0.76L	0.050	0.022	0.039	0.08	0.14	0.15
Rifleman:	Davis[b]								
0.042	1050 to 1108	0.02A	0.36L	0.045	0.034	0.025	0.11	0.12	0.13
Rifleman:	Hendricks								
0.042	1353 to 1414	0.14A	0.66L	0.060	0.049	0.022	0.25	0.08	0.25
Rifleman:	Smith[b]								
0.042	1556 to 1619	0.60A	0.62L	0.058	0.014	0.053	0.05	0.15	0.15

[b]The exact location of several shot holes within the group was estimated.

Rear Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Average	21 min	0.25A	0.55L	0.054	0.032	0.033	0.14	0.12	0.18
Rifleman:	Davis[b]								
0.046	1144 to 1158	0.40A	0.53L	0.039	0.027	0.029	0.07	0.07	0.08
Rifleman:	Hendricks								
0.046	1009 to 1027	0.19B	0.65L	0.072	0.058	0.034	0.24	0.14	0.24
Rifleman:	Smith[b]								
0.046	1519 to 1537	1.05A	0.64L	0.049	0.019	0.043	0.11	0.24	0.26
Average	17 min	0.42A	0.61L	0.053	0.035	0.035	0.14	0.15	0.19
Rifleman:	Davis[b]								
0.050	1315 to 1331	0.78A	0.50L	0.047	0.029	0.029	0.11	0.12	0.14
Rifleman:	Hendricks								
0.050	1110 to 1125	0.22B	0.65L	0.092	0.060	0.044	0.26	0.25	0.27
Rifleman:	Smith[b]								
0.050	1622 to 1643	0.89A	0.60L	0.063	0.048	0.033	0.15	0.09	0.15
Average	17 min	0.48A	0.58L	0.067	0.046	0.035	0.17	0.15	0.19
Rifleman:	Davis								
0.058	1416 to 1435	0.86A	0.55L	0.054	0.032	0.037	0.13	0.12	0.13
Rifleman:	Hendricks								
0.058	1235 to 1250	0.30A	0.85L	0.090	0.073	0.045	0.26	0.16	0.28
Rifleman:	Smith								
0.058	1032 to 1045	0.20B	0.64L	0.090	0.063	0.049	0.31	0.19	0.33
Average	16 min	0.32A	0.68L	0.078	0.056	0.044	0.23	0.16	0.25

[b]The exact location of several shot holes within the group was estimated.

Date: 18 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.3	3.5	Scattered clouds	47	Calm	1.029
0900	0.4	4.0	Scattered clouds	57	Calm	1.013
1000	1.0	4.6	Scattered clouds	65	Calm	1.006
1100	1.2	4.8	Clear	69	NNE, 4	1.002
1200	1.2	4.7	Scattered clouds	70	NNE, 8	1.002
1300	1.1	4.7	Scattered clouds	72	ENE, 6	0.999
1400	1.0	4.9	Clear	75	SE, 6	1.000
1500	1.1	4.7	Scattered clouds	76	SE, 3	0.998
1600	1.1	5.0	Scattered clouds	78	SE, 3	0.996

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (Aperture - see each rifleman).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: N.R.A. 100-yd smallbore rifle.
Range: 100 yards.

Rear Sight Aperture Diameter, inch	Time	C. I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis								
0.030	1545 to 1600	0.61A	0.53L	0.058	0.045	0.030	0.21	0.11	0.21
Rifleman:	Hendricks								
0.030	1145 to 1214	0.49B	0.80L	0.082	0.055	0.043	0.17	0.22	0.22
Rifleman:	Smith								
0.030	0946 to 1001	0.46B	0.49L	0.075	0.052	0.044	0.28	0.16	0.28
Average	20 min	0.11B	0.61L	0.072	0.051	0.039	0.22	0.16	0.24
Rifleman:	Davis[b]								
0.038	0901 to 0917	0.00	0.58L	0.053	0.025	0.040	0.11	0.15	0.15
Rifleman:	Hendricks								
0.038	1338 to 1356	0.40A	0.90L	0.066	0.048	0.034	0.21	0.17	0.24
Rifleman:	Smith								
0.038	1100 to 1120	0.12A	0.75L	0.044	0.029	0.026	0.14	0.11	0.15
Average	18 min	0.17A	0.74L	0.054	0.034	0.033	0.15	0.14	0.18
Rifleman:	Davis[b]								
0.042	1005 to 1021	0.10B	0.36L	0.043	0.034	0.022	0.14	0.09	0.16
Rifleman:	Hendricks								
0.042	1450 to 1506	0.60A	0.79L	0.066	0.053	0.032	0.20	0.15	0.21
Rifleman:	Smith[b]								
0.042	1251 to 1314	0.48A	0.80L	0.034	0.029	0.017	0.14	0.05	0.14
Average	18 min	0.33A	0.65L	0.048	0.039	0.024	0.16	0.10	0.17
Rifleman:	Davis[b]								
0.046	1125 to 1140	0.43A	0.33L	0.036	0.019	0.027	0.08	0.09	0.10
Rifleman:	Hendricks								
0.046	0808 to 0833	0.09B	0.53L	0.075	0.043	0.050	0.17	0.21	0.24
Rifleman:	Smith[b]								
0.046	1400 to 1424	0.97A	0.76L	0.042	0.026	0.021	0.16	0.15	0.16
Average	21 min	0.44A	0.54L	0.051	0.029	0.033	0.14	0.15	0.17
Rifleman:	Davis								
0.050	1320 to 1334	0.76A	0.49L	0.057	0.038	0.032	0.12	0.17	0.18
Rifleman:	Hendricks								
0.050	0921 to 0943	0.08B	0.71L	0.069	0.039	0.054	0.15	0.17	0.22
Rifleman:	Smith								
0.050	1510 to 1540	0.93A	0.58L	0.063	0.035	0.041	0.11	0.13	0.14
Average	22 min	0.54A	0.59L	0.063	0.037	0.042	0.13	0.16	0.18
Rifleman:	Davis[b]								
0.058	1430 to 1445	0.98A	0.50L	0.051	0.030	0.033	0.16	0.09	0.17
Rifleman:	Hendricks								
0.058	1038 to 1058	0.01A	0.76L	0.081	0.051	0.049	0.23	0.22	0.24
Rifleman:	Smith								
0.058	0838 to 0855	0.39B	0.55L	0.080	0.047	0.059	0.20	0.26	0.29
Average	17 min	0.20A	0.60L	0.071	0.043	0.047	0.20	0.19	0.23

[b]The exact location of several shot holes within the group was estimated.

Date: 21 October 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.4	3.5	Scattered clouds	34	W, 4	1.073
0900	0.5	4.0	Scattered clouds	40	NW, 6	1.063
1000	0.6	4.4	Scattered clouds	48	NW, 8	1.053
1100	0.9	4.6	Clear	50	NNW, 8	1.043
1200	1.0	4.6	Clear	52	W, 6	1.039
1300	1.0	4.6	Clear	53	NNW, 8	1.039
1400	1.3	5.3	Scattered clouds	56	NW, 8	1.029
1500	1.1	4.8	Scattered clouds	54	NW, 8	1.038

[a]Reading on G.E. type HR-1 exposure meter.

Rear Sight: Redfield International Match (aperture - see each rifleman)
Front Sight: Redfield International Match (0.125-inch-diameter aperture)
Sight Radius: 34 inches
Target: N.R.A. 100-yd smallbore rifle
Distance-Rear Sight to Eye: 2 inches
Range: 100 yards

Rear Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis									
0.030	1446 to 1459	0.17A	0.56L	0.075	0.040	0.058	0.17	0.22	0.23
Rifleman: Hendricks									
0.030	1300 to 1318	0.08B	0.91L	0.066	0.038	0.038	0.22	0.22	0.23
Rifleman: Smith									
0.030	0934 to 0950	0.49B	0.44L	0.097	0.054	0.063	0.27	0.23	0.27
Average	16 min	0.13B	0.64L	0.079	0.044	0.053	0.22	0.22	0.24
Rifleman: Davis									
0.038	0850 to 0906	0.13B	0.34L	0.056	0.026	0.032	0.08	0.12	0.13
Rifleman: Hendricks[b]									
0.038	1400 to 1417	0.40A	0.91L	0.062	0.048	0.023	0.21	0.07	0.22
Rifleman: Smith[b]									
0.038	1036 to 1059	0.09B	0.68L	0.067	0.043	0.045	0.22	0.18	0.27
Average	19 min	0.06A	0.64L	0.062	0.039	0.033	0.17	0.12	0.21
Rifleman: Davis[b]									
0.042	0955 to 1012	0.26B	0.36L	0.036	0.026	0.024	0.12	0.12	0.15
Rifleman: Hendricks									
0.042	1503 to 1525	0.11B	0.81L	0.092	0.065	0.053	0.20	0.21	0.26
Rifleman: Smith									
0.042	1145 to 1205	0.17B	0.49L	0.047	0.029	0.033	0.13	0.12	0.14
Average	20 min	0.18B	0.55L	0.058	0.040	0.037	0.15	0.15	0.18

[b]The exact location of several shot holes within the group was estimated.

Rear Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis								
0.046	1104 to 1117	0.05A	0.42L	0.061	0.043	0.038	0.14	0.13	0.15
Rifleman:	Hendricks								
0.046	0908 to 0931	0.28B	0.49L	0.102	0.052	0.069	0.24	0.26	0.28
Rifleman:	Smith								
0.046	1321 to 1343	0.48A	0.54L	0.065	0.031	0.053	0.12	0.16	0.18
Average	19 min	0.08A	0.48L	0.076	0.042	0.053	0.17	0.18	0.20
Rifleman:	Davis								
0.050	1242 to 1255	0.23A	0.42L	0.056	0.036	0.031	0.19	0.14	0.20
Rifleman:	Hendricks								
0.050	1014 to 1034	0.18B	0.72L	0.084	0.065	0.039	0.23	0.18	0.25
Rifleman:	Smith								
0.050	1421 to 1443	0.43A	0.60L	0.075	0.040	0.055	0.15	0.22	0.27
Average	18 min	0.16A	0.58L	0.072	0.047	0.042	0.19	0.18	0.24
Rifleman:	Davis								
0.058	1346 to 1356	0.61A	0.53L	0.075	0.058	0.037	0.21	0.14	0.25
Rifleman:	Hendricks								
0.058	1120 to 1142	0.32B	0.91L	0.092	0.050	0.072	0.18	0.23	0.26
Rifleman:	Smith								
0.058	0830 to 0845	0.41B	0.40L	0.106	0.054	0.075	0.22	0.32	0.32
Average	16 min	0.04B	0.61L	0.091	0.054	0.061	0.20	0.23	0.28

Date: 24 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.2	3.5	Broken	51	NW, 10	1.022
0900	0.3	4.1	Scattered clouds	50	WNW, 20	1.028
1000	0.6	4.5	Scattered clouds	50	WNW, 23	1.029
1100	0.7	4.5	Scattered clouds	50	WNW, 22	1.028
1200	1.3	5.3	Scattered clouds	50	WNW, 21	1.031
1300	1.3	5.0	Scattered clouds	49	NW, 19	1.029
1400	1.0	4.6	Broken	48	NW, 22	1.031
1500	0.9	4.3	Overcast	48	NW, 20	1.032
1600	0.4	4.1	Broken	50	NW, 20	1.030

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (aperture - see each rifleman)
Front Sight: Redfield International Match (0.125-inch-diameter aperture)
Sight Radius: 34 inches
Target: N.R.A. 100-yd smallbore rifle
Distance-Rear Sight to Eye: 2 inches
Range 100 yards

Rear Sight Aperture Diameter, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis								
0.030	1430 to 1444	0.28B	0.42L	0.065	0.050	0.035	0.17	0.14	0.18
Rifleman:	Hendricks								
0.030	1234 to 1254	0.47B	0.81L	0.062	0.051	0.024	0.22	0.10	0.22
Rifleman:	Smith								
0.030	1003 to 1020	0.47B	0.66L	0.084	0.051	0.058	0.19	0.24	0.25
Average	17 min	0.41B	0.63L	0.070	0.051	0.039	0.19	0.16	0.22
Rifleman:	Davis								
0.038	0808 to 0825	0.07B	0.47L	0.043	0.028	0.026	0.10	0.12	0.14
Rifleman:	Hendricks[b]								
0.038	1347 to 1402	0.20B	0.89L	0.069	0.060	0.030	0.20	0.08	0.21
Rifleman:	Smith								
0.038	1109 to 1135	0.00	0.84L	0.054	0.028	0.039	0.08	0.22	0.22
Average	19 min	0.09B	0.73L	0.055	0.039	0.032	0.13	0.14	0.19
Rifleman:	Davis								
0.042	0919 to 0932	0.21B	0.34L	0.066	0.054	0.026	0.20	0.12	0.22
Rifleman:	Hendricks								
0.042	1448 to 1512	0.34B	0.86L	0.063	0.038	0.047	0.15	0.14	0.21
Rifleman:	Smith[b]								
0.042	1258 to 1322	0.02B	0.62L	0.050	0.034	0.027	0.21	0.08	0.21
Average	20 min	0.19B	0.61L	0.060	0.042	0.033	0.19	0.11	0.21
Rifleman:	Davis								
0.046	1025 to 1041	0.09A	0.44L	0.055	0.035	0.035	0.12	0.17	0.19
Rifleman:	Hendricks								
0.046	0830 to 0850	0.29B	0.62L	0.080	0.044	0.053	0.17	0.21	0.22
Rifleman:	Smith								
0.046	1406 to 1428	0.11A	0.53L	0.074	0.053	0.042	0.20	0.21	0.24
Average	19 min	0.03B	0.53L	0.070	0.044	0.043	0.16	0.20	0.22
Rifleman:	Davis								
0.050	1138 to 1150	0.12A	0.42L	0.052	0.036	0.026	0.18	0.10	0.18
Rifleman:	Hendricks								
0.050	0938 to 0959	0.27B	0.65L	0.044	0.031	0.027	0.15	0.10	0.16
Rifleman:	Smith[b]								
0.050	1517 to 1532	0.37B	0.38L	0.055	0.035	0.035	0.16	0.13	0.16
Average	16 min	0.17B	0.48L	0.050	0.034	0.029	0.16	0.11	0.17
Rifleman:	Davis								
0.058	1326 to 1342	0.08A	0.53L	0.054	0.028	0.044	0.11	0.16	0.19
Rifleman:	Hendricks								
0.058	1045 to 1105	0.50B	0.77L	0.059	0.045	0.031	0.18	0.14	0.18
Rifleman:	Smith								
0.058	0855 to 0915	0.30B	0.58L	0.077	0.030	0.070	0.13	0.24	0.24
Average	19 min	0.24B	0.63L	0.063	0.034	0.048	0.14	0.18	0.20

[b]The exact location of several shot holes within the group was estimated.

SIGHTING ERROR TEST NO. 4

Date: 25 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0900	0.6	4.0	Clear	46	W, 11	1.045
1000	0.6	4.0	Clear	50	WNW, 18	1.041
1100	1.0	4.5	Clear	54	W, 19	1.037
1200	1.2	4.7	Clear	54	W, 22	1.033
1300	1.3	4.7	Clear	58	W, 18	1.026
1400	1.4	4.9	Clear	60	WNW, 13	1.021
1500	1.3	4.6	Clear	60	WNW, 13	1.021

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (Aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: See each individual.
Range: 100 yards.

Front Sight Aperture Diameter, inch	Aiming Point Diameter, inch	Time	C.I. from Index Point	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 0.075	Davis 2.9	1420 to 1433	0.40B 0.60L	0.081	0.040	0.066	0.16	0.21	0.23
Rifleman: 0.075	Hendricks 2.9	1255 to 1307	0.75B 0.72L	0.158	0.118	0.088	0.45	0.27	0.45
Rifleman: 0.075	Smith 2.9	1040 to 1057	0.98B 0.42L	0.062	0.036	0.044	0.16	0.16	0.20
Average		14 min	0.71B 0.58L	0.100	0.065	0.066	0.26	0.21	0.29
Rifleman: 0.100	Davis 2.9	0845 to 0905	1.12B 0.50L	0.056	0.050	0.025	0.14	0.10	0.16
Rifleman: 0.100	Hendricks 2.9	1340 to 1355	0.60B 0.85L	0.114	0.089	0.052	0.35	0.19	0.36
Rifleman: 0.100	Smith 2.9	1145 to 1201	0.87B 0.65L	0.069	0.022	0.056	0.09	0.26	0.26
Average		17 min	0.86B 0.67L	0.080	0.054	0.044	0.19	0.18	0.26

Front Sight Aperture Diameter, inch	Aiming Point Diam, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis									
0.125	2.9	0958 to 1020	0.86B	0.56L	0.080	0.061	0.040	0.28	0.20	0.30
Rifleman:	Hendricks									
0.125	2.9	1437 to 1449	0.40B	0.87L	0.095	0.072	0.054	0.27	0.22	0.29
Rifleman:	Smith									
0.125	2.9	1311 to 1323	0.37B	0.46L	0.075	0.053	0.043	0.18	0.16	0.22
Average		15 min	0.54B	0.63L	0.083	0.062	0.046	0.24	0.19	0.27
Rifleman:	Davis									
0.125	6.0	1101 to 1120	0.72B	0.55L	0.050	0.044	0.019	0.14	0.08	0.14
Rifleman:	Hendricks									
0.125	6.0	0910 to 0934	1.08B	0.82L	0.064	0.042	0.038	0.22	0.14	0.23
Rifleman:	Smith									
0.125	6.0	1359 to 1418	0.14B	0.64L	0.058	0.038	0.041	0.12	0.13	0.18
Average		21 min	0.65B	0.67L	0.057	0.041	0.033	0.16	0.12	0.18
Rifleman:	Davis[b]									
0.125	8.1	1234 to 1249	0.51B	0.48L	0.051	0.034	0.034	0.13	0.13	0.14
Rifleman:	Hendricks									
0.125	8.1	1023 to 1035	0.93B	0.82L	0.083	0.053	0.046	0.25	0.20	0.25
Rifleman:	Smith									
0.125	8.1	1452 to 1509	0.22B	0.66L	0.045	0.030	0.033	0.09	0.14	0.15
Average		15 min	0.55B	0.65L	0.060	0.039	0.038	0.16	0.16	0.18
Rifleman:	Davis									
0.125	12.0	1325 to 1335	0.47B	0.54L	0.085	0.072	0.036	0.27	0.18	0.30
Rifleman:	Hendricks									
0.125	12.0	1127 to 1140	0.70B	0.78L	0.105	0.049	0.081	0.19	0.29	0.31
Rifleman:	Smith									
0.125	12.0	0938 to 0954	0.84B	0.73L	0.084	0.069	0.042	0.25	0.18	0.28
Average		13 min	0.67B	0.68L	0.091	0.063	0.053	0.24	0.22	0.30

[b]The exact location of several shot holes within the group was estimated.

SIGHTING ERROR TEST NO. 4

Date: 26 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.3	3.3	Scattered clouds	30	Calm	1.075
0900	0.5	4.0	Scattered clouds	38	W, 3	1.064
1000	1.2	5.2	Broken	50	WSW, 6	1.055
1100	1.0	4.8	Broken	50	SSW, 6	1.050
1200	1.3	5.0	Overcast	54	SE, 8	1.047
1300	1.3	4.7	Overcast	57	SSE, 7	1.046
1400	1.3	5.3	Overcast	58	SE, 6	1.038
1500	1.3	4.6	Broken	58	SSE, 7	1.040

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (Aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: See each individual.
Range: 100 yards.

Front Sight Aperture Diameter, inch	Aiming Point Diam, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis										
0.075	2.9	1439 to 1450	0.72B	0.46L	0.096	0.064	0.063	0.24	0.20	0.28
Rifleman: Hendricks										
0.075	2.9	1126 to 1141	1.22B	0.59L	0.079	0.044	0.057	0.11	0.26	0.26
Rifleman: Smith										
0.075	2.9	0949 to 1007	1.19B	0.30L	0.086	0.049	0.059	0.14	0.26	0.27
Average		15 min	1.04B	0.45L	0.087	0.052	0.060	0.16	0.24	0.27
Rifleman: Davis										
0.100	2.9	0902 to 0917	1.23B	0.35L	0.053	0.047	0.020	0.20	0.08	0.20
Rifleman: Hendricks										
0.100	2.9	1253 to 1320	1.22B	0.71L	0.051	0.027	0.038	0.10	0.20	0.22
Rifleman: Smith										
0.100	2.9	1044 to 1101	1.14B	0.57L	0.087	0.049	0.059	0.17	0.24	0.24
Average		20 min	1.20B	0.54L	0.064	0.041	0.039	0.16	0.17	0.22

Front Sight Aperture Diameter, inch	Aiming Point Diam, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis[b]									
0.125	2.9	1012 to 1026	0.91B	0.47L	0.061	0.054	0.018	0.20	0.11	0.20
Rifleman:	Hendricks									
0.125	2.9	1401 to 1417	0.83B	0.72L	0.104	0.080	0.056	0.30	0.22	0.34
Rifleman:	Smith									
0.125	2.9	1145 to 1157	0.83B	0.42L	0.081	0.042	0.058	0.21	0.18	0.24
Average		14 min	0.86B	0.54L	0.082	0.059	0.044	0.24	0.17	0.26
Rifleman:	Davis									
0.125	6.0	1106 to 1124	0.80B	0.40L	0.046	0.029	0.029	0.10	0.11	0.14
Rifleman:	Hendricks									
0.125	6.0	0810 to 0834	1.18B	0.72L	0.104	0.076	0.053	0.26	0.26	0.27
Rifleman:	Smith									
0.125	6.0	1324 to 1345	0.73B	0.50L	0.062	0.042	0.037	0.20	0.16	0.25
Average		21 min	0.90B	0.54L	0.071	0.049	0.040	0.19	0.18	0.22
Rifleman:	Davis									
0.125	8.1	1232 to 1249	0.69B	0.42L	0.083	0.067	0.045	0.18	0.11	0.18
Rifleman:	Hendricks									
0.125	8.1	0925 to 0945	1.17B	0.59L	0.068	0.049	0.034	0.22	0.12	0.22
Rifleman:	Smith[b]									
0.125	8.1	1423 to 1435	0.57B	0.54L	0.085	0.080	0.024	0.42	0.10	0.43
Average		16 min	0.81B	0.52L	0.079	0.065	0.034	0.27	0.11	0.28
Rifleman:	Davis									
0.125	12.0	1348 to 1357	0.83B	0.57L	0.080	0.054	0.049	0.21	0.21	0.24
Rifleman:	Hendricks									
0.125	12.0	1028 to 1040	1.09B	0.48L	0.106	0.061	0.071	0.25	0.25	0.29
Rifleman:	Smith									
0.125	12.0	0839 to 0855	1.32B	0.43L	0.076	0.042	0.061	0.12	0.19	0.19
Average		12 min	1.08B	0.49L	0.087	0.052	0.060	0.19	0.22	0.24

[b]The exact location of several shot holes within the group was estimated.

SIGHTING ERROR TEST NO. 4

Date: 27 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.0	1.2	Overcast w/fog	48	Calm	1.047
0900	0.6	4.3	Overcast w/fog	51	NE, 4	1.043
1000	0.5	4.0	Overcast w/fog	52	NE, 7	1.040
1100	0.6	4.5	Overcast w/fog	54	NE, 6	1.035
1200	0.6	4.2	Overcast w/fog	56	NE, 5	1.033
1300	0.6	4.3	Overcast w/fog	58	NE, 4	1.032
1400	0.5	4.0	Overcast w/light rain	58	Calm	1.030

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (Aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: See each individual.
Range: 100 yards.

Front Sight Aperture Diameter, inch	Aiming Point Diam, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis									
0.075	2.9	1331 to 1342	0.94B	0.50L	0.128	0.050	0.106	0.18	0.41	0.44
Rifleman:	Hendricks									
0.075	2.9	1130 to 1141	1.18B	0.62L	0.152	0.097	0.100	0.39	0.50	0.53
Rifleman:	Smith									
0.075	2.9	0907 to 0924	1.26B	0.50L	0.103	0.079	0.057	0.27	0.21	0.27
Average		13 min	1.13B	0.54L	0.128	0.075	0.088	0.28	0.37	0.41
Rifleman:	Davis[b]									
0.100	2.9	0826 to 0838	1.15B	0.42L	0.047	0.030	0.033	0.12	0.14	0.16
Rifleman:	Hendricks									
0.100	2.9	1253 to 1303	1.25B	0.70L	0.083	0.047	0.057	0.15	0.21	0.23
Rifleman:	Smith									
0.100	2.9	1004 to 1018	1.06B	0.51L	0.064	0.045	0.040	0.17	0.19	0.25
Average		12 min	1.15B	0.54L	0.065	0.041	0.043	0.15	0.18	0.21

[b]The exact location of several shot holes within the group was estimated.

Front Sight Aperture Diameter, inch	Aiming Point Diam, inch	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis									
0.125	2.9	0927 to 0938	0.81B	0.48L	0.089	0.056	0.051	0.22	0.20	0.28
Rifleman:	Hendricks									
0.125	2.9	1345 to 1409	1.02B	0.70L	0.104	0.081	0.050	0.29	0.21	0.32
Rifleman:	Smith									
0.125	2.9	1053 to 1110	0.88B	0.40L	0.093	0.080	0.040	0.30	0.20	0.32
Average		17 min	0.90B	0.53L	0.095	0.072	0.047	0.27	0.20	0.31
Rifleman:	Davis[b]									
0.125	6.0	1022 to 1036	0.83B	0.40L	0.045	0.031	0.024	0.17	0.14	0.17
Rifleman:	Hendricks									
0.125	6.0	0841 to 0904	1.11B	0.60L	0.077	0.047	0.057	0.25	0.25	0.32
Rifleman:	Smith[b]									
0.125	6.0	1145 to 1206	0.82B	0.48L	0.059	0.047	0.026	0.24	0.12	0.25
Average		19 min	0.92B	0.49L	0.060	0.042	0.036	0.22	0.17	0.25
Rifleman:	Davis									
0.125	8.1	1113 to 1126	0.84B	0.36L	0.057	0.048	0.022	0.21	0.11	0.22
Rifleman:	Hendricks[b]									
0.125	8.1	0940 to 1000	1.06B	0.66L	0.077	0.046	0.044	0.27	0.25	0.28
Rifleman:	Smith									
0.125	8.1	1312 to 1330	0.84B	0.60L	0.080	0.055	0.045	0.19	0.21	0.24
Average		17 min	0.91B	0.54L	0.071	0.050	0.037	0.22	0.19	0.25
Rifleman:	Davis									
0.125	12.0	1242 to 1250	0.88B	0.38L	0.136	0.075	0.099	0.36	0.41	0.43
Rifleman:	Hendricks									
0.125	12.0	1040 to 1050	0.98B	0.51L	0.085	0.064	0.041	0.28	0.19	0.30
Rifleman:	Smith									
0.125	12.0	0811 to 0823	1.12B	0.47L	0.152	0.089	0.108	0.34	0.46	0.49
Average		10 min	0.99B	0.45L	0.124	0.076	0.083	0.33	0.35	0.41

[b]The exact location of several shot holes within the group was estimated.

Date: 31 October 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.2	3.0	Overcast w/fog	51	NE, 9	1.039
0900	0.2	3.5	Overcast w/fog	52	NE, 10	1.038
1000	0.3	3.6	Overcast w/fog	52	NE, 8	1.036
1100	0.3	3.5	Overcast w/fog	53	NE, 8	1.035
1200	0.1	3.3	Overcast w/fog	54	Calm	1.031
1300	0.1	3.3	Overcast w/drizzling rain	54	NE, 3	1.031
1400	0.0	2.3	Overcast w/drizzling rain	54	NE, 3	1.028

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture)
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches
Distance-Rear Sight to Eye: 2 inches.
Target: See each individual.
Range: 100 yards

Front Sight Aperture Diameter, inch	Aiming Point Diam, inch	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis									
0.075	2.9	0800 to 0814	1.28B	0.66L	0.085	0.041	0.069	0.16	0.26	0.28
Rifleman:	Hendricks									
0.075	2.9	1120 to 1128	1.48B	0.75L	0.131	0.060	0.100	0.30	0.41	0.41
Rifleman:	Smith[b]									
0.075	2.9	0939 to 0958	1.25B	0.62L	0.068	0.044	0.039	0.20	0.18	0.27
Average		14 min	1.34B	0.68L	0.095	0.048	0.069	0.22	0.28	0.32
Rifleman:	Davis									
0.100	2.9	1327 to 1335	1.15B	0.71L	0.062	0.049	0.028	0.17	0.10	0.18
Rifleman:	Hendricks									
0.100	2.9	1255 to 1305	1.54B	0.84L	0.141	0.113	0.067	0.39	0.17	0.40
Rifleman:	Smith[b]									
0.100	2.9	1037 to 1059	1.29B	0.74L	0.049	0.038	0.024	0.08	0.10	0.11
Average		13 min	1.33B	0.76L	0.084	0.067	0.040	0.21	0.12	0.23
Rifleman:	Davis									
0.125	2.9	0905 to 0918	0.88B	0.59L	0.102	0.079	0.055	0.27	0.20	0.32

[b]The exact location of several shot holes within the group was estimated.

Front Sight Aperture Diameter, inch	Aiming Point Diam, inch	Time	C. I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Hendricks									
0.125	2.9	1339 to 1348	1.25B	0.85L	0.135	0.105	0.064	0.50	0.24	0.52
Rifleman:	Smith									
0.125	2.9	1131 to 1141	1.00B	0.61L	0.070	0.023	0.061	0.08	0.19	0.19
Average		11 min	1.04B	0.68L	0.102	0.069	0.060	0.28	0.21	0.34
Rifleman:	Davis[b]									
0.125	6.0	1002 to 1020	0.87B	0.53L	0.042	0.034	0.029	0.10	0.08	0.11
Rifleman:	Hendricks									
0.125	6.0	0818 to 0836	1.36B	0.73L	0.088	0.043	0.063	0.16	0.29	0.30
Rifleman:	Smith									
0.125	6.0	1308 1323	0.73B	0.81L	0.063	0.037	0.043	0.18	0.18	0.20
Average		17 min	0.99B	0.69L	0.064	0.038	0.045	0.15	0.18	0.20
Rifleman:	Davis[b]									
0.125	8.1	1103 to 1118	1.06B	0.46L	0.065	0.030	0.049	0.15	0.12	0.16
Rifleman:	Hendricks									
0.125	8.1	0920 to 0936	1.10B	0.72L	0.107	0.080	0.063	0.36	0.22	0.38
Rifleman:	Smith									
0.125	8.1	1412 to 1428	1.00B	0.71L	0.067	0.029	0.055	0.09	0.24	0.24
Average		16 min	1.05B	0.63L	0.080	0.046	0.056	0.20	0.19	0.26
Rifleman:	Davis									
0.125	12.0	1240 to 1250	0.86B	0.63L	0.147	0.085	0.095	0.34	0.44	0.44
Rifleman:	Hendricks									
0.125	12.0	1023 to 1034	1.26B	0.67L	0.092	0.084	0.023	0.37	0.13	0.38
Rifleman:	Smith									
0.125	12.0	0838 to 0859	1.26B	0.75L	0.110	0.073	0.066	0.29	0.24	0.31
Average		14 min	1.13B	0.68L	0.116	0.081	0.061	0.33	0.27	0.38

[b]The exact location of several shot holes within the group was estimated.

SIGHTING ERROR TEST NO. 5

Date: 12 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.4	4.0	Overcast	50	NE, 6	1.054
0900	1.0	4.6	Overcast	51	Calm	1.048
1000	1.0	4.8	Overcast	50	SE, 5	1.047
1100	1.5	5.3	Overcast	54	SE, 7	1.039
1200	1.3	5.0	Overcast	55	SE, 10	1.038
1300	1.5	5.2	Overcast	56	SE, 11	1.036
1400	0.3	3.5	Overcast w/light rain	53	SE, 9	1.037
1500	0.3	3.5	Overcast w/light rain	49	E, 10	1.037
					E, 14	1.039

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (modified) (see each rifleman).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Distance Between Front Sight and Eye: 36 inches.
Distance-Rear Sight to Eye: See each rifleman.
Target: N.R.A. 100-yd small bore rifle.
Range: 100 yards.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis							
1.0	0.020	1416 to 1429	0.194	0.096	0.157	0.43	0.60	0.65
Rifleman:	Hendricks							
1.0	0.020	1135 to 1147	0.165	0.140	0.067	0.52	0.27	0.52
Rifleman:	Smith							
1.0	0.020	0937 to 0957	0.182	0.142	0.082	0.56	0.37	0.58
Average			0.180	0.126	0.102	0.50	0.41	0.58
Rifleman:	Davis							
2.0	0.040	0732 to 0751	0.058	0.031	0.048	0.11	0.13	0.14
Rifleman:	Hendricks							
2.0	0.040	1326 to 1347	0.104	0.067	0.068	0.24	0.27	0.28
Rifleman:	Smith							
2.0	0.040	1047 to 1105	0.069	0.043	0.044	0.17	0.18	0.19
Average			0.077	0.047	0.053	0.17	0.19	0.20
Rifleman:	Davis							
4.0	0.080	0855 to 0909	0.078	0.056	0.048	0.19	0.19	0.25
Rifleman:	Hendricks							
4.0	0.080	1433 to 1452	0.210	0.147	0.121	0.50	0.49	0.56
Rifleman:	Smith							
4.0	0.080	1237 to 1255	0.116	0.074	0.069	0.30	0.28	0.31
Average			0.135	0.092	0.079	0.33	0.32	0.37

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 8.0	Davis 0.160	1000 to 1017	0.207	0.126	0.151	0.44	0.60	0.63
Rifleman: 8.0	Hendricks 0.160	0800 to 0823	0.346	0.262	0.202	1.10	0.75	1.13
Rifleman: 8.0	Smith 0.160	1350 to 1413	0.354	0.253	0.205	0.84	0.81	1.00
			0.302	0.214	0.186	0.79	0.72	0.92
Rifleman: 16.0	Davis 0.320	1110 to 1132	0.832	0.665	0.321	2.83	1.17	2.84
Rifleman: 16.0	Hendricks 0.320	0917 to 0934	0.432	0.246	0.274	1.20	1.21	1.27
Rifleman: 16.0	Smith 0.320	1456 to 1511	0.409	0.321	0.177	1.74	0.86	1.75
Average			0.558	0.411	0.257	1.92	1.08	1.95
Rifleman: 24.0	Davis 0.480	1300 to 1323	1.361	0.962	0.686	4.08	3.67	4.24
Rifleman: 24.0	Hendricks 0.480	1020 to 1039	0.698	0.223	0.623	0.89	2.25	2.27
Rifleman: 24.0	Smith 0.480	0830 to 0848	1.287	0.564	1.101	2.52	4.12	4.45
Average			1.115	0.583	0.803	2.50	3.35	3.65

Date: 14 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	1.2	4.5	Scattered clouds	43	W, 7	1.050
0800	1.3	5.0	Scattered clouds	46	WNW, 8	1.035
0900	1.3	5.0	Scattered clouds	52	N, 17	1.026
1000	1.3	5.0	Clear	54	NW, 15	1.026
1100	1.4	5.1	Clear	58	NW, 19	1.018
1200	1.3	5.1	Clear	60	NW, 15	1.015
1300	1.5	5.2	Scattered clouds	61	NW, 15	1.009
1400	1.6	5.3	Clear	62	NW, 14	1.009
1500	1.5	5.3	Clear	63	W, 12	1.011

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (modified) (see each rifleman).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Distance Between Front Sight and Eye: 36 inches.
Distance-Rear Sight to Eye: See each rifleman.
Target: N.R.A. 100-yd small bore rifle.
Range: 100 yards.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis							
1.0	0.020	1345 to 1401	0.108	0.079	0.058	0.22	0.21	0.26
Rifleman:	Hendricks							
1.0	0.020	1109 to 1133	0.131	0.079	0.088	0.36	0.26	0.39
Rifleman:	Smith							
1.0	0.020	0920 to 0940	0.158	0.122	0.075	0.62	0.40	0.63
Average			0.132	0.093	0.074	0.40	0.29	0.43
Rifleman:	Davis							
2.0	0.040	0720 to 0746	0.073	0.059	0.033	0.33	0.14	0.34
Rifleman:	Hendricks[b]							
2.0	0.040	1301 to 1313	0.065	0.044	0.037	0.25	0.12	0.28
Rifleman:	Smith							
2.0	0.040	1018 to 1043	0.047	0.026	0.039	0.10	0.13	0.16
Average			0.062	0.043	0.036	0.23	0.13	0.26
Rifleman:	Davis							
3.0	0.080	0843 to 0900	0.161	0.090	0.116	0.35	0.42	0.44
Rifleman:	Hendricks							
3.0	0.080	1405 to 1430	0.175	0.148	0.064	0.58	0.26	0.59
Rifleman:	Smith							
3.0	0.080	1137 to 1159	0.104	0.086	0.049	0.33	0.18	0.33
Average			0.147	0.108	0.076	0.42	0.29	0.45
Rifleman:	Davis							
4.0	0.160	0944 to 0959	0.317	0.154	0.264	0.57	0.84	0.93
Rifleman:	Hendricks							
4.0	0.160	0749 to 0812	0.345	0.266	0.179	1.17	0.63	1.23
Rifleman:	Smith							
4.0	0.160	1317 to 1340	0.466	0.252	0.327	1.03	1.27	1.32
Average			0.376	0.224	0.257	0.92	0.91	1.16
Rifleman:	Davis							
5.0	0.320	1046 to 1106	0.505	0.304	0.344	1.61	1.48	1.94
Rifleman:	Hendricks							
5.0	0.320	0904 to 0917	0.543	0.480	0.165	1.73	0.76	1.74
Rifleman:	Smith							
5.0	0.320	1434 to 1449	0.540	0.395	0.328	1.58	1.24	1.68
Average			0.529	0.393	0.279	1.64	1.16	1.79
Rifleman:	Davis							
6.0	0.480	1239 to 1257	0.739	0.564	0.361	1.67	1.81	2.06
Rifleman:	Hendricks							
6.0	0.480	1003 to 1014	0.596	0.529	0.198	1.60	1.00	1.65
Rifleman:	Smith							
6.0	0.480	0817 to 0838	0.463	0.389	0.199	1.41	0.77	1.47
Average			0.599	0.494	0.253	1.56	1.19	1.73

[b]The exact location of several shot holes within the group was estimated.

Date: 18 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	1.6	5.2	Clear	44	W, 16	1.047
0800	1.6	5.5	Scattered clouds	48	W, 20	1.040
0900	1.7	5.3	Broken clouds	52	W, 18	1.035
1000	1.6	5.1	Broken clouds	52	W, 18	1.036
1100	1.7	5.3	Broken clouds	52	WNW, 18	1.038
1200	0.5	3.5	Overcast	49	WNW, 17	1.038
1300	2.0	5.5	Broken clouds	49	WNW, 17	1.033
1400	1.5	5.0	Broken clouds	56	WNW, 10	1.033

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (modified) (see each rifleman).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Distance Between Front Sight and Eye: 36 inches.
Distance-Rear Sight to Eye: See each rifleman.
Target: N.R.A. 100-yd small bore rifle.
Range: 100 yards.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 1.0	Davis 0.020	0714 to 0728	0.128	0.071	0.079	0.23	0.46	0.46
Rifleman: 1.0	Hendricks 0.034	0733 to 0749	0.096	0.078	0.040	0.26	0.14	0.27
Rifleman: 1.0	Smith 0.042	0751 to 0813	0.101	0.051	0.081	0.20	0.32	0.38
Rifleman: 2.0	Davis 0.034	0818 to 0835	0.049	0.027	0.033	0.12	0.15	0.17
Rifleman: 2.0	Hendricks 0.042	0838 to 0900	0.089	0.058	0.057	0.25	0.13	0.26
Rifleman: 2.0	Smith 0.050	0903 to 0922	0.071	0.055	0.068	0.21	0.26	0.27
Rifleman: 3.0	Davis 0.042	0925 to 0945	0.062	0.048	0.032	0.23	0.11	0.24
Rifleman: 3.0	Hendricks 0.050	0948 to 1008	0.076	0.049	0.047	0.13	0.26	0.28
Rifleman: 3.0	Smith 0.034	1013 to 1033	0.067	0.039	0.047	0.18	0.16	0.22
Rifleman: 4.0	Davis 0.050	1036 to 1052	0.099	0.059	0.068	0.25	0.23	0.25
Rifleman: 4.0	Hendricks 0.058	1056 to 1115	0.079	0.060	0.036	0.29	0.12	0.30

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 4.0	Smith 0.042	1119 to 1137	0.078	0.048	0.052	0.23	0.26	0.26
Rifleman: 8.0	Davis 0.075	1144 to 1158	0.165	0.124	0.093	0.46	0.36	0.54
Rifleman: 8.0	Hendricks 0.042	1239 to 1256	0.165	0.133	0.067	0.63	0.25	0.63
Rifleman: 8.0	Smith 0.058	1259 to 1315	0.184	0.119	0.118	0.58	0.44	0.69
Rifleman: 16.0	Davis 0.480	1322 to 1337	0.690	0.498	0.343	2.62	1.27	2.65
Rifleman: 16.0	Hendricks 0.110	1343 to 1402	0.210	0.117	0.147	0.50	0.55	0.57
Rifleman: 16.0	Smith 0.130	1406 to 1421	0.403	0.249	0.264	1.00	1.02	1.07

Date: 19 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	1.2	4.5	Scattered clouds	46	NW, 7	1.049
0800	1.6	5.6	Clear	49	N, 8	1.039
0900	1.5	5.5	Clear	52	N, 12	1.035
1000	1.5	5.3	Scattered clouds	54	NW, 11	1.035
1100	1.5	5.3	Scattered clouds	53	N, 13	1.037
1200	2.2	5.7	Scattered clouds	55	N, 12	1.029
1300	2.0	5.5	Broken clouds	55	N, 13	1.030
1400	1.9	5.5	Broken clouds	57	N, 10	1.033
1500	1.1	4.5	Broken clouds w/sprinkling rain	54	NW,10	1.044

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (modified) (see each rifleman).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Distance Between Front Sight and Eye: 36 inches.
Distance-Rear Sight to Eye: See each rifleman.
Target: N.R.A. 100-yd small bore rifle.
Range: 100 yards

Rear Sight to Eye, inches	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 1.0	Davis[b] 0.030	0800 to 0821	0.063	0.034	0.044	0.13	0.18	0.19
Rifleman: 1.0	Hendricks 0.038	0714 to 0733	0.126	0.101	0.070	0.29	0.23	0.35
Rifleman: 1.0	Smith[b] 0.046	0736 to 0755	0.054	0.031	0.045	0.11	0.16	0.16
Rifleman: 2.0	Davis[b] 0.038	0908 to 0934	0.031	0.025	0.011	0.10	0.08	0.13
Rifleman: 2.0	Hendricks 0.046	0824 to 0843	0.085	0.062	0.047	0.24	0.17	0.26
Rifleman: 2.0	Smith 0.030	0846 to 0904	0.090	0.060	0.050	0.20	0.20	0.20
Rifleman: 3.0	Davis 0.046	1031 to 1058	0.051	0.030	0.032	0.12	0.12	0.13
Rifleman: 3.0	Hendricks 0.058	0936 to 0958	0.094	0.075	0.043	0.34	0.18	0.35
Rifleman: 3.0	Smith[b] 0.038	1001 to 1026	0.038	0.026	0.025	0.10	0.13	0.13
Rifleman: 4.0	Davis[b] 0.054	1236 to 1255	0.060	0.029	0.047	0.16	0.20	0.20
Rifleman: 4.0	Hendricks 0.038	1101 to 1126	0.120	0.093	0.052	0.50	0.20	0.50
Rifleman: 4.0	Smith 0.046	1129 to 1147	0.088	0.059	0.062	0.19	0.21	0.26
Rifleman: 8.0	Davis 0.140	1413 to 1429	0.290	0.169	0.226	0.68	0.89	1.09
Rifleman: 8.0	Hendricks 0.050	1300 to 1310	0.131	0.103	0.075	0.40	0.29	0.49
Rifleman: 8.0	Smith 0.065	1315 to 1330	0.219	0.125	0.150	0.46	0.70	0.79
Rifleman: 16.0	Davis 0.105	1452 to 1508	0.279	0.182	0.172	0.85	0.56	0.86
Rifleman: 16.0	Hendricks 0.120	1356 to 1408	0.241	0.143	0.164	0.64	0.51	0.65
Rifleman: 16.0	Smith 0.140	1434 to 1449	0.433	0.331	0.222	1.03	1.27	1.36

Date: 20 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	1.3	5.0	Clear	43	NNE 7	1.068
0800	1.4	5.1	Clear	46	NE 6	1.060

[a]Reading on G.E. type PR-1 exposure meter.
[b]The exact location of several shot holes within the group was estimated.

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0900	1.5	5.1	Scatt. Clouds	50	NE 7	1.055
1000	2.0	5.6	Scatt. Clouds	54	NE 10	1.049
1100	1.6	5.3	Scatt. Clouds	54	NE 7	1.049
1200	1.5	5.0	Clear	56	NE 8	1.047
1300	1.4	5.3	Clear	58	NE 9	1.041
1400	1.4	5.3	Clear	61	SE 6	1.037
1500	1.4	5.2	Clear	64	S 7	1.039

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (modified) (see each individual).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Distance Between Front Sight and Eye: 36 inches.
Distance-Rear Sight to Eye: see each individual.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Rear Sight to Eye, inches	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 1.0	Davis 0.034	0729 to 0747	0.081	0.057	0.049	0.17	0.22	0.22
Rifleman: 1.0	Hendricks 0.042	0750 to 0816	0.108	0.078	0.065	0.26	0.21	0.30
Rifleman: 1.0	Smith 0.020	0713 to 0725	0.225	0.105	0.176	0.39	0.73	0.73
Rifleman: 2.0	Davis[b] 0.042	0845 to 0905	0.028	0.017	0.022	0.09	0.12	0.12
Rifleman: 2.0	Hendricks 0.050	0908 to 0930	0.063	0.049	0.034	0.14	0.15	0.17
Rifleman: 2.0	Smith[b] 0.034	0819 to 0842	0.068	0.021	0.058	0.13	0.24	0.24
Rifleman: 3.0	Davis 0.050	0958 to 1016	0.057	0.038	0.033	0.14	0.12	0.15
Rifleman: 3.0	Hendricks 0.034	1019 to 1033	0.082	0.062	0.050	0.30	0.21	0.36
Rifleman: 3.0	Smith 0.042	0933 to 0955	0.071	0.049	0.039	0.15	0.22	0.24
Rifleman: 4.0	Davis 0.058	1059 to 1116	0.053	0.032	0.039	0.12	0.16	0.17
Rifleman: 4.0	Hendricks[b] 0.042	1119 to 1138	0.052	0.023	0.039	0.10	0.11	0.12
Rifleman: 4.0	Smith[b] 0.050	1035 to 1055	0.048	0.022	0.038	0.08	0.14	0.14

[b]The exact location of several shot holes within the group was estimated.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 8.0	Davis 0.042	1253 to 1304	0.128	0.094	0.073	0.33	0.27	0.37
Rifleman: 8.0	Hendricks 0.058	1307 to 1328	0.112	0.103	0.024	0.35	0.15	0.35
Rifleman: 8.0	Smith 0.075	1234 to 1249	0.237	0.199	0.088	0.67	0.51	0.68
Rifleman: 16.0	Davis 0.110	1353 to 1408	0.154	0.058	0.133	0.28	0.50	0.51
Rifleman: 16.0	Hendricks 0.130	1413 to 1434	0.230	0.140	0.149	0.66	0.66	0.70
Rifleman: 16.0	Smith 0.480	1333 to 1349	0.592	0.485	0.319	1.87	1.26	2.25

21 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	1.4	5.2	Clear	44	SSW 10	1.075
0800	1.5	5.3	Clear	55	SSW 8	1.054
0900	1.5	5.3	Clear	58	SSW 9	1.050
1000	1.5	5.2	Scatt. Clouds	61	SW 14	1.039
1100	2.0	5.8	Scatt. Clouds	64	SSW 14	1.037
1200	2.0	5.9	Scatt. Clouds	64	SSW 14	1.037
1300	1.8	5.5	Scatt. Clouds	66	SSW 12	1.027
1400	2.0	5.7	Overcast	65	SSW 12	1.026
1500	1.6	5.2	Overcast	64	SSW 8	1.026

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (modified) (see each individual).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Distance Between Front Sight and Eye: 36 inches.
Distance-Rear Sight to Eye: see each individual.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 1.0	Davis[b] 0.038	0747 to 0807	0.037	0.021	0.032	0.10	0.10	0.12
Rifleman: 1.0	Hendricks 0.046	0812 to 0831	0.110	0.071	0.080	0.25	0.26	0.36

[b]The exact location of several shot holes within the group was estimated.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: 1.0	Smith 0.030	0833 to 0851	0.079	0.039	0.055	0.15	0.24	0.25
Rifleman: 2.0	Davis 0.046	0854 to 0911	0.086	0.054	0.057	0.17	0.16	0.22
Rifleman: 2.0	Hendricks 0.030	0915 to 0937	0.137	0.117	0.059	0.47	0.23	0.49
Rifleman: 2.0	Smith 0.038	0939 to 1004	0.082	0.062	0.049	0.24	0.18	0.30
Rifleman: 3.0	Davis 0.058	1008 to 1029	0.065	0.041	0.042	0.13	0.18	0.19
Rifleman: 3.0	Hendricks 0.038	1033 to 1053	0.092	0.065	0.050	0.26	0.22	0.27
Rifleman: 3.0	Smith[b] 0.046	1056 to 1111	0.103	0.095	0.035	0.32	0.18	0.37
Rifleman: 4.0	Davis 0.038	1116 to 1134	0.047	0.030	0.033	0.11	0.12	0.14
Rifleman: 4.0	Hendricks 0.046	1138 to 1152	0.104	0.089	0.038	0.40	0.20	0.40
Rifleman: 4.0	Smith 0.054	1236 to 1252	0.068	0.049	0.045	0.17	0.15	0.22
Rifleman: 8.0	Davis 0.050	1254 to 1304	0.079	0.054	0.049	0.26	0.15	0.27
Rifleman: 8.0	Hendricks 0.065	1307 to 1321	0.150	0.113	0.077	0.50	0.34	0.53
Rifleman: 8.0	Smith 0.140	1325 to 1340	0.351	0.204	0.221	0.92	1.02	1.16
Rifleman: 16.0	Davis 0.120	1344 to 1400	0.243	0.196	0.110	0.75	0.48	0.79
Rifleman: 16.0	Hendricks 0.140	1406 to 1427	0.192	0.142	0.106	0.60	0.39	0.61
Rifleman: 16.0	Smith 0.105	1433 to 1447	0.326	0.190	0.256	0.58	0.93	1.20

24 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	2.0	5.5	Scatt. Clouds	67	Calm	1.023
0800	2.0	5.4	Scatt. Clouds	72	SSW 7	1.011
0900	1.6	5.0	Overcast	74	SSW 10	1.007
1000	2.0	5.5	Broken	76	SSW 7	1.005
1100	2.0	5.0	Overcast	78	SW 7	0.999
1200	1.5	4.9	Overcast	80	SSW 9	0.991
1300	1.0	4.6	Overcast	77	SSW 10	0.983
1400	1.5	5.0	Scatt. Clouds	84	SW 13	0.978

[a]Reading on G. E. type PR-1 exposure meter.
[b]The exact location of several shot holes within the group was estimated.

Rear Sight: Redfield International Match (modified) (see each individual).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Distance Between Front Sight and Eye: 36 inches.
Distance-Rear Sight to Eye: see each individual.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis[b]								
1.0	0.042	0815 to 0838	0.046	0.027	0.037	0.13	0.18	0.22
Rifleman: Hendricks								
1.0	0.020	0725 to 0749	0.112	0.070	0.079	0.29	0.31	0.32
Rifleman: Smith[b]								
1.0	0.034	0751 to 0810	0.046	0.026	0.037	0.10	0.14	0.16
Rifleman: Davis								
2.0	0.050	0917 to 0935	0.049	0.026	0.042	0.10	0.16	0.17
Rifleman: Hendricks[b]								
2.0	0.034	0842 to 0855	0.076	0.063	0.034	0.26	0.20	0.28
Rifleman: Smith[b]								
2.0	0.042	0858 to 0913	0.050	0.031	0.035	0.10	0.09	0.11
Rifleman: Davis[b]								
3.0	0.034	1019 to 1042	0.036	0.026	0.016	0.10	0.05	0.10
Rifleman: Hendricks[b]								
3.0	0.042	0937 to 0954	0.074	0.062	0.037	0.26	0.15	0.27
Rifleman: Smith[b]								
3.0	0.050	0958 to 1015	0.066	0.032	0.051	0.15	0.17	0.18
Rifleman: Davis[b]								
4.0	0.042	1120 to 1140	0.036	0.020	0.028	0.14	0.09	0.14
Rifleman: Hendricks								
4.0	0.050	1045 to 1058	0.093	0.056	0.055	0.27	0.22	0.28
Rifleman: Smith								
4.0	0.058	1101 to 1115	0.090	0.042	0.068	0.17	0.25	0.25
Rifleman: Davis								
8.0	0.058	1255 to 1315	0.082	0.065	0.050	0.24	0.21	0.32
Rifleman: Hendricks								
8.0	0.075	1144 to 1200	0.181	0.144	0.080	0.63	0.36	0.64
Rifleman: Smith								
8.0	0.042	1236 to 1251	0.090	0.051	0.064	0.19	0.26	0.27
Rifleman: Davis								
16.0	0.130	1413 to 1430	0.193	0.106	0.119	0.37	0.60	0.60
Rifleman: Hendricks								
16.0	0.480	1319 to 1345	0.366	0.307	0.140	1.20	0.63	1.20
Rifleman: Smith								
16.0	0.110	1350 to 1408	0.317	0.286	0.110	0.99	0.44	0.99

[b]The exact location of several shot holes within the group was estimated.

Date: 25 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	1.8	5.6	Scatt. Clouds	71	SSW 4	0.988
0800	1.9	5.6	Scatt. Clouds	82	SSW 11	0.982
0900	1.8	5.5	Scatt. Clouds	84	SSW 11	0.979
1000	1.6	5.3	Scatt. Clouds	86	SSW 12	0.970
1100	1.7	5.2	Scatt. Clouds	90	SSW 10	0.968
1200	1.7	5.2	Broken	88	S 11	0.966
1300	1.4	4.8	Overcast	88	SW 8	0.951
1400	1.6	5.3	Broken	90	SSW 13	0.959

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (modified) (See each individual).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Distance Between Front Sight and Eye: 36 inches.
Distance-Rear Sight to Eye: see each individual.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Davis[b]							
1.0	0.046	0732 to 0756	0.057	0.029	0.048	0.09	0.16	0.17
Rifleman:	Hendricks							
1.0	0.030	0759 to 0822	0.080	0.048	0.049	0.19	0.24	0.27
Rifleman:	Smith							
1.0	0.038	0707 to 0727	0.043	0.029	0.027	0.09	0.09	0.10
Rifleman:	Davis[b]							
2.0	0.030	0851 to 0909	0.070	0.059	0.033	0.22	0.10	0.24
Rifleman:	Hendricks							
2.0	0.038	0912 to 0931	0.067	0.047	0.046	0.13	0.15	0.17
Rifleman:	Smith							
2.0	0.046	0825 to 0846	0.060	0.040	0.036	0.14	0.16	0.18
Rifleman:	Davis[b]							
3.0	0.038	1000 to 1022	0.049	0.025	0.035	0.08	0.21	0.22
Rifleman:	Hendricks							
3.0	0.046	1025 to 1043	0.071	0.052	0.035	0.28	0.19	0.29
Rifleman:	Smith[b]							
3.0	0.058	0935 to 0957	0.084	0.054	0.053	0.19	0.27	0.30
Rifleman:	Davis[b]							
4.0	0.046	1107 to 1127	0.020	0.015	0.012	0.07	0.07	0.08

[b]The exact location of several shot holes within the group was estimated.

Rear Sight to Eye, inch	Rear Sight Aperture Diameter, inch	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman:	Hendricks							
4.0	0.054	1129 to 1144	0.097	0.079	0.041	0.30	0.20	0.31
Rifleman:	Smith							
4.0	0.038	1046 to 1102	0.061	0.041	0.032	0.18	0.18	0.18
Rifleman:	Davis							
8.0	0.065	1245 to 1257	0.098	0.076	0.054	0.39	0.16	0.39
Rifleman:	Hendricks							
8.0	0.140	1300 to 1323	0.204	0.164	0.090	0.61	0.37	0.63
Rifleman:	Smith							
8.0	0.050	1228 to 1242	0.091	0.045	0.071	0.25	0.23	0.26
Rifleman:	Davis							
16.0	0.140	1346 to 1405	0.272	0.142	0.219	0.55	0.79	0.84
Rifleman:	Hendricks							
16.0	0.105	1410 to 1425	0.312	0.255	0.126	1.02	0.48	1.02
Rifleman:	Smith							
16.0	0.120	1329 to 1344	0.369	0.210	0.267	0.81	1.17	1.26

SIGHTING ERROR TEST NO. 6

Date: 9 November 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	0.2	3.2	Scattered clouds	31	SSW 6	1.071
0800	0.5	3.0	Scattered clouds	38	SSW 5	1.067
0900	1.0	4.6	Broken	46	SSW 8	1.062
1000	1.5	5.0	Broken	53	SSW 10	1.056
1100	1.5	5.0	Overcast	55	SSW 10	1.056
1200	1.6	5.1	Overcast	56	SSW 11	1.051
1300	1.3	5.0	Overcast	57	SSW 10	1.050
1400	0.6	4.0	Broken	55	SSW 8	1.048

[a]Reading on G.E. Type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (see each individual).
Sight Radius: See each individual.
Distance-Rear Sight to Eye: 2 inches.
Range: 100 yards.

Front Sight to Eye, in.	Front Sight Aperture Diameter, in.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis										
10.0	0.035	1349 to 1416	3.56B	3.45L	0.266	0.230	0.098	0.82	0.52	0.91
Rifleman: Hendricks										
10.0	0.035	1108 to 1122	3.54B	3.64L	0.319	0.177	0.255	0.60	0.91	0.99
Rifleman: Smith										
10.0	0.035	0915 to 0934	2.54B	2.05L	0.378	0.190	0.290	0.93	0.96	1.08
Average		20 min	3.21B	3.05L	0.321	0.199	0.214	0.78	0.80	0.99
Rifleman: Davis										
20.0	0.075	0719 to 0732	2.30A	1.12L	0.233	0.118	0.181	0.50	0.68	0.80
Rifleman: Hendricks										
20.0	0.075	1257 to 1320	1.37A	1.84L	0.082	0.061	0.038	0.24	0.14	0.24
Rifleman: Smith										
20.0	0.075	1018 to 1035	1.78A	1.36L	0.137	0.031	0.129	0.12	0.46	0.46
Average		18 min	1.82A	1.44L	0.151	0.070	0.116	0.29	0.43	0.50

Front Sight to Eye, in.	Front Sight Aperture Diameter, in.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis										
30.0	0.105	0822 to 0846	1.30A	0.46R	0.092	0.081	0.034	0.30	0.17	0.30
Rifleman: Hendricks										
30.0	0.105	1420 to 1438	0.91A	0.01R	0.071	0.032	0.054	0.18	0.17	0.20
Rifleman: Smith										
30.0	0.105	1125 to 1146	1.23A	0.26R	0.082	0.052	0.057	0.16	0.25	0.28
Average		21 min	1.15A	0.24R	0.082	0.055	0.048	0.21	0.20	0.26
Rifleman: Davis										
34.0	0.125	0937 to 0948	1.67A	1.15R	0.057	0.038	0.034	0.13	0.17	0.20
Rifleman: Hendricks										
34.0	0.125	0735 to 0753	1.44A	0.86R	0.120	0.110	0.037	0.39	0.15	0.39
Rifleman: Smith										
34.0	0.125	1323 to 1345	1.55A	0.84R	0.048	0.029	0.031	0.14	0.13	0.14
Average		17 min	1.55A	0.95R	0.075	0.059	0.034	0.22	0.15	0.24
Rifleman: Davis[b]										
40.0	0.140	1039 to 1103	2.32A	1.87R	0.046	0.033	0.023	0.11	0.09	0.12
Rifleman: Hendricks										
40.0	0.140	0849 to 0912	1.89A	1.51R	0.071	0.054	0.036	0.17	0.15	0.18
Rifleman: Smith										
40.0	0.140	1442 to 1502	2.16A	1.55R	0.051	0.016	0.043	0.09	0.15	0.15
Average		22 min	2.12A	1.64R	0.056	0.034	0.034	0.12	0.13	0.15
Rifleman: Davis[b]										
48.0	0.170	1233 to 1253	3.87A	2.51R	0.055	0.044	0.017	0.14	0.10	0.14
Rifleman: Hendricks[b]										
48.0	0.170	0952 to 1013	3.16A	2.22R	0.061	0.045	0.030	0.12	0.16	0.17
Rifleman: Smith[b]										
48.0	0.170	0757 to 0817	3.39A	2.41R	0.064	0.040	0.038	0.13	0.18	0.20
Average		20 min	3.47A	2.38R	0.060	0.043	0.028	0.13	0.15	0.17

[b]The exact location of several shot holes within the group was estimated.

Date: 14 November 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	0.0	1.6	Broken	39	Calm	1.064
0800	0.3	3.3	Broken	44	Calm	1.061
0900	0.5	4.2	Broken	50	Calm	1.052
1000	1.0	4.6	Broken	54	Calm	1.049
1100	1.0	4.6	Scattered clouds and hazy	54	Calm	1.049
1200	1.0	4.5	Scattered clouds and hazy	62	Calm	1.047
1300	1.0	4.6	Overcast	62	Calm	1.042
1400	1.3	5.0	Broken	64	Calm	1.043
1500	0.6	4.3	Broken	65	ESE 3	1.031

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (See each individual).
Sight Radius: See each individual
Target: N.R.A. 100-yard Smallbore Rifle
Distance-Rear Sight to Eye: 2 inches.
Range: 100 yards.

Front Sight to Eye, in.	Front Sight Aperture Diameter, in.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis										
10.0	0.035	1423 to 1447	3.43B	3.93L	0.261	0.174	0.132	0.87	0.69	0.89
Rifleman: Hendricks										
10.0	0.035	1056 to 1115	3.74B	3.46L	0.289	0.245	0.112	1.01	0.48	1.02
Rifleman: Smith										
10.0	0.035	0851 to 0908	3.36B	2.18L	0.470	0.338	0.294	1.06	1.00	1.43
Average		20 min	3.51B	3.19L	0.340	0.252	0.179	0.98	0.72	1.11
Rifleman: Davis										
20.0	0.075	0758 to 0812	2.18A	1.32L	0.160	0.069	0.133	0.34	0.46	0.52
Rifleman: Hendricks										
20.0	0.075	1234 to 1251	1.43A	1.66L	0.091	0.046	0.071	0.23	0.25	0.28
Rifleman: Smith										
20.0	0.075	0958 to 1021	1.73A	1.44L	0.115	0.064	0.090	0.21	0.30	0.32
Average		18 min	1.78A	1.47L	0.122	0.060	0.098	0.26	0.34	0.37

Front Sight to Eye, in.	Front Sight Aperture Diameter, in.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis										
30.0	0.105	0912 to 0928	1.52A	0.49R	0.120	0.064	0.088	0.26	0.38	0.39
Rifleman: Hendricks										
30.0	0.105	1342 to 1357	0.93A	0.02R	0.075	0.044	0.053	0.23	0.22	0.25
Rifleman: Smith										
30.0	0.105	1117 to 1139	1.37A	0.27R	0.049	0.037	0.026	0.11	0.09	0.12
Average		14 min	1.27A	0.26R	0.081	0.048	0.056	0.20	0.23	0.25
Rifleman: Davis										
34.0	0.125	1027 to 1052	1.81A	0.96R	0.071	0.036	0.057	0.17	0.28	0.32
Rifleman: Hendricks[b]										
34.0	0.125	0711 to 0733	1.40A	0.55R	0.085	0.036	0.071	0.14	0.27	0.28
Rifleman: Smith										
34.0	0.125	1255 to 1315	1.63A	0.88R	0.057	0.034	0.042	0.14	0.18	0.18
Average		22 min	1.61A	0.80R	0.071	0.035	0.057	0.15	0.24	0.26
Rifleman: Davis										
40.0	0.140	1141 to 1155	2.49A	1.82R	0.057	0.035	0.036	0.17	0.13	0.20
Rifleman: Hendricks										
40.0	0.140	0818 to 0848	2.02A	1.61R	0.062	0.042	0.037	0.19	0.14	0.20
Rifleman: Smith[b]										
40.0	0.140	1401 to 1419	2.41A	1.61R	0.028	0.019	0.016	0.09	0.09	0.10
Average		21 min	2.31A	1.68R	0.049	0.032	0.030	0.15	0.12	0.17
Rifleman: Davis										
48.0	0.170	1320 to 1338	3.72A	2.57R	0.044	0.012	0.038	0.08	0.15	0.16
Rifleman: Hendricks										
48.0	0.170	0932 to 0955	3.20A	2.43R	0.088	0.040	0.068	0.19	0.29	0.30
Rifleman: Smith[b]										
48.0	0.170	0737 to 0756	3.51A	2.56R	0.065	0.024	0.059	0.07	0.19	0.19
Average		20 min	3.48A	2.52R	0.066	0.025	0.055	0.11	0.21	0.22

[b]The exact location of several shot holes within the group was estimated.

15 November 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	0.0	2.0	Overcast	46	Calm	1.051
0800	0.2	3.5	Overcast	51	Calm	1.051
0900	0.2	3.6	Overcast	54	Calm	1.047
1000	0.8	4.6	Broken	59	SSW 7	1.040
1100	0.8	4.6	Overcast	63	SSW 6	1.031
1200	1.0	5.0	Overcast	63	SSW 7	1.028
1300	1.1	5.0	Overcast	65	SSW 7	1.021
1400	1.3	5.0	Overcast	67	SSW 8	1.019
1500	1.0	5.0	Broken	66	SSW 7	1.019

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (See each individual).
Sight Radius: See each individual.
Target: N.R.A. 100-yard Smallbore Rifle.
Distance-Rear Sight to Eye: 2 inches.
Range: 100 yards.

Front Sight to Eye, in.	Front Sight Aperture Diameter, in.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis										
10.0	0.035	1414 to 1430	3.76B	4.08L	0.300	0.164	0.205	0.60	0.74	0.77
Rifleman: Hendricks										
10.0	0.035	1140 to 1151	3.77B	3.59L	0.367	0.302	0.142	1.02	0.55	1.03
Rifleman: Smith										
10.0	0.035	0840 to 0853	3.82B	2.23L	0.557	0.344	0.401	1.58	1.40	1.63
Average		13 min	3.78B	3.30L	0.408	0.270	0.249	1.07	0.90	1.14
Rifleman: Davis										
20.0	0.075	0750 to 0812	1.80A	1.35L	0.119	0.076	0.087	0.20	0.35	0.35
Rifleman: Hendricks										
20.0	0.075	1328 to 1347	1.30A	1.88L	0.098	0.041	0.078	0.14	0.42	0.43
Rifleman: Smith										
20.0	0.075	0942 to 1000	1.62A	1.34L	0.092	0.061	0.057	0.23	0.18	0.26
Average		20 min	1.57A	1.52L	0.103	0.059	0.074	0.19	0.32	0.35

Front Sight to Eye, in.	Front Sight Aperture Diameter, in.	Time	C.I. from Index Point	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis[b]									
30.0	0.105	0857 to 0918	1.23A	0.45R	0.046	0.026	0.034	0.13	0.13	0.15
Rifleman: Hendricks									
30.0	0.105	1435 to 1449	0.92A	0.02R	0.056	0.029	0.046	0.11	0.14	0.17
Rifleman: Smith[b]									
30.0	0.105	1054 to 1116	1.21A	0.23R	0.045	0.024	0.031	0.08	0.13	0.14
Average		19 min	1.12A	0.23R	0.049	0.026	0.037	0.11	0.13	0.15
Rifleman: Davis									
34.0	0.125	1003 to 1029	1.70A	1.14R	0.060	0.041	0.040	0.12	0.12	0.15
Rifleman: Hendricks									
34.0	0.125	0816 to 0837	1.20A	0.76R	0.068	0.026	0.060	0.12	0.21	0.21
Rifleman: Smith									
34.0	0.125	1240 to 1303	1.50A	1.11R	0.044	0.023	0.034	0.10	0.18	0.18
Average		23 min	1.47A	1.00R	0.057	0.030	0.045	0.11	0.17	0.18
Rifleman: Davis[b]									
40.0	0.140	1118 to 1135	2.30A	1.83R	0.065	0.018	0.060	0.12	0.23	0.24
Rifleman: Hendricks									
40.0	0.140	0922 to 0939	1.95A	1.44R	0.067	0.050	0.038	0.18	0.21	0.22
Rifleman: Smith[b]									
40.0	0.140	1350 to 1410	2.22A	1.70R	0.048	0.022	0.042	0.10	0.14	0.16
Average		18 min	2.16A	1.66R	0.060	0.030	0.047	0.13	0.19	0.21
Rifleman: Davis									
48.0	0.170	1306 to 1325	3.68A	2.57R	0.056	0.013	0.051	0.05	0.16	0.16
Rifleman: Hendricks[b]									
48.0	0.170	1033 to 1050	3.23A	2.20R	0.054	0.031	0.038	0.16	0.19	0.22
Rifleman: Smith									
48.0	0.170	0727 to 0748	3.51A	2.65R	0.071	0.038	0.051	0.17	0.20	0.21
Average		19 min	3.47A	2.47R	0.060	0.027	0.047	0.13	0.18	0.20

[b] The exact location of several shot holes within the group was estimated.

Date: 16 November 1960

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph		Density
0700	0.0	1.5	Broken	52	SSW	15	1.029
0800	0.8	4.2	Broken	58	SSW	15	1.022
0900	1.0	4.5	Broken	60	SSW	16	1.017
1000	1.3	5.0	Broken	63	SSW	15	1.013
1100	1.3	5.0	Broken	68	SSW	14	1.009
1200	1.0	4.6	Broken	67	SSW	15	1.004
1300	1.0	4.6	Overcast	72	SSW	15	0.996
1400	0.3	3.3	Overcast	71	SSW	12	0.995
1500	0.3	3.5	Overcast	71	SW	10	0.999

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (See each individual).
Sight Radius: See each individual.
Target: N.R.A. 100-yard Smallbore Rifle.
Distance-Rear Sight to Eye: 2 inches.
Range: 100 yards.

Front Sight to Eye, in.	Front Sight Aperture Diameter, in.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis										
10.0	0.035	1318 to 1338	4.05B	3.87L	0.273	0.213	0.140	0.73	0.53	0.80
Rifleman: Hendricks										
10.0	0.035	1103 to 1118	4.32B	4.27L	0.458	0.396	0.175	1.18	0.87	1.23
Rifleman: Smith										
10.0	0.035	0915 to 0929	3.53B	3.17L	0.421	0.301	0.256	1.03	1.07	1.24
Average		16 min	3.97B	3.77L	0.384	0.303	0.190	0.98	0.82	1.09
Rifleman: Davis										
20.0	0.075	0710 to 0732	1.67A	1.60L	0.086	0.060	0.054	0.21	0.20	0.28
Rifleman: Hendricks										
20.0	0.075	1238 to 1252	1.38A	1.99L	0.101	0.071	0.057	0.32	0.26	0.33
Rifleman: Smith[b]										
20.0	0.075	1017 to 1036	1.64A	1.67L	0.076	0.059	0.041	0.19	0.25	0.31
Average		18 min	1.56A	1.75L	0.088	0.063	0.051	0.24	0.24	0.31

[b]The exact location of several shot holes within the group was estimated.

Front Sight to Eye, in.	Front Sight Aperture Diameter, in.	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis										
30.0	0.105	0827 to 0848	1.22A	0.32R	0.043	0.021	0.033	0.08	0.14	0.14
Rifleman: Hendricks										
30.0	0.105	1340 to 1409	0.98A	0.12L	0.065	0.046	0.038	0.20	0.16	0.24
Rifleman: Smith										
30.0	0.105	1121 to 1142	1.27A	0.17R	0.064	0.045	0.039	0.13	0.15	0.16
Average		24 min	1.16A	0.12R	0.057	0.037	0.037	0.14	0.15	0.18
Rifleman: Davis										
34.0	0.125	0932 to 0951	1.63A	0.93R	0.078	0.051	0.043	0.16	0.18	0.18
Rifleman: Hendricks										
34.0	0.125	0740 to 0757	1.16A	0.67R	0.054	0.030	0.040	0.12	0.18	0.22
Rifleman: Smith										
34.0	0.125	1257 to 1314	1.69A	0.89R	0.060	0.021	0.052	0.07	0.17	0.18
Average		18 min	1.49A	0.83R	0.064	0.034	0.045	0.12	0.18	0.19
Rifleman: Davis[b]										
40.0	0.140	1041 to 1100	2.34A	1.65R	0.037	0.022	0.027	0.09	0.09	0.13
Rifleman: Hendricks[b]										
40.0	0.140	0851 to 0911	1.95A	1.24R	0.057	0.032	0.035	0.15	0.13	0.16
Rifleman: Smith										
40.0	0.140	1417 to 1435	2.21A	1.59R	0.051	0.023	0.041	0.08	0.15	0.16
Average		19 min	2.17A	1.49R	0.048	0.026	0.034	0.11	0.12	0.15
Rifleman: Davis[b]										
48.0	0.170	1145 to 1201	3.71A	2.52R	0.051	0.038	0.032	0.18	0.14	0.22
Rifleman: Hendricks[b]										
48.0	0.170	0955 to 1013	3.23A	2.10R	0.054	0.022	0.041	0.08	0.18	0.18
Rifleman: Smith[b]										
48.0	0.170	0802 to 0824	3.47A	2.42R	0.033	0.013	0.028	0.05	0.08	0.08
Average		19 min	3.47A	2.35R	0.046	0.024	0.034	0.10	0.13	0.16

[b]The exact location of several shot holes within the group was estimated.

SIGHTING ERROR TEST NO. 7

Target: N.R.A. 100-yd Smallbore Rifle
Range: 100 yards

Individual	Weapon Sight Combination	Date, Nov 1960	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	M1 Factory	25	0746 to 0758	0.03A	0.18R	0.229	0.134	0.173	0.61	0.66	0.77
Hendricks	M1 Factory	22	1433 to 1447	1.03B	0.93L	0.218	0.188	0.089	0.52	0.40	0.56
Smith	M1 Factory	22	1008 to 1029	1.35B	0.22L	0.203	0.128	0.150	0.37	0.57	0.68
Average			16 minutes	0.78B	0.32L	0.217	0.150	0.137	0.50	0.54	0.67
Davis	M2 Factory	22	1040 to 1050	1.91A	0.95R	0.273	0.226	0.116	0.83	0.44	0.84
Hendricks	M2 Factory	23	1101 to 1112	2.54B	1.20R	0.242	0.197	0.078	0.95	0.39	0.96
Smith	M2 Factory	22	1355 to 1414	1.14B	0.86R	0.336	0.236	0.199	0.97	0.69	1.08
Average			13 minutes	0.59B	1.00R	0.284	0.220	0.131	0.92	0.51	0.96
Davis	M12 Factory	22	1131 to 1143	1.14A	1.29L	0.641	0.306	0.463	1.15	1.52	1.57
Hendricks	M12 Factory	23	1240 to 1252	3.23B	0.12R	0.750	0.349	0.574	1.31	2.23	2.23
Smith	M12 Factory	22	1450 to 1504	1.96B	1.89R	0.648	0.367	0.431	1.99	1.69	2.18
Average			13 minutes	1.35B	0.24R	0.680	0.341	0.489	1.48	1.81	1.99
Davis	M14 Factory	23	0952 to 1001	0.01A	0.39R	0.273	0.213	0.119	0.85	0.58	0.90
Hendricks	M14 Factory	22	0950 to 1003	2.50B	0.29R	0.254	0.222	0.093	0.87	0.37	0.88
Smith	M14 Factory	23	1255 to 1310	0.82A	0.63L	0.288	0.207	0.146	1.10	0.48	1.13
Average			12 minutes	0.56B	0.02R	0.272	0.214	0.119	0.94	0.48	0.97
Davis	M70 Factory	23	1045 to 1058	1.60B	0.50L	0.348	0.243	0.184	1.00	0.67	1.01
Hendricks	M70 Factory	22	1055 to 1107	2.05B	0.08R	0.792	0.655	0.289	3.05	1.03	3.23
Smith	M70 Factory	23	1402 to 1422	2.47B	1.42R	0.527	0.409	0.251	1.64	1.08	1.70
Average			15 minutes	2.04B	0.33R	0.556	0.436	0.241	1.90	0.93	1.98
Davis	M94 Factory	22	0935 to 0947	2.16A	1.13R	0.333	0.118	0.278	0.82	1.34	1.35
Hendricks	M94 Factory	23	1003 to 1017	0.83B	0.62R	0.822	0.649	0.436	2.00	1.62	2.42
Smith	M94 Factory	22	1306 to 1324	1.88B	0.28L	0.342	0.235	0.192	1.12	0.73	1.16
Average			15 minutes	0.18B	0.49R	0.499	0.334	0.302	1.31	1.23	1.64
Davis	M99 Factory	23	1321 to 1334	3.15B	0.50L	0.348	0.302	0.154	0.97	0.79	1.24
Hendricks	M99 Factory	22	1343 to 1350	3.27B	0.82R	0.662	0.615	0.178	2.73	0.75	2.78
Smith	M99 Factory	22	0915 to 0930	1.38B	0.55R	0.486	0.314	0.296	1.09	1.50	1.55
Average			12 minutes	2.60B	0.29R	0.499	0.410	0.209	1.60	1.01	1.86

Individual	Weapon Sight Combination	Date, Nov 1960	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	M760 Factory	23	0857 to 0910	2.37B	0.11L	0.497	0.413	0.237	1.78	1.05	2.06
Hendricks	M760 Factory	22	0830 to 0853	1.21B	1.30R	0.422	0.303	0.225	1.71	1.11	1.85
Smith	M760 Factory	23	1118 to 1136	0.20B	0.52R	0.702	0.584	0.270	2.12	1.01	2.13
Average			15 minutes	1.26B	0.57R	0.540	0.433	0.244	1.87	1.06	2.01
Davis	M760 Aperture Rear	22	1330 to 1339	0.63B	0.34R	0.221	0.105	0.176	0.48	0.67	0.75
Hendricks	M760 Aperture Rear	23	1340 to 1357	1.79A	0.26R	0.540	0.313	0.385	1.31	1.41	1.52
Smith	M760 Aperture Rear	23	0931 to 0947	2.49A	0.55R	0.217	0.100	0.178	0.47	0.58	0.62
Average			14 minutes	1.22A	0.38R	0.326	0.173	0.246	0.75	0.89	0.96
Davis	M760 1-X Telescope	22	0826 to 0835	3.09A	1.16R	0.211	0.152	0.124	0.54	0.61	0.71
Hendricks	M760 1-X Telescope	23	0912 to 0920	0.90A	0.30L	0.132	0.089	0.085	0.37	0.27	0.39
Smith	M760 1-X Telescope	22	1110 to 1125	1.80A	0.84L	0.194	0.108	0.145	0.48	0.65	0.66
Average			11 minutes	1.93A	0.01R	0.179	0.116	0.118	0.46	0.51	0.59
Davis	M760 2.5-X Telescope	22	1420 to 1430	0.15B	0.28R	0.119	0.083	0.064	0.32	0.26	0.32
Hendricks	M760 2.5-X Telescope	25	0803 to 0823	0.03B	0.04L	0.117	0.108	0.020	0.40	0.12	0.40
Smith	M760 2.5-X Telescope	23	1024 to 1038	0.02B	2.55L	0.184	0.067	0.158	0.22	0.58	0.58
Average			15 minutes	0.07B	0.77L	0.140	0.086	0.081	0.31	0.32	0.43
Davis	M760 8-X Telescope	23	1141 to 1151	0.00	0.01R	0.066	0.036	0.050	0.12	0.17	0.19
Hendricks	M760 8-X Telescope	22	1238 to 1300	1.10A	0.11R	0.042	0.026	0.027	0.10	0.08	0.10
Smith	M760 8-X Telescope	25	0826 to 0845	0.05A	0.09L	0.067	0.038	0.049	0.13	0.19	0.21
Average			17 minutes	0.38A	0.01R	0.058	0.033	0.042	0.12	0.15	0.17
Davis	M1 Factory	27	1327 to 1341	0.79B	0.62R	0.397	0.323	0.206	0.99	0.73	1.07
Hendricks	M1 Factory	25	1342 to 1349	0.27B	1.17R	0.201	0.143	0.113	0.74	0.48	0.79
Smith	M1 Factory	25	0955 to 1010	0.60A	0.34R	0.219	0.185	0.076	0.70	0.37	0.71
Average			12 minutes	0.15B	0.71R	0.272	0.217	0.132	0.81	0.53	0.86
Davis	M2 Factory	25	1052 to 1103	1.60A	0.51L	0.261	0.202	0.136	0.88	0.55	0.94
Hendricks	M2 Factory	27	0933 to 0943	2.57B	1.49R	0.390	0.337	0.132	1.32	0.53	1.36
Smith	M2 Factory	25	1313 to 1326	0.10A	0.96R	0.447	0.384	0.188	1.66	0.86	1.72
Average			11 minutes	0.29B	0.65R	0.366	0.308	0.152	1.29	0.65	1.34
Davis	M12 Factory	25	1245 to 1258	2.47A	1.97L	0.923	0.219	0.828	1.01	2.95	2.97
Hendricks	M12 Factory	27	1014 to 1022	1.80B	2.70R	0.431	0.232	0.287	1.00	1.02	1.03
Smith	M12 Factory	25	1355 to 1405	2.14B	0.54R	0.804	0.606	0.461	2.36	1.68	2.40
Average			10 minutes	0.49B	0.42R	0.719	0.352	0.525	1.46	1.88	2.13
Davis	M14 Factory	27	0921 to 0930	0.52A	0.18R	0.414	0.366	0.140	1.42	0.49	1.44

Individual	Weapon Sight Combination	Date, Nov 1960	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Hendricks	M14 Factory	25	0940 to 0951	2.07B	0.78L	0.169	0.125	0.101	0.55	0.25	0.60
Smith	M14 Factory	27	1026 to 1040	0.20B	0.56R	0.306	0.256	0.133	0.77	0.55	0.80
Average			11 minutes	0.58B	0.01L	0.296	0.249	0.125	0.91	0.43	0.95
Davis	M70 Factory	27	1003 to 1012	2.45A	1.09L	0.384	0.206	0.307	0.73	1.15	1.34
Hendricks	M70 Factory	25	1028 to 1034	0.08B	1.02R	0.695	0.623	0.209	1.98	1.37	2.22
Smith	M70 Factory	27	1115 to 1130	0.22B	0.45R	0.472	0.371	0.231	1.48	0.73	1.60
Average			10 minutes	0.72A	0.13R	0.517	0.400	0.249	1.40	1.08	1.72
Davis	M94 Factory	25	1013 to 1026	0.53B	0.02R	0.285	0.152	0.201	0.77	0.81	0.94
Hendricks	M94 Factory	27	0853 to 0901	0.17A	0.36R	0.349	0.275	0.143	1.23	0.72	1.24
Smith	M94 Factory	25	1127 to 1143	1.25B	0.71R	0.399	0.282	0.216	1.02	0.84	1.06
Average			12 minutes	0.54B	0.36R	0.344	0.236	0.187	1.01	0.79	1.08
Davis	M99 Factory	27	1134 to 1145	0.46B	1.03R	0.367	0.308	0.159	1.08	0.64	1.08
Hendricks	M99 Factory	25	1301 to 1308	2.24B	1.27R	0.417	0.267	0.295	0.91	1.01	1.25
Smith	M99 Factory	25	0906 to 0919	0.43B	1.01L	0.573	0.515	0.170	1.88	0.74	1.88
Average			10 minutes	1.04B	0.43R	0.452	0.363	0.208	1.29	0.80	1.40
Davis	M760 Factory	27	0836 to 0849	1.30B	0.30L	0.387	0.351	0.128	1.33	0.64	1.35
Hendricks	M760 Factory	25	0850 to 0900	2.80B	1.45R	0.493	0.407	0.172	1.66	0.85	1.75
Smith	M760 Factory	27	0948 to 1001	1.65B	0.10R	0.370	0.273	0.196	1.11	0.78	1.19
Average			12 minutes	1.92B	0.42R	0.417	0.344	0.165	1.37	0.76	1.43
Davis	M760 Aperture Rear	25	1330 to 1339	0.24A	0.03R	0.171	0.101	0.116	0.51	0.46	0.59
Hendricks	M760 Aperture Rear	27	1101 to 1109	1.14B	2.02R	0.262	0.191	0.130	0.86	0.57	0.87
Smith	M760 Aperture Rear	27	0823 to 0832	1.12B	0.35R	0.286	0.234	0.119	0.99	0.52	1.00
Average			9 minutes	0.67B	0.80R	0.240	0.175	0.122	0.79	0.52	0.82
Davis	M760 1-X Telescope	25	0925 to 0938	1.34A	0.05L	0.211	0.159	0.118	0.64	0.42	0.67
Hendricks	M760 1-X Telescope	27	0803 to 0819	1.04B	0.54L	0.163	0.112	0.102	0.39	0.50	0.56
Smith	M760 1-X Telescope	25	1037 to 1047	0.68A	0.57R	0.201	0.175	0.075	0.66	0.34	0.71
Average			13 minutes	0.33A	0.01L	0.192	0.149	0.098	0.56	0.42	0.65
Davis	M760 2.5-X Telescope	25	1410 to 1418	0.84B	1.67R	0.084	0.050	0.060	0.28	0.25	0.28
Hendricks	M760 2.5-X Telescope	27	1235 to 1258	2.16A	0.05L	0.053	0.030	0.035	0.18	0.18	0.21
Smith[a]	M760 2.5-X Telescope	27	0905 to 0917	0.01A	0.68L	0.090	0.079	0.033	0.28	0.18	0.28
Average			14 minutes	0.44A	0.31R	0.076	0.053	0.043	0.25	0.20	0.26

[a]The exact location of several shot holes within the group was estimated.

Individual	Weapon Sight Combination	Date, Nov 1960	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	M760 8-X Telescope	27	1043 to 1057	1.21B	0.68L	0.077	0.048	0.052	0.14	0.18	0.22
Hendricks	M760 8-X Telescope	25	1105 to 1122	0.71A	0.33R	0.064	0.044	0.037	0.18	0.16	0.22
Smith[a]	M760 8-X Telescope	27	1302 to 1324	0.87A	0.18R	0.030	0.020	0.018	0.08	0.08	0.09
Average			18 minutes	0.12A	0.06L	0.057	0.037	0.036	0.13	0.14	0.18
Davis	M1 Factory	29	1317 to 1325	0.87B	0.56R	0.244	0.149	0.143	0.96	0.54	0.96
Hendricks	M1 Factory	28	1316 to 1329	0.97B	0.55R	0.160	0.109	0.099	0.38	0.44	0.46
Smith	M1 Factory	28	0907 to 0916	2.34B	0.41L	0.337	0.295	0.084	1.82	0.27	1.82
Average			10 minutes	1.39B	0.23R	0.247	0.184	0.109	1.05	0.42	1.08
Davis	M2 Factory	28	1003 to 1015	0.27A	0.18L	0.436	0.289	0.250	1.55	0.88	1.62
Hendricks	M2 Factory	29	1015 to 1024	0.90B	0.60L	0.463	0.386	0.145	1.51	0.72	1.52
Smith	M2 Factory	28	1129 to 1143	1.99B	0.67R	0.155	0.121	0.086	0.64	0.33	0.64
Average			12 minutes	0.87B	0.04L	0.351	0.265	0.160	1.23	0.64	1.26
Davis	M12 Factory	28	1050 to 1104	0.38B	1.32L	0.754	0.687	0.221	2.50	1.16	2.65
Hendricks	M12 Factory	29	1101 to 1110	0.72B	0.90R	0.658	0.571	0.261	2.14	1.23	2.30
Smith	M12 Factory	28	1249 to 1300	1.03B	0.47R	0.662	0.423	0.421	1.30	1.75	1.98
Average			11 minutes	0.71B	0.02R	0.691	0.560	0.301	1.98	1.38	2.31
Davis	M14 Factory	29	0918 to 0927	0.56A	1.23R	0.296	0.230	0.153	0.81	0.53	0.88
Hendricks	M14 Factory	28	0935 to 0945	0.08B	0.43L	0.221	0.176	0.118	0.68	0.53	0.75
Smith	M14 Factory	29	1027 to 1045	1.55B	0.21R	0.213	0.168	0.103	0.60	0.44	0.60
Average			12 minutes	0.36B	0.34R	0.243	0.191	0.125	0.70	0.50	0.74
Davis	M70 Factory	29	1001 to 1013	1.85A	2.27R	0.273	0.168	0.193	0.67	0.72	0.76
Hendricks	M70 Factory	28	1018 to 1029	0.27B	0.45R	0.759	0.659	0.229	3.06	1.10	3.06
Smith	M70 Factory	29	1115 to 1132	2.34B	0.22R	0.345	0.248	0.164	1.47	0.73	1.47
Average			13 minutes	0.25B	0.98R	0.459	0.358	0.195	1.73	0.85	1.76
Davis	M94 Factory	28	0918 to 0932	1.77A	2.16L	0.401	0.315	0.210	0.91	0.82	1.07
Hendricks	M94 Factory	29	0930 to 0940	2.52B	1.14R	0.498	0.393	0.239	1.38	1.10	1.78
Smith	M94 Factory	28	1031 to 1044	0.41B	0.47R	0.558	0.473	0.226	2.12	0.83	2.19
Average			12 minutes	0.39B	0.18L	0.486	0.394	0.225	1.47	0.92	1.68
Davis	M99 Factory	29	1136 to 1146	1.40A	0.16R	0.459	0.326	0.283	1.43	0.83	1.56
Hendricks	M99 Factory	28	1234 to 1245	1.40B	0.02L	0.496	0.439	0.152	1.81	0.49	1.85
Smith	M99 Factory	28	0820 to 0831	3.00B	0.19R	0.519	0.413	0.266	1.75	0.96	1.94
Average			11 minutes	1.00B	0.11R	0.491	0.393	0.234	1.66	0.76	1.78

[a]The exact location of several shot holes within the group was estimated.

Individual	Weapon Sight Combination	Date, Nov 1960	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	M760 Factory	29	0831 to 0845	0.17B	0.14R	0.690	0.637	0.203	1.91	0.66	2.00
Hendricks	M760 Factory	28	0857 to 0904	0.76A	0.45L	0.368	0.221	0.229	0.93	0.88	0.94
Smith	M760 Factory	29	0945 to 0956	0.22A	2.43R	0.412	0.316	0.179	1.41	0.80	1.42
Average			11 minutes	0.27A	0.71R	0.490	0.391	0.204	1.42	0.78	1.45
Davis	M760 Aperture Rear	28	1145 to 1152	0.02A	0.11R	0.220	0.100	0.172	0.54	0.59	0.65
Hendricks	M760 Aperture Rear	29	1243 to 1250	1.66B	0.14R	0.361	0.311	0.160	1.03	0.62	1.09
Smith	M760 Aperture Rear	29	0811 to 0823	0.82B	0.34L	0.265	0.171	0.159	0.96	0.76	1.00
Average			9 minutes	0.82B	0.03L	0.282	0.194	0.164	0.84	0.66	0.91
Davis	M760 1-X Telescope	28	0838 to 0851	1.51B	2.18L	0.258	0.202	0.142	0.79	0.63	0.84
Hendricks	M760 1-X Telescope	29	0846 to 0853	0.97A	0.41R	0.177	0.095	0.131	0.41	0.58	0.59
Smith	M760 1-X Telescope	28	0949 to 1000	0.26B	1.27L	0.250	0.179	0.141	0.62	0.51	0.73
Average			10 minutes	0.27B	1.01L	0.228	0.159	0.138	0.61	0.57	0.72
Davis	M760 2.5-X Telescope	28	1304 to 1312	0.12B	0.39R	0.092	0.035	0.083	0.14	0.35	0.35
Hendricks	M760 2.5-X Telescope	29	1330 to 1357	0.71B	0.69R	0.106	0.058	0.076	0.25	0.27	0.34
Smith	M760 2.5-X Telescope	29	0857 to 0915	0.45A	0.47L	0.076	0.030	0.068	0.13	0.23	0.25
Average			18 minutes	0.13B	0.20R	0.091	0.041	0.076	0.17	0.28	0.31
Davis[a]	M760 8-X Telescope	29	1049 to 1055	0.35A	0.31R	0.056	0.026	0.047	0.10	0.14	0.15
Hendricks[a]	M760 8-X Telescope	28	1107 to 1123	0.42B	0.25L	0.052	0.040	0.027	0.21	0.15	0.21
Smith[a]	M760 8-X Telescope	29	1256 to 1313	0.22A	0.06L	0.042	0.037	0.017	0.13	0.07	0.13
Average			13 minutes	0.05A	0.00	0.050	0.034	0.030	0.15	0.12	0.16

Individual	Weapon Sight Combination	Date, 1960	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	M1 Factory	1 Dec	1141 to 1151	1.53B	1.22R	0.159	0.112	0.099	0.44	0.38	0.56
Hendricks	M1 Factory	30 Nov	1102 to 1111	1.64B	0.11R	0.285	0.221	0.137	0.86	0.62	0.89
Smith	M1 Factory	30 Nov	0837 to 0848	1.13B	0.21L	0.256	0.234	0.082	0.98	0.32	1.03
Average			10 minutes	1.43B	0.37R	0.233	0.189	0.106	0.76	0.44	0.83
Davis	M2 Factory	30 Nov	0850 to 0900	1.37B	0.58R	0.290	0.209	0.162	1.06	0.77	1.23
Hendricks	M2 Factory	1 Dec	0959 to 1007	3.78B	0.68R	0.461	0.352	0.240	1.56	0.79	1.66
Smith	M2 Factory	30 Nov	1037 to 1048	2.25B	0.30R	0.308	0.277	0.108	1.28	0.65	1.33
Average			10 minutes	2.47B	0.52R	0.353	0.279	0.170	1.30	0.74	1.41

[a]The exact location of several shot holes within the group was estimated.

Individual	Weapon Sight Combination	Date, 1960	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	M12 Factory	30 Nov	0932 to 0940	0.75A	0.42R	0.899	0.355	0.803	1.72	3.02	3.19
Hendricks	M12 Factory	1 Dec	1036 to 1045	2.20B	0.27L	0.452	0.341	0.210	1.41	1.35	1.69
Smith	M12 Factory	30 Nov	1114 to 1123	3.90B	0.50L	0.378	0.208	0.280	1.12	1.06	1.39
Average			9 minutes	1.78B	0.12L	0.576	0.301	0.432	1.42	1.81	2.09
Davis	M14 Factory	1 Dec	0850 to 0900	0.21A	0.11R	0.271	0.227	0.122	0.77	0.41	0.81
Hendricks	M14 Factory	30 Nov	0824 to 0834	0.56B	0.04R	0.247	0.191	0.110	0.84	0.52	0.85
Smith	M14 Factory	1 Dec	1050 to 1101	1.14B	0.22R	0.165	0.118	0.087	0.59	0.31	0.59
Average			10 minutes	0.50B	0.12R	0.228	0.179	0.106	0.73	0.41	0.75
Davis	M70 Factory	1 Dec	0946 to 0956	0.47A	0.52L	0.480	0.337	0.253	1.42	1.04	1.51
Hendricks	M70 Factory	30 Nov	0904 to 0912	0.49B	1.16R	0.337	0.201	0.226	0.94	0.81	1.07
Smith	M70 Factory	1 Dec	1128 to 1139	1.66B	0.14R	0.281	0.217	0.129	0.89	0.59	0.90
Average			10 minutes	0.56B	0.26R	0.366	0.252	0.203	1.08	0.81	1.16
Davis	M94 Factory	30 Nov	0816 to 0822	2.52B	0.44L	0.516	0.451	0.203	1.86	0.67	1.99
Hendricks	M94 Factory	1 Dec	0910 to 0918	0.89B	0.12L	0.376	0.328	0.125	1.52	0.49	1.54
Smith	M94 Factory	30 Nov	1005 to 1013	1.15A	1.27R	0.750	0.593	0.304	2.62	1.29	2.71
Average			7 minutes	0.75B	0.24R	0.547	0.457	0.211	2.00	0.82	2.08
Davis	M99 Factory	1 Dec	1104 to 1113	1.80A	0.52L	0.533	0.346	0.349	1.38	1.27	1.52
Hendricks	M99 Factory	30 Nov	1027 to 1035	1.26B	0.15R	0.525	0.369	0.335	1.17	1.06	1.46
Smith	M99 Factory	30 Nov	0800 to 0813	2.48B	0.54R	0.480	0.434	0.142	2.07	0.71	2.08
Average			10 minutes	0.65B	0.05R	0.513	0.383	0.275	1.54	1.01	1.69
Davis	M760 Factory	1 Dec	0756 to 0811	2.62B	0.49R	0.765	0.682	0.273	3.52	1.09	3.67
Hendricks	M760 Factory	30 Nov	0749 to 0757	0.28A	0.07R	0.531	0.401	0.335	1.24	1.11	1.59
Smith	M760 Factory	1 Dec	1011 to 1022	2.25B	0.82R	0.558	0.452	0.281	1.46	1.18	1.68
Average			11 minutes	1.53B	0.46R	0.618	0.512	0.296	2.07	1.13	2.31
Davis	M760 Aperture Rear	30 Nov	1016 to 1024	0.54A	0.95R	0.197	0.149	0.112	0.56	0.42	0.66
Hendricks	M760 Aperture Rear	1 Dec	1116 to 1124	0.92B	0.29R	0.302	0.276	0.114	0.89	0.47	1.01
Smith	M760 Aperture Rear	1 Dec	0831 to 0845	1.57B	0.92L	0.373	0.356	0.096	1.05	0.29	1.06
Average			10 minutes	0.65B	0.11R	0.291	0.260	0.107	0.83	0.39	0.91
Davis	M760 1-X Telescope	30 Nov	0736 to 0745	2.32A	1.15L	0.168	0.091	0.129	0.39	0.42	0.50
Hendricks	M760 1-X Telescope	1 Dec	0815 to 0827	1.97A	0.44R	0.295	0.198	0.190	0.74	0.85	0.90
Smith	M760 1-X Telescope	30 Nov	0915 to 0927	0.42A	1.04L	0.203	0.125	0.127	0.42	0.48	0.53
Average			11 minutes	1.57A	0.58L	0.222	0.138	0.149	0.52	0.58	0.64

Individual	Weapon Sight Combination	Date, 1960	Time	C.I. from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	M760 2.5-X Telescope	30 Nov	1051 to 1058	0.10A	0.14L	0.138	0.065	0.109	0.23	0.44	0.45
Hendricks[a]	M760 2.5-X Telescope	1 Dec	1235 to 1253	0.02B	0.48L	0.089	0.060	0.059	0.23	0.39	0.42
Smith	M760 2.5-X Telescope	1 Dec	0921 to 0942	0.29A	0.97L	0.104	0.082	0.043	0.41	0.18	0.41
Average			15 minutes	0.12A	0.53L	0.110	0.069	0.070	0.29	0.34	0.43
Davis	M760 8-X Telescope	1 Dec	1025 to 1034	1.42A	0.14L	0.062	0.023	0.051	0.10	0.21	0.22
Hendricks[a]	M760 8-X Telescope	30 Nov	0943 to 1000	1.12B	0.29R	0.038	0.021	0.026	0.09	0.16	0.17
Smith[a]	M760 8-X Telescope	1 Dec	1256 to 1310	0.35B	0.00	0.042	0.033	0.021	0.12	0.09	0.13
Average			13 minutes	0.02B	0.05R	0.047	0.026	0.033	0.10	0.15	0.17

[a]The exact location of several shot holes within the group was estimated.

Weather Data for Test 7

Time	Light[b] High	Light[b] Low	Sky Condition	Temperature, °F	Wind Direction	Wind Velocity, mph	Density
22 November 1960							
0800	0.3	3.5	Clear	40	Calm		1.062
0900	0.3	4.0	Clear	49	Calm		1.044
1000	0.8	4.5	Scattered clouds	56	Calm		1.033
1100	1.3	5.0	Broken	63	SSW	6	1.034
1200	1.2	4.8	Overcast	64	SSW	8	1.030
1300	1.3	5.0	Broken	68	SSW	6	1.016
1400	1.0	4.5	Broken	68	SSW	5	1.018
1500	0.2	3.5	Overcast	63	SSW	5	1.023
23 November 1960							
0900	0.3	3.0	Overcast with fog	50	W	8	1.045
1000	0.3	3.0	Overcast with fog	52	W	5	1.042
1100	0.5	3.8	Overcast with fog	55	W	6	1.038
1200	0.3	3.6	Overcast with fog	57	W	8	1.034
1300	0.0	1.6	Overcast	57	N	8	1.030
1400	0.2	2.6	Overcast	55	N	10	1.035

[b]Reading on G.E. type PR-1 exposure meter.

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind Direction	Wind Velocity, mph	Density
25 November 1960							
0900	0.6	3.5	Overcast	48	Calm		1.052
1000	0.6	4.1	Overcast	52	Calm		1.050
1100	1.5	4.6	Overcast	54	S	7	1.037
1200	1.5	4.6	Broken	56	S	8	1.033
1300	1.3	4.6	Broken	56	NW	5	1.031
1400	1.0	4.0	Overcast	58	S	9	1.031
27 November 1960							
0800	0.3	3.3	Overcast	41	not recorded		1.056
0900	0.6	3.8	Overcast	47			1.051
1000	0.8	4.3	Scattered clouds	54			1.038
1100	1.3	5.0	Scattered clouds	60			1.028
1200	1.6	5.3	Clear	65			1.026
1300	1.3	5.0	Clear	65			1.016
1400	1.1	4.5	Clear	64			1.017
28 November 1960							
0800	0.2	3.0	Overcast with fog	44	Calm		1.056
0900	0.4	4.0	Overcast with fog	48	Calm		1.052
1000	0.5	4.3	Overcast with fog	48	Calm		1.050
1100	0.8	4.5	Overcast with fog	56	Calm		1.043
1200	0.8	4.4	Overcast with fog	55	Calm		1.034
1300	1.0	4.5	Overcast with fog	60	Calm		1.032
29 November 1960							
0800	0.2	2.7	Overcast with fog	54	SSE	5	1.027
0900	0.5	4.0	Overcast with fog	60	SSE	5	1.024
1000	0.6	4.5	Overcast	63	SW	11	1.013
1100	0.5	4.2	Overcast	63	SW	19	0.999
1200	0.2	3.0	Overcast with rain showers	64	SW	12	1.008
1300	0.3	3.6	Overcast with rain showers	64	SSW	12	1.003
1400	0.0	1.8	Overcast	64	SSW	12	1.001

[a]Reading on G.E. type PR-1 exposure meter.

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind Direction	Wind Velocity, mph	Density
30 November 1960							
0800	0.2	3.0	Broken	34	NW	9	1.068
0900	0.3	3.4	Broken	35	NW	17	1.071
1000	0.6	3.7	Scattered clouds	34	W	15	1.069
1100	1.0	4.6	Scattered clouds	38	W	18	1.069
1 December 1960							
0800	0.1	2.8	Scattered clouds	30	W	14	1.084
0900	0.6	4.0	Scattered clouds	35	WNW	17	1.078
1000	1.0	4.6	Broken	37	NW	16	1.076
1100	1.0	4.5	Broken	39	NW	15	1.072
1200	1.3	4.6	Broken	40	NW	18	1.071
1300	1.2	4.6	Broken	38	NW	17	1.069

[a]Reading on G.E. type PR-1 exposure meter.

SIGHTING ERROR TEST NO. 8

Date: 10 May 1961

Time	Temperature, °F	Density
0800	70	1.006
0900	70	1.002
1000	70	1.005
1100	72	1.006

Rear Sight: M94 Open hunting.
Front Sight: Silver-colored bead protected by a hood.
Sight Radius: 16.9 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.2	0.8	0732 to 0752	0.455	0.415	0.151	1.63	0.67	1.67
Hendricks	0.2	0.8	0754 to 0810	0.434	0.374	0.147	1.24	0.60	1.25
Smith	0.2	0.8	0812 to 0826	0.467	0.439	0.131	1.34	0.51	1.43
Average				0.452	0.409	0.143	1.40	0.59	1.45
Davis	0.3	2.2	0831 to 0847	0.261	0.227	0.099	1.03	0.44	1.04
Hendricks	0.3	2.2	0851 to 0904	0.224	0.117	0.164	0.48	0.76	0.78
Smith	0.3	2.2	0907 to 0921	0.492	0.417	0.185	1.78	0.68	1.84
Average				0.326	0.254	0.149	1.10	0.63	1.22
Davis	0.4	3.1	0927 to 0943	0.352	0.336	0.073	1.53	0.39	1.54
Hendricks	0.4	3.1	0946 to 1001	0.258	0.128	0.178	0.53	0.93	1.02
Smith	0.4	3.1	1004 to 1020	0.424	0.384	0.121	1.87	0.43	1.92
Average				0.345	0.283	0.124	1.31	0.58	1.49
Davis	0.5	3.8	1027 to 1042	0.345	0.294	0.141	1.14	0.62	1.17
Hendricks	0.5	3.8	1044 to 1054	0.264	0.225	0.113	0.98	0.38	1.00
Smith	0.5	3.8	1057 to 1112	0.396	0.306	0.205	1.12	0.61	1.12
Average				0.335	0.275	0.153	1.08	0.54	1.10

[a]Reading on G.E. Type PR-1 Exposure Meter.

Date: 5 June 1961

Time	Temperature, °F	Density
1400	80	0.982
1500	80	0.979

Rear Sight: M94 Open hunting.
Front Sight: Silver-colored bead protected by a hood.
Sight Radius: 16.9 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.00	0.05	1412 to 1421	0.720	0.494	0.379	2.06	1.38	2.09
	0.00	0.05	1448 to 1459	1.145	0.918	0.554	3.57	1.93	3.58
Hendricks	0.00	0.05	1423 to 1432	1.013	0.894	0.360	3.88	1.43	3.88
	0.00	0.05	1501 to 1515	1.219	1.058	0.488	4.23	1.83	4.25
Smith	0.00	0.05	1434 to 1446	0.937	0.806	0.357	3.57	1.26	3.68
	0.00	0.05	1517 to 1530	1.109	0.905	0.569	3.81	2.01	3.82
Average				1.024	0.846	0.451	3.52	1.64	3.55

[a]Reading on G.E. Type PR-1 Exposure Meter.

Date: 26 May 1961

Time	Temperature, °F	Density
0800	73	0.986
0900	73	0.984
1000	74	0.981
1100	74	0.977
1200	76	0.976
1300	77	0.992
1400	77	1.005
1500	78	1.003

Rear Sight: M94 Open hunting.
Front Sight: Silver-colored bead protected by a hood.
Sight Radius: 16.9 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.1	0.5	0823 to 0833	0.353	0.309	0.137	1.11	0.50	1.12
	0.1	0.5	0909 to 0923	0.355	0.313	0.125	1.44	0.61	1.48
Hendricks	0.1	0.5	0835 to 0847	0.403	0.281	0.228	1.38	0.97	1.53
	0.1	0.5	0926 to 0947	0.434	0.365	0.154	2.00	0.74	2.02
Smith	0.1	0.5	0849 to 0906	0.553	0.521	0.129	1.86	0.40	1.87
	0.1	0.5	0949 to 1004	0.482	0.442	0.152	2.07	0.72	2.14
Average				0.430	0.372	0.154	1.64	0.66	1.69
Davis	0.2	0.8	1033 to 1050	0.364	0.358	0.076	1.27	0.31	1.27
Hendricks	0.2	0.8	1052 to 1110	0.650	0.528	0.321	1.64	1.05	1.72
Smith	0.2	0.8	1112 to 1125	0.548	0.490	0.199	1.80	0.88	1.92
Average				0.521	0.459	0.199	1.57	0.75	1.64
Davis	0.2	2.2	1145 to 1200	0.445	0.424	0.122	1.33	0.48	1.37
Hendricks	0.2	2.2	1242 to 1253	0.418	0.377	0.153	1.37	0.54	1.38
Smith	0.2	2.2	1255 to 1309	0.514	0.415	0.224	1.52	0.87	1.52
Average				0.459	0.405	0.166	1.41	0.63	1.42

[a]Reading on G.E. Type PR-1 Exposure Meter.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.3	3.2	1322 to 1340	0.439	0.412	0.090	1.46	0.53	1.47
Hendricks	0.3	3.2	1343 to 1353	0.739	0.698	0.209	2.29	0.87	2.32
Smith	0.3	3.2	1355 to 1408	0.347	0.322	0.087	1.18	0.47	1.19
Average				0.508	0.477	0.129	1.64	0.62	1.66
Davis	0.4	3.8	1420 to 1432	0.293	0.262	0.109	0.92	0.41	0.98
Hendricks	0.4	3.8	1433 to 1443	0.367	0.296	0.169	1.12	0.55	1.14
Smith	0.4	3.8	1445 to 1457	0.343	0.273	0.173	0.95	0.69	1.09
Average				0.334	0.277	0.150	1.00	0.55	1.07

Date: 8 May 1961

Time	Temperature, °F	Density
0800	62	1.017
0900	63	1.015
1000	64	1.012
1100	66	1.008

Sight: 8-X telescope on M760 Rifle.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis[b]	0.2	0.8	0732 to 0800	0.037	0.029	0.018	0.11	0.07	0.13
Hendricks[b]	0.2	0.8	0802 to 0819	0.036	0.031	0.017	0.12	0.06	0.12
Smith	0.2	0.8	0823 to 0837	0.101	0.007	0.100	0.04	0.41	0.41
Average				0.058	0.022	0.045	0.09	0.18	0.22
Davis[b]	0.3	2.1	0840 to 0859	0.015	0.006	0.010	0.03	0.05	0.05
Hendricks[b]	0.3	2.1	0901 to 0916	0.035	0.027	0.015	0.12	0.07	0.14
Smith[b]	0.3	2.1	0919 to 0933	0.042	0.029	0.025	0.11	0.12	0.13
Average				0.031	0.021	0.017	0.09	0.08	0.11
Davis[b]	0.4	3.1	0942 to 1001	0.025	0.020	0.017	0.06	0.05	0.08
Hendricks[b]	0.4	3.1	1003 to 1020	0.025	0.018	0.013	0.10	0.05	0.10
Smith[b]	0.4	3.1	1021 to 1033	0.040	0.023	0.027	0.07	0.15	0.15
Average				0.030	0.020	0.019	0.08	0.08	0.11
Davis[b]	0.5	3.8	1041 to 1057	0.023	0.016	0.014	0.08	0.06	0.10
Hendricks[b]	0.5	3.8	1059 to 1112	0.011	0.007	0.007	0.02	0.03	0.03
Smith[b]	0.5	3.8	1114 to 1126	0.034	0.016	0.027	0.05	0.10	0.11
Average				0.023	0.013	0.016	0.05	0.06	0.08

[a]Reading on G.E. Type PR-1 Exposure Meter.

[b]The exact location of several shot holes within the group was estimated.

Date: 24 May 1961

Time	Temperature, °F	Density
0800	64	1.023
0900	65	1.017
1000	66	1.007
1100	68	1.006
1200	70	1.001
1300	70	0.998
1400	72	0.991
1500	74	0.989

Sight: 8-X telescope on M760 Rifle.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis[b]	0.00	0.05	0736 to 0756	0.054	0.042	0.025	0.19	0.09	0.19
	0.00	0.05	0826 to 0845	0.043	0.023	0.031	0.10	0.09	0.11
Hendricks[b]	0.00	0.05	0757 to 0809	0.059	0.037	0.041	0.14	0.23	0.23
	0.00	0.05	0849 to 0905	0.063	0.041	0.045	0.10	0.13	0.15
Smith	0.00	0.05	0811 to 0823	0.082	0.036	0.064	0.14	0.37	0.37
[b]	0.00	0.05	0907 to 0923	0.050	0.017	0.044	0.10	0.17	0.18
Average				0.058	0.033	0.042	0.13	0.18	0.20
Davis[b]	0.1	0.5	0936 to 0950	0.029	0.026	0.009	0.13	0.03	0.14
[b]	0.1	0.5	1027 to 1042	0.027	0.021	0.013	0.07	0.07	0.07
Hendricks[b]	0.1	0.5	0953 to 1010	0.049	0.022	0.037	0.09	0.19	0.20
[b]	0.1	0.5	1044 to 1056	0.036	0.024	0.022	0.12	0.08	0.12
Smith	0.1	0.5	1011 to 1024	0.039	0.016	0.033	0.07	0.11	0.11
[b]	0.1	0.5	1058 to 1111	0.084	0.018	0.078	0.08	0.28	0.28
Average				0.044	0.021	0.032	0.09	0.13	0.15
Davis[b]	0.2	0.8	1119 to 1133	0.027	0.024	0.013	0.09	0.05	0.09
Hendricks[b]	0.2	0.8	1135 to 1148	0.020	0.012	0.013	0.06	0.07	0.08
Smith[b]	0.2	0.8	1150 to 1205	0.027	0.023	0.012	0.09	0.04	0.09
Average				0.025	0.020	0.013	0.08	0.05	0.09
Davis[b]	0.2	2.2	1235 to 1247	0.048	0.042	0.018	0.15	0.07	0.16
Hendricks	0.2	2.2	1250 to 1313	0.040	0.030	0.016	0.18	0.08	0.18
Smith[b]	0.2	2.2	1316 to 1331	0.039	0.033	0.014	0.12	0.07	0.12
Average				0.042	0.035	0.016	0.15	0.07	0.15
Davis[b]	0.3	3.2	1336 to 1347	0.044	0.033	0.026	0.11	0.07	0.11
Hendricks	0.3	3.2	1349 to 1402	0.042	0.031	0.022	0.14	0.08	0.14
Smith[b]	0.3	3.2	1404 to 1420	0.019	0.011	0.016	0.04	0.06	0.06
Average				0.035	0.025	0.021	0.10	0.07	0.10
Davis	0.4	3.8	1432 to 1444	0.048	0.041	0.018	0.17	0.06	0.18
Hendricks[b]	0.4	3.8	1446 to 1502	0.026	0.014	0.019	0.06	0.10	0.12
Smith[b]	0.4	3.8	1504 to 1518	0.034	0.015	0.030	0.05	0.17	0.17
Average				0.036	0.023	0.022	0.09	0.11	0.16

[a] Reading on G.E. Type PR-1 Exposure Meter.

[b] The exact location of several shot holes within the group was estimated.

Date: 5 May 1961

Time	Temperature, °F	Density
0800	58	1.049
0900	58	1.036
1000	60	1.031
1100	63	1.031

Sight: 2.5-X telescope on M760 Rifle.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.2	0.8	0730 to 0747	0.053	0.031	0.031	0.17	0.14	0.18
Hendricks	0.2	0.8	0749 to 0802	0.082	0.066	0.039	0.27	0.12	0.27
Smith	0.2	0.8	0804 to 0823	0.078	0.049	0.052	0.23	0.21	0.29
Average				0.071	0.049	0.041	0.22	0.16	0.25
Davis	0.3	2.1	0832 to 0846	0.042	0.031	0.024	0.14	0.10	0.15
Hendricks	0.3	2.1	0848 to 0903	0.067	0.044	0.038	0.19	0.17	0.21
Smith	0.3	2.1	0905 to 0920	0.126	0.054	0.103	0.22	0.48	0.48
Average				0.078	0.043	0.055	0.18	0.25	0.28
Davis[b]	0.3	3.1	0936 to 0952	0.029	0.012	0.021	0.09	0.10	0.10
Hendricks[b]	0.3	3.1	0954 to 1007	0.057	0.055	0.009	0.15	0.03	0.16
Smith[b]	0.3	3.1	1009 to 1024	0.092	0.058	0.051	0.18	0.25	0.28
Average				0.059	0.042	0.027	0.14	0.13	0.18
Davis[b]	0.4	3.8	1033 to 1050	0.044	0.031	0.030	0.19	0.14	0.23
Hendricks[b]	0.4	3.8	1053 to 1112	0.087	0.072	0.042	0.27	0.14	0.27
Smith	0.4	3.8	1114 to 1127	0.121	0.066	0.090	0.30	0.27	0.35
Average				0.084	0.056	0.054	0.25	0.18	0.28

[a]Reading on G.E. Type PR-1 Exposure Meter.

[b]The exact location of several shot holes within the group was estimated.

Date: 23 May 1961

Time	Temperature, °F	Density
0800	62	1.025
0900	63	1.019
1000	64	1.013
1100	66	1.010
1200	68	1.018
1300	69	1.006
1400	70	1.002
1500	72	1.002
1600	75	0.998
1700	75	

Sight: 2.5 X telescope on M760 Rifle.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.00	0.05	0746 to 0807	0.117	0.099	0.037	0.42	0.20	0.42
	0.00	0.05	0848 to 0908	0.118	0.102	0.041	0.38	0.23	0.41
Hendricks	0.00	0.05	0809 to 0823	0.096	0.068	0.058	0.25	0.14	0.28
	0.00	0.05	0910 to 0934	0.127	0.121	0.033	0.45	0.14	0.46
Smith	0.00	0.05	0825 to 0842	0.212	0.164	0.103	0.59	0.40	0.59
	0.00	0.05	0936 to 0950	0.107	0.082	0.053	0.32	0.28	0.36
Average				0.130	0.106	0.054	0.40	0.23	0.42
Davis	0.1	0.5	1011 to 1031	0.052	0.046	0.022	0.18	0.06	0.19
[b]	0.1	0.5	1110 to 1131	0.039	0.031	0.019	0.09	0.07	0.10
Hendricks[b]	0.1	0.5	1033 to 1052	0.069	0.068	0.013	0.25	0.06	0.25
	0.1	0.5	1132 to 1147	0.083	0.064	0.043	0.26	0.15	0.26
Smith[b]	0.1	0.5	1056 to 1106	0.051	0.027	0.037	0.12	0.14	0.16
	0.1	0.5	1150 to 1204	0.064	0.038	0.045	0.13	0.18	0.18
Average				0.060	0.046	0.030	0.17	0.11	0.19

[a]Reading on G.E. Type PR-1 Exposure Meter.

Davis[b]	0.2	0.8	1253 to 1309	0.054	0.050	0.011	0.25	0.05	0.25
Hendricks	0.2	0.8	1311 to 1320	0.081	0.059	0.037	0.34	0.21	0.36
Smith	0.2	0.8	1323 to 1339	0.070	0.047	0.045	0.20	0.22	0.28
Average				0.068	0.052	0.031	0.26	0.16	0.30
Davis[b]	0.2	2.2	1347 to 1404	0.078	0.070	0.022	0.31	0.10	0.32
Hendricks	0.2	2.2	1406 to 1422	0.070	0.061	0.026	0.23	0.10	0.25
Smith	0.2	2.2	1424 to 1443	0.071	0.057	0.033	0.24	0.18	0.26
Average				0.073	0.063	0.027	0.26	0.13	0.28
Davis	0.3	3.2	1450 to 1508	0.057	0.048	0.021	0.18	0.12	0.18
Hendricks	0.3	3.2	1510 to 1528	0.065	0.047	0.032	0.18	0.14	0.19
Smith	0.3	3.2	1530 to 1547	0.077	0.064	0.032	0.27	0.15	0.29
Average				0.066	0.053	0.028	0.21	0.14	0.22
Davis[b]	0.4	3.8	1559 to 1616	0.050	0.044	0.020	0.16	0.06	0.16
Hendricks[b]	0.4	3.8	1617 to 1633	0.074	0.069	0.025	0.24	0.10	0.24
Smith	0.4	3.8	1635 to 1648	0.040	0.034	0.020	0.11	0.08	0.14
Average				0.055	0.049	0.022	0.17	0.08	0.18

[b]The exact location of several shot holes within the group was estimated.

Date: 16 May 1961

Time	Temperature, °F	Density
0800	72	0.989
0900	73	0.993
1000	75	0.992
1100	76	0.989

Rear Sight: M1 Rifle (Multilite).
Front Sight: M1 Rifle (Multilite).
Sight Radius: 27.2 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.2	0.8	0735 to 0750	0.507	0.396	0.259	1.48	1.05	1.50
Hendricks	0.2	0.8	0752 to 0804	0.434	0.241	0.312	0.85	1.51	1.51
Smith	0.2	0.8	0806 to 0823	0.681	0.480	0.430	1.39	1.48	1.84
Average				0.541	0.372	0.334	1.24	1.35	1.62
Davis	0.2	2.2	0829 to 0845	0.532	0.471	0.193	1.64	0.72	1.66
Hendricks	0.2	2.2	0848 to 0904	0.484	0.240	0.374	1.16	1.42	1.48
Smith	0.2	2.2	0906 to 0919	0.771	0.592	0.327	2.73	1.70	2.73
Average				0.596	0.434	0.298	1.84	1.28	1.96
Davis	0.3	3.2	0929 to 0941	0.525	0.279	0.396	1.42	1.23	1.55
Hendricks	0.3	3.2	0944 to 0958	0.241	0.150	0.169	0.56	0.67	0.80
Smith	0.3	3.2	1001 to 1016	0.901	0.765	0.338	3.25	1.71	3.26
Average				0.556	0.398	0.301	1.74	1.20	1.87
Davis	0.4	3.8	1026 to 1038	0.394	0.141	0.315	0.66	1.68	1.70
Hendricks	0.4	3.8	1040 to 1055	0.544	0.297	0.402	1.29	1.13	1.42
Smith	0.4	3.8	1059 to 1114	0.734	0.594	0.295	2.08	2.11	2.43
Average				0.557	0.344	0.337	1.34	1.64	1.85

[a]Reading on G.E. PR-1 Exposure Meter

Date: 2 June 1961

Time	Temperature, °F	Density
0800	73	0.985
0900	73	0.988
1000	74	0.978
1100	75	0.966
1200	76	0.965
1300	79	0.961
1400	81	0.959
1500	84	0.954
1600	84	0.962

Rear Sight: M1 Rifle (Multilite).
Front Sight: M1 Rifle (Multilite).
Sight Radius: 27.2 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 Yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.00	0.05	0740 to 0753	0.620	0.361	0.453	1.36	1.81	2.11
	0.00	0.05	0828 to 0843	0.469	0.260	0.337	1.13	1.19	1.30
Hendricks	0.00	0.05	0756 to 0810	0.946	0.752	0.492	2.24	1.90	2.65
	0.00	0.05	0845 to 0903	0.929	0.721	0.517	2.60	2.73	3.77
Smith	0.00	0.05	0812 to 0825	1.152	0.915	0.560	4.08	2.23	4.25
	0.00	0.05	0905 to 0921	1.047	0.750	0.690	2.80	2.67	3.65
Average				0.860	0.626	0.508	2.37	2.09	2.96
Davis	0.1	0.5	0936 to 0948	0.322	0.249	0.171	0.93	0.79	1.08
	0.1	0.5	1039 to 1054	0.454	0.247	0.306	1.31	1.41	1.51
Hendricks	0.1	0.5	1012 to 1025	0.363	0.177	0.302	0.77	0.94	1.11
	0.1	0.5	1057 to 1113	0.336	0.237	0.193	0.86	0.90	1.02
Smith	0.1	0.5	1027 to 1036	0.749	0.574	0.364	2.33	1.37	2.35
	0.1	0.5	1117 to 1127	0.515	0.395	0.286	1.46	1.36	1.76
Average				0.456	0.313	0.270	1.28	1.13	1.47
Davis	0.1	0.8	1133 to 1147	0.526	0.402	0.245	1.41	0.86	1.46
Hendricks	0.1	0.8	1149 to 1205	0.333	0.156	0.230	0.68	0.90	0.90
Smith	0.1	0.8	1249 to 1303	0.708	0.500	0.401	2.33	1.28	2.41
Average				0.522	0.353	0.292	1.47	1.01	1.59
Davis	0.2	2.2	1308 to 1320	0.639	0.476	0.331	1.87	1.27	1.87
Hendricks	0.2	2.2	1322 to 1336	0.333	0.215	0.208	0.83	0.85	0.91
Smith	0.2	2.2	1339 to 1353	0.812	0.537	0.491	2.46	1.50	2.47
Average				0.595	0.409	0.343	1.72	1.21	1.75
Davis	0.3	3.2	1403 to 1415	0.534	0.249	0.390	0.98	1.86	1.87
Hendricks	0.3	3.2	1417 to 1433	0.303	0.204	0.192	0.64	0.81	0.96
Smith	0.3	3.2	1435 to 1446	0.674	0.405	0.450	1.66	1.57	1.80
Average				0.504	0.286	0.344	1.09	1.41	1.54
Davis	0.4	3.8	1504 to 1515	0.525	0.218	0.405	1.23	1.54	1.56
Hendricks	0.4	3.8	1517 to 1529	0.265	0.183	0.157	0.67	0.79	0.96
Smith	0.4	3.8	1532 to 1543	0.582	0.218	0.501	0.84	1.79	1.80
Average				0.457	0.206	0.354	0.91	1.37	1.44

[a]Reading on G.E. Type PR-1 Exposure Meter.

Date: 9 May 1961

Time	Temperature, °F	Density
0800	67	0.999
0900	68	0.989
1000	70	0.982
1100	71	0.980

Rear Sight: M12 Shotgun notch.
Front Sight: Ivory bead.
Sight Radius: 30.7 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.2	0.8	0732 to 0745	0.653	0.565	0.219	2.03	1.04	2.05
Hendricks	0.2	0.8	0747 to 0755	0.541	0.322	0.385	1.37	1.39	1.79
Smith	0.2	0.8	0758 to 0813	1.001	0.813	0.429	2.54	1.88	2.54
Average				0.732	0.567	0.344	1.98	1.44	2.13
Davis	0.3	2.1	0820 to 0830	0.575	0.332	0.368	1.74	1.52	1.76
Hendricks	0.3	2.1	0831 to 0839	0.354	0.238	0.167	1.37	0.76	1.38
Smith	0.3	2.1	0843 to 0856	0.678	0.539	0.311	1.83	1.07	2.00
Average				0.536	0.370	0.282	1.65	1.12	1.71
Davis	0.3	3.1	0913 to 0925	0.908	0.311	0.835	1.01	3.27	3.29
Hendricks	0.3	3.1	0926 to 0935	0.372	0.298	0.174	1.25	0.51	1.28
Smith	0.3	3.1	0938 to 0950	0.546	0.365	0.287	1.68	1.49	1.68
Average				0.609	0.325	0.432	1.31	1.76	2.08
Davis	0.4	3.8	1004 to 1015	0.580	0.359	0.447	1.17	1.47	1.59
Hendricks	0.4	3.8	1016 to 1023	0.295	0.163	0.219	0.75	0.64	0.75
Smith	0.4	3.8	1026 to 1038	0.479	0.380	0.245	1.44	1.06	1.61
Average				0.451	0.301	0.304	1.12	1.06	1.32

Date: 25 May 1961

Time	Temperature, °F	Density
0800	67	1.008
0900	67	1.003
1000	69	0.999
1100	70	0.994
1200	74	0.991
1300	74	0.984
1400	76	0.978
1500	78	0.978

Rear Sight: M12 Shotgun notch.
Front Sight: Ivory bead.
Sight Radius: 30.7 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Davis	0.00	0.05	0735 to 0745	0.649	0.388	0.407	1.68	1.55	1.70
	0.00	0.05	0815 to 0824	0.786	0.584	0.464	2.28	2.01	2.82
Hendricks	0.00	0.05	0747 to 0758	0.673	0.523	0.344	1.59	1.17	1.71
	0.00	0.05	0826 to 0836	0.551	0.388	0.306	1.58	1.47	1.73
Smith	0.00	0.05	0801 to 0813	0.940	0.808	0.435	2.74	1.44	3.01
	0.00	0.05	0838 to 0848	1.844	1.691	0.531	6.12	2.76	6.23
Average				0.907	0.730	0.414	2.66	1.73	2.87
Davis	0.1	0.5	0859 to 0908	1.128	0.908	0.513	3.69	2.04	3.96
	0.1	0.5	0950 to 1000	0.423	0.242	0.286	1.24	1.32	1.37
Hendricks	0.1	0.5	0910 to 0929	0.519	0.350	0.295	1.11	1.14	1.28
	0.1	0.5	1003 to 1020	0.566	0.297	0.455	1.21	1.37	1.66
Smith	0.1	0.5	0932 to 0946	1.004	0.531	0.781	1.48	2.59	2.70
	0.1	0.5	1022 to 1037	0.793	0.739	0.200	2.50	0.99	2.50
Average				0.739	0.511	0.422	1.87	1.58	2.24

Individual	Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	0.1	0.8	1050 to 1100	0.518	0.380	0.296	1.47	0.84	1.47
Hendricks	0.1	0.8	1102 to 1112	0.427	0.355	0.190	1.23	0.71	1.23
Smith	0.1	0.8	1113 to 1125	0.380	0.287	0.221	1.43	0.97	1.56
Average				0.442	0.340	0.236	1.38	0.84	1.42
Davis	0.2	2.2	1239 to 1249	0.415	0.218	0.321	0.74	1.32	1.41
Hendricks	0.2	2.2	1251 to 1303	0.371	0.231	0.243	0.96	0.76	1.06
Smith	0.2	2.2	1304 to 1322	0.348	0.274	0.151	1.37	0.57	1.38
Average				0.378	0.241	0.238	1.02	0.88	1.28
Davis	0.3	3.2	1328 to 1340	0.551	0.458	0.245	1.82	1.05	2.10
Hendricks	0.3	3.2	1343 to 1355	0.363	0.208	0.280	0.80	1.00	1.17
Smith	0.3	3.2	1356 to 1411	0.563	0.468	0.224	2.31	0.93	2.37
Average				0.492	0.378	0.250	1.64	0.99	1.88
Davis	0.4	3.8	1420 to 1430	0.642	0.533	0.286	2.19	0.94	2.20
Hendricks	0.4	3.8	1432 to 1443	0.355	0.169	0.265	0.65	1.25	1.26
Smith	0.4	3.8	1447 to 1458	0.401	0.247	0.260	0.89	1.13	1.18
Average				0.466	0.316	0.270	1.24	1.11	1.55

Date: 11 May 1961

Time	Temperature, °F	Density
0800	67	1.023
0900	68	1.027
1000	68	1.029
1100	68	1.032

Rear Sight: M1 rifle (standard).
Front Sight: M1 rifle (standard).
Sight Radius: 27.9 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards .

Davis	0.2	0.8	0730 to 0747	0.184	0.143	0.102	0.51	0.33	0.52
Hendricks	0.2	0.8	0750 to 0800	0.268	0.218	0.124	0.76	0.50	0.90
Smith	0.2	0.8	0802 to 0816	0.319	0.293	0.118	1.01	0.52	1.11
Average				0.257	0.218	0.115	0.76	0.45	0.84
Davis	0.3	2.2	0821 to 0837	0.227	0.184	0.087	0.91	0.32	0.92
Hendricks	0.3	2.2	0840 to 0854	0.303	0.263	0.107	0.89	0.42	0.89
Smith	0.3	2.2	0856 to 0908	0.402	0.370	0.101	1.66	0.43	1.68
Average				0.311	0.272	0.098	1.15	0.39	1.16
Davis	0.3	3.1	0919 to 0935	0.123	0.090	0.071	0.38	0.37	0.43
Hendricks	0.3	3.1	0938 to 0951	0.191	0.094	0.144	0.30	0.61	0.63
Smith	0.3	3.1	0953 to 1008	0.221	0.154	0.129	0.67	0.57	0.75
Average				0.178	0.113	0.115	0.45	0.52	0.60
Davis	0.4	3.8	1026 to 1040	0.109	0.068	0.074	0.27	0.24	0.30
Hendricks	0.4	3.8	1042 to 1053	0.154	0.102	0.098	0.35	0.39	0.50
Smith	0.4	3.8	1055 to 1106	0.280	0.229	0.126	1.00	0.35	1.02
Average				0.181	0.133	0.099	0.54	0.33	0.61

[a]Reading on G.E. Type PR-1 Exposure Meter.

SIGHTING ERROR TEST NO. 8

Date: 29 May 1961

Time	Temperature, °F	Density
0800	66	1.011
0900	67	1.008
1000	68	1.008
1100	69	1.008
1200	70	1.005
1300	73	1.006

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (standard).
Sight Radius: 27.9 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman:		Davis						
0.1	0.5	0803 to 0819	0.190	0.180	0.037	0.66	0.14	0.66
0.1	0.5	0848 to 0905	0.192	0.135	0.116	0.57	0.50	0.70
Rifleman:		Hendricks						
0.1	0.5	0821 to 0833	0.236	0.191	0.120	0.75	0.47	0.77
0.1	0.5	0907 to 0917	0.257	0.185	0.138	0.66	0.63	0.69
Rifleman:		Smith						
0.1	0.5	0835 to 0847	0.270	0.225	0.119	0.73	0.42	0.79
0.1	0.5	0918 to 0934	0.236	0.213	0.081	0.70	0.30	0.73
Average			0.230	0.188	0.102	0.68	0.41	0.72
Rifleman:		Davis						
0.2	0.8	0943 to 0957	0.187	0.151	0.071	0.95	0.26	0.95
Rifleman:		Hendricks						
0.2	0.8	1000 to 1008	0.323	0.274	0.129	1.11	0.52	1.12
Rifleman:		Smith						
0.2	0.8	1009 to 1021	0.274	0.267	0.049	1.20	0.33	1.21
Average			0.261	0.231	0.083	1.09	0.37	1.09
Rifleman:		Davis						
0.2	2.2	1029 to 1044	0.154	0.142	0.052	0.44	0.19	0.44
Rifleman:		Hendricks						
0.2	2.2	1047 to 1055	0.265	0.215	0.116	0.64	0.50	0.65
Rifleman:		Smith						
0.2	2.2	1059 to 1109	0.277	0.264	0.067	0.83	0.25	0.84
Average			0.232	0.207	0.078	0.64	0.31	0.64
Rifleman:		Davis						
0.3	3.2	1117 to 1135	0.152	0.114	0.083	0.45	0.27	0.46
Rifleman:		Hendricks						
0.3	3.2	1138 to 1146	0.138	0.091	0.079	0.28	0.40	0.46
Rifleman:		Smith						
0.3	3.2	1150 to 1200	0.279	0.249	0.093	0.89	0.42	0.91
Average			0.190	0.151	0.085	0.54	0.36	0.61

[a]Reading on G.E. type PR-1 exposure meter.

Light[a] High	Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.4	3.8	1254 to 1308	0.162	0.146	0.056	0.48	0.28	0.53
Rifleman: Hendricks								
0.4	3.8	1309 to 1316	0.297	0.223	0.154	0.76	0.62	0.90
Rifleman: Smith								
0.4	3.8	1318 to 1329	0.295	0.255	0.106	0.95	0.42	0.95
Average			0.251	0.208	0.105	0.73	0.44	0.79

Date: 5 June 1961

Time	Temperature, °F	Density
1000	72	1.000
1100	72	0.994

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (standard).
Sight Radius: 27.9 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.00	0.05	0956 to 1006	0.654	0.506	0.363	1.58	1.88	2.24
0.00	0.05	1024 to 1031	0.483	0.428	0.207	1.78	0.72	1.90
Rifleman: Hendricks								
0.00	0.05	1008 to 1013	0.758	0.519	0.455	1.67	1.91	2.38
0.00	0.05	1033 to 1039	0.455	0.390	0.200	1.70	0.94	1.88
Rifleman: Smith								
0.00	0.05	1015 to 1022	0.651	0.396	0.396	1.64	1.38	1.69
0.00	0.05	1041 to 1049	0.731	0.501	0.416	1.78	1.61	1.82
Average			0.622	0.457	0.340	1.69	1.41	1.98

Date: 12 May 1961

Time	Temperature, °F	Density
0800	62	1.030
0900	62	1.030
1000	63	1.027
1100	64	1.022

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (Ithaca post).
Sight Radius: 28.1 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

[a]Reading on G.E. type PR-1 exposure meter.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.2	0.8	0736 to 0759	0.168	0.109	0.097	0.55	0.30	0.55
Rifleman: Hendricks								
0.2	0.8	0800 to 0814	0.295	0.198	0.202	0.61	0.74	0.96
Rifleman: Smith								
0.2	0.8	0816 to 0829	0.270	0.227	0.126	0.97	0.46	1.02
Average			0.244	0.178	0.142	0.71	0.50	0.84
Rifleman: Davis								
0.2	2.2	0838 to 0852	0.228	0.182	0.096	0.84	0.32	0.85
Rifleman: Hendricks								
0.2	2.2	0856 to 0913	0.237	0.198	0.081	0.99	0.39	1.00
Rifleman: Smith								
0.2	2.2	0915 to 0929	0.283	0.265	0.077	1.04	0.26	1.05
Average			0.249	0.215	0.085	0.96	0.32	0.97
Rifleman: Davis								
0.3	3.1	0935 to 0949	0.280	0.246	0.091	1.14	0.35	1.15
Rifleman: Hendricks								
0.3	3.1	0951 to 1004	0.361	0.309	0.136	1.38	0.47	1.38
Rifleman: Smith								
0.3	3.1	1006 to 1019	0.441	0.428	0.069	1.37	0.28	1.37
Average			0.361	0.328	0.099	1.30	0.37	1.30
Rifleman: Davis								
0.3	3.8	1028 to 1043	0.400	0.377	0.073	1.32	0.42	1.33
Rifleman: Hendricks								
0.3	3.8	1045 to 1055	0.347	0.335	0.052	1.19	0.26	1.22
Rifleman: Smith								
0.3	3.8	1058 to 1114	0.223	0.206	0.064	0.71	0.23	0.75
Average			0.323	0.306	0.063	1.07	0.30	1.10

Date: 31 May 1961

Time	Temperature, °F	Density
0800	62	1.033
0900	63	1.024
1000	64	1.014
1100	66	1.009
1200	68	1.007
1300	72	0.997
1400	72	0.996

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (Ithaca post).
Sight Radius: 28.1 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.1	0.5	0803 to 0819	0.289	0.254	0.107	1.02	0.41	1.03

[a]Reading on G.E. type PR-1 exposure meter.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.1	0.5	0859 to 0914	0.179	0.123	0.104	0.64	0.34	0.66
Rifleman: Hendricks								
0.1	0.5	0821 to 0833	0.350	0.158	0.299	0.41	0.94	1.00
0.1	0.5	0916 to 0932	0.384	0.342	0.156	1.14	0.53	1.22
Rifleman: Smith								
0.1	0.5	0835 to 0847	0.390	0.332	0.126	1.32	0.57	1.33
0.1	0.5	0934 to 0943	0.338	0.283	0.139	1.15	0.66	1.25
Average			0.322	0.249	0.155	0.95	0.58	1.08
Rifleman: Davis								
0.1	0.8	0952 to 1007	0.147	0.102	0.083	0.36	0.34	0.38
Rifleman: Hendricks								
0.1	0.8	1009 to 1017	0.321	0.231	0.180	0.95	0.57	1.01
Rifleman: Smith								
0.1	0.8	1019 to 1031	0.178	0.122	0.114	0.44	0.44	0.47
Average			0.215	0.152	0.126	0.58	0.45	0.62
Rifleman: Davis								
0.2	2.2	1037 to 1052	0.186	0.170	0.048	0.88	0.17	0.88
Rifleman: Hendricks								
0.2	2.2	1054 to 1105	0.279	0.166	0.195	0.61	0.64	0.68
Rifleman: Smith								
0.2	2.2	1107 to 1121	0.266	0.210	0.137	0.75	0.65	0.82
Average			0.244	0.182	0.127	0.75	0.49	0.79
Rifleman: Davis								
0.3	3.2	1132 to 1146	0.169	0.123	0.080	0.62	0.41	0.62
Rifleman: Hendricks								
0.3	3.2	1148 to 1157	0.292	0.228	0.149	0.73	0.61	0.90
Rifleman: Smith								
0.3	3.2	1248 to 1300	0.289	0.212	0.162	1.11	0.66	1.29
Average			0.250	0.188	0.130	0.82	0.56	0.94
Rifleman: Davis								
0.5	3.8	1322 to 1334	0.230	0.208	0.054	1.08	0.20	1.08
Rifleman: Hendricks								
0.5	3.8	1336 to 1347	0.271	0.202	0.129	1.08	0.40	1.10
Rifleman: Smith								
0.5	3.8	1350 to 1403	0.273	0.169	0.181	0.85	0.67	0.88
Average			0.258	0.193	0.121	1.00	0.42	1.02

Date: 5 June 1961

Time	Temperature, °F	Density
1100	74	0.994
1200	75	0.991

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (Ithaca post).
Sight Radius: 28.1 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

[a]Reading on G.E. type PR-1 exposure meter.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.00	0.05	1105 to 1112	0.408	0.299	0.204	1.49	1.02	1.51
0.00	0.05	1132 to 1140	0.534	0.290	0.362	1.02	1.64	1.66
Rifleman: Hendricks								
0.00	0.05	1114 to 1120	0.438	0.241	0.326	0.76	1.61	1.74
0.00	0.05	1142 to 1147	0.723	0.329	0.599	1.40	1.82	1.86
Rifleman: Smith								
0.00	0.05	1121 to 1130	0.439	0.343	0.200	1.58	1.08	1.67
0.00	0.05	1149 to 1200	0.549	0.377	0.367	1.32	1.49	1.93
Average			0.515	0.313	0.343	1.26	1.44	1.73

Date: 15 May 1961

Time	Temperature, °F	Density
0800	71	1.011
0900	70	1.009
1000	70	1.007
1100	72	1.004

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (Ithaca bead).
Sight Radius: 27.8 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.2	0.8	0731 to 0744	0.272	0.258	0.066	0.96	0.31	0.97
Rifleman: Hendricks								
0.2	0.8	0746 to 0800	0.166	0.100	0.119	0.38	0.46	0.46
Rifleman: Smith								
0.2	0.8	0802 to 0817	0.334	0.217	0.198	0.78	0.97	1.04
Average			0.257	0.192	0.128	0.71	0.58	0.82
Rifleman: Davis								
0.2	2.1	0823 to 0835	0.166	0.126	0.093	0.49	0.36	0.55
Rifleman: Hendricks								
0.2	2.1	0838 to 0853	0.129	0.071	0.094	0.30	0.38	0.40
Rifleman: Smith								
0.2	2.1	0855 to 0912	0.356	0.304	0.115	1.54	0.54	1.55
Average			0.217	0.167	0.101	0.78	0.43	0.83
Rifleman: Davis								
0.3	3.2	0920 to 0933	0.163	0.129	0.077	0.79	0.26	0.81
Rifleman: Hendricks								
0.3	3.2	0937 to 0951	0.261	0.129	0.203	0.40	0.88	0.90
Rifleman: Smith								
0.3	3.2	0956 to 1010	0.274	0.227	0.103	1.01	0.57	1.05
Average			0.233	0.162	0.128	0.73	0.57	0.92

[a]Reading on G.E. type PR-1 exposure meter.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.4	3.8	1020 to 1033	0.111	0.058	0.083	0.28	0.35	0.39
Rifleman: Hendricks								
0.4	3.8	1036 to 1046	0.232	0.094	0.190	0.37	0.63	0.68
Rifleman: Smith								
0.4	3.8	1048 to 1101	0.351	0.269	0.173	1.13	0.56	1.14
Average			0.231	0.140	0.149	0.59	0.51	0.74
Rifleman: Davis								
0.2	3.2	1100 to 1116	0.151	0.101	0.081	0.53	0.44	0.54
Rifleman: Hendricks								
0.2	3.2	1118 to 1130	0.329	0.190	0.213	0.82	1.06	1.07
Rifleman: Smith								
0.2	3.2	1132 to 1142	0.213	0.105	0.175	0.34	0.76	0.82
Average			0.231	0.132	0.156	0.56	0.75	0.81
Rifleman: Davis								
0.4	3.8	1233 to 1247	0.144	0.091	0.081	0.48	0.33	0.48
Rifleman: Hendricks								
0.4	3.8	1249 to 1258	0.163	0.073	0.113	0.49	0.46	0.49
Rifleman: Smith								
0.4	3.8	1302 to 1312	0.183	0.145	0.077	0.69	0.38	0.71
Average			0.163	0.103	0.090	0.55	0.39	0.56

Date: 1 June 1961

Time	Temperature, °F	Density
0800	70	1.013
0900	70	1.010
1000	70	1.007
1100	72	1.002
1200	73	0.997
1300	74	0.993

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (Ithaca bead).
Sight Radius: 27.8 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.1	0.5	0742 to 0756	0.478	0.457	0.085	1.57	0.43	1.57
0.1	0.5	0832 to 0845	0.207	0.154	0.106	0.65	0.50	0.66
Rifleman: Hendricks								
0.1	0.5	0759 to 0810	0.301	0.196	0.185	0.61	0.74	0.82
0.1	0.5	0848 to 0901	0.302	0.232	0.139	0.72	0.72	0.81
Rifleman: Smith								
0.1	0.5	0811 to 0825	0.266	0.232	0.090	0.88	0.46	0.89

[a]Reading on G.E. type PR-1 exposure meter.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Smith								
0.1	0.5	0903 to 0914	0.216	0.117	0.165	0.56	0.75	0.91
Average			0.295	0.231	0.128	0.83	0.60	0.94
Rifleman: Davis								
0.2	0.8	0923 to 0937	0.308	0.271	0.093	0.89	0.41	0.89
Rifleman: Hendricks								
0.2	0.8	0938 to 0949	0.264	0.182	0.168	0.71	0.63	0.86
Rifleman: Smith								
0.2	0.8	0955 to 1005	0.185	0.109	0.135	0.73	0.47	0.87
Average			0.252	0.187	0.132	0.78	0.50	0.87
Rifleman: Davis								
0.2	2.2	1016 to 1030	0.115	0.093	0.056	0.43	0.28	0.44
Rifleman: Hendricks								
0.2	2.2	1032 to 1040	0.343	0.236	0.222	0.86	0.93	1.22
Rifleman: Smith								
0.2	2.2	1043 to 1053	0.224	0.178	0.101	0.69	0.36	0.72
Average			0.227	0.169	0.126	0.66	0.52	0.79

Date: 5 June 1961

Time	Temperature, °F	Density
1300	76	0.988
1400	78	0.982

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (Ithaca bead).
Sight Radius: 27.8 inches.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.00	0.05	1244 to 1255	0.393	0.356	0.092	1.36	0.32	1.37
0.00	0.05	1320 to 1333	0.553	0.535	0.159	1.68	0.59	1.70
Rifleman: Hendricks								
0.00	0.05	1257 to 1306	0.947	0.797	0.372	3.73	1.40	3.75
0.00	0.05	1335 to 1340	0.492	0.229	0.375	0.84	1.61	1.61
Rifleman: Smith								
0.00	0.05	1307 to 1317	0.795	0.661	0.385	2.63	1.37	2.63
0.00	0.05	1341 to 1350	0.607	0.539	0.234	2.19	0.88	2.19
Average			0.631	0.520	0.270	2.07	1.03	2.21

[a]Reading on G.E. type PR-1 exposure meter.

SIGHTING ERROR TEST NO. 8

Date: 4 May 1961

Time	Density
0800	1.050
0900	1.039
1000	1.034
1100	1.026
1200	1.025

Sight: 1-X Telescope on M760 Rifle (sighted with the bull's-eye tangent to the horizontal and vertical cross hairs).
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.2	0.8	0750 to 0812	0.296	0.263	0.099	1.02	0.48	1.05
Rifleman: Hendricks								
0.2	0.8	0815 to 0829	0.219	0.145	0.141	0.51	0.51	0.65
Rifleman: Smith								
0.2	0.8	0831 to 0845	0.218	0.077	0.195	0.35	0.58	0.60
Average			0.244	0.162	0.145	0.63	0.52	0.77
Rifleman: Davis								
0.3	2.1	0848 to 0905	0.174	0.133	0.095	0.44	0.35	0.44
Rifleman: Hendricks								
0.3	2.1	0906 to 0923	0.233	0.154	0.136	0.57	0.63	0.64
Rifleman: Smith								
0.3	2.1	0925 to 0940	0.253	0.075	0.223	0.28	1.09	1.10
Average			0.220	0.121	0.151	0.43	0.69	0.73
Rifleman: Davis								
0.3	3.1	0952 to 1008	0.303	0.216	0.198	0.89	0.71	1.07
Rifleman: Hendricks								
0.3	3.1	1010 to 1021	0.135	0.109	0.062	0.36	0.34	0.43
Rifleman: Smith								
0.3	3.1	1023 to 1036	0.187	0.084	0.150	0.34	0.59	0.59
Average			0.208	0.136	0.137	0.53	0.55	0.70
Rifleman: Davis								
0.4	3.7	1050 to 1101	0.433	0.255	0.311	0.98	1.19	1.43
Rifleman: Hendricks								
0.4	3.7	1103 to 1118	0.255	0.223	0.086	1.12	0.30	1.12
Rifleman: Smith								
0.4	3.7	1122 1131	0.151	0.062	0.120	0.24	0.51	0.52
Average			0.280	0.180	0.172	0.78	0.67	1.02

Date: 22 May 1961

Time	Temperature, °F	Density
0900	67	1.011
1000	67	1.006

[a]Reading on G.E. type PR-1 exposure meter.

Time	Temperature, °F	Density
1100	67	1.007
1200	68	1.006
1300	70	1.009
1400	71	1.005
1500	73	1.005
1600	73	1.003

Sight: 1-X Telescope in M760 Rifle (sighted with the bull's-eye tangent to the horizontal and vertical cross hairs).
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.00	0.05	0920 to 0931	0.354	0.235	0.242	0.98	0.88	1.01
0.00	0.05	1000 to 1010	0.323	0.234	0.189	1.05	0.67	1.07
Rifleman: Hendricks								
0.00	0.05	0933 to 0945	0.641	0.478	0.384	1.83	1.39	2.28
0.00	0.05	1012 to 1023	0.562	0.385	0.367	1.20	1.63	1.93
Rifleman: Smith								
0.00	0.05	0947 to 0958	0.379	0.275	0.172	1.06	1.04	1.16
		1025 to 1037	0.259	0.187	0.143	0.73	0.48	0.74
Average			0.420	0.299	0.250	1.14	1.02	1.36
Rifleman: Davis								
0.1	0.5	1050 to 1100	0.171	0.092	0.117	0.46	0.47	0.48
0.1	0.5	1126 to 1136	0.209	0.117	0.135	0.52	0.69	0.74
Rifleman: Hendricks								
0.1	0.5	1103 to 1111	0.245	0.175	0.144	0.77	0.65	0.91
0.1	0.5	1137 to 1147	0.235	0.163	0.128	0.50	0.50	0.54
Rifleman: Smith								
0.1	0.5	1113 to 1124	0.195	0.080	0.168	0.29	0.61	0.67
		1150 to 1201	0.128	0.091	0.069	0.38	0.35	0.42
Average			0.197	0.120	0.127	0.49	0.54	0.63
Rifleman: Davis								
0.1	0.8	1250 to 1300	0.233	0.164	0.128	0.73	0.43	0.74
Rifleman: Hendricks								
0.1	0.8	1301 to 1307	0.224	0.088	0.184	0.43	0.74	0.74
Rifleman: Smith								
0.1	0.8	1309 to 1323	0.109	0.062	0.080	0.23	0.28	0.30
Average			0.189	0.105	0.131	0.46	0.48	0.59
Rifleman: Davis								
0.2	2.2	1330 to 1341	0.261	0.173	0.181	0.69	1.07	1.27
Rifleman: Hendricks								
0.2	2.2	1342 to 1353	0.165	0.078	0.136	0.31	0.44	0.49
Rifleman: Smith								
0.2	2.2	1355 to 1410	0.094	0.041	0.075	0.14	0.37	0.37
Average			0.173	0.097	0.131	0.38	0.63	0.71

[a]Reading on G.E. type PR-1 exposure meter.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.4	3.2	1416 to 1426	0.250	0.138	0.165	0.42	0.96	0.96
Rifleman: Hendricks								
0.4	3.2	1428 to 1440	0.152	0.096	0.097	0.35	0.45	0.46
Rifleman: Smith								
0.4	3.2	1443 to 1458	0.077	0.037	0.059	0.16	0.21	0.22
Average			0.160	0.090	0.107	0.31	0.54	0.55
Rifleman: Davis								
0.4	3.8	1506 to 1516	0.263	0.229	0.093	0.74	0.46	0.74
Rifleman: Hendricks								
0.4	3.8	1517 to 1527	0.136	0.098	0.072	0.37	0.32	0.42
Rifleman: Smith								
0.4	3.8	1530 to 1542	0.153	0.073	0.119	0.24	0.46	0.48
Average			0.184	0.133	0.095	0.45	0.41	0.55

Date: 6 June 1961

Time	Temperature, °F	Density
1400	78	0.983
1500	79	0.980

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (modified Ithaca post).
Sight Radius: 28.1 inches.
Target: 54-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.2	2.2	1415 to 1428	0.185	0.154	0.069	0.87	0.34	0.88
0.2	2.2	1459 to 1509	0.226	0.216	0.033	0.75	0.14	0.75
Rifleman: Hendricks								
0.2	2.2	1430 to 1441	0.249	0.213	0.105	0.89	0.45	0.99
0.2	2.2	1511 to 1521	0.298	0.264	0.116	0.89	0.46	0.93
Rifleman: Smith								
0.2	2.2	1444 to 1456	0.283	0.255	0.100	1.11	0.35	1.12
0.2	2.2	1524 to 1530	0.330	0.303	0.112	1.26	0.46	1.34
Average			0.262	0.234	0.089	0.96	0.37	1.00

Date: 6 June 1961

Time	Temperature, °F	Density
1000	76	0.996
1100	76	0.994
1200	76	0.992
1300	76	0.983

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: M70 (no sight).
Front Sight: M70 (no sight.
Target: 5.4-inch-diameter aiming point.
Range: 90 yards.

Light[a] High	Light[a] Low	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis								
0.00	0.05	1009 to 1020	0.949	0.298	0.873	1.17	3.68	3.79
0.00	0.05	1048 to 1057	0.942	0.774	0.441	2.96	1.84	3.47
Rifleman: Hendricks								
0.00	0.05	1022 to 1033	0.699	0.405	0.535	1.42	2.63	2.65
0.00	0.05	1100 to 1108	0.734	0.287	0.641	1.25	2.37	2.57
Rifleman: Smith								
0.00	0.05	1036 to 1046	0.971	0.863	0.383	2.47	1.90	2.90
0.00	0.05	1110 to 1119	1.333	1.012	0.811	3.04	2.67	3.40
Average			0.938	0.606	0.614	2.05	2.52	3.13
Rifleman: Davis								
0.2	2.2	1203 to 1210	0.574	0.427	0.292	1.70	1.17	1.72
0.2	2.2	1231 to 1238	0.880	0.479	0.650	1.75	2.77	2.92
Rifleman: Hendricks								
0.2	2.2	1212 to 1217	0.750	0.346	0.609	1.67	3.06	3.09
0.2	2.2	1243 to 1250	0.557	0.160	0.470	0.57	2.37	2.37
Rifleman: Smith								
0.2	2.2	1219 to 1228	1.309	1.178	0.341	5.74	1.61	5.76
0.2	2.2	1251 to 1306	0.808	0.467	0.556	2.44	2.09	2.46
Average			0.813	0.510	0.486	2.31	2.18	3.05

[a]Reading on G.E. type PR-1 exposure meter.

SIGHTING ERROR TEST NO. 9

Date: 29 June 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	5.0	1.3	Clear	80	Calm	1.001
0830	5.4	1.5	Clear	86	--	--
0900	5.7	1.8	Clear	86	Calm	0.996
0930	5.6	2.1	Clear	86	--	--
1000	5.8	2.2	Clear	88	S, 4	0.994
1030	5.9	2.3	Clear	88	--	--
1100	6.0	2.4	Clear	89	Calm	0.989

[a]Reading on G. E. type PR-1 exposure meter (with filter).

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (standard).
Sight Radius: 27.9 inches.
Distance-Rear Sight to Eye: 3.8 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
N.R.A. Smallbore Rifle	0738 to 0754	0.244	0.175	0.155	0.58	0.54	0.76
Rifleman: Hendricks							
N.R.A. Smallbore Rifle	0847 to 0900	0.207	0.181	0.084	0.47	0.35	0.50
Rifleman: Smith							
N.R.A. Smallbore Rifle	0953 to 1005	0.258	0.205	0.131	0.70	0.55	0.79
Average		0.236	0.187	0.123	0.58	0.48	0.68
Rifleman: Davis							
Reduced Canadian Military	0921 to 0935	0.188	0.147	0.095	0.55	0.31	0.57
Rifleman: Hendricks							
Reduced Canadian Military	1020 to 1032	0.283	0.241	0.132	0.84	0.49	0.96
Rifleman: Smith							
Reduced Canadian Military	0813 to 0827	0.289	0.235	0.128	0.86	0.40	0.93
Average		0.253	0.208	0.118	0.75	0.40	0.82
Rifleman: Davis							
Reduced U.S. Military B	1007 to 1017	0.198	0.164	0.087	0.67	0.33	0.67
Rifleman: Hendricks							
Reduced U.S. Military B	0759 to 0809	0.321	0.285	0.121	1.13	0.51	1.15
Rifleman: Smith							
Reduced U.S. Military B	0904 to 0917	0.407	0.370	0.129	1.49	0.52	1.49
Average		0.309	0.273	0.112	1.10	0.45	1.10
Rifleman: Davis							
Game	0831 to 0843	0.316	0.200	0.214	0.83	0.96	1.19
Rifleman: Hendricks							
Game	0938 to 0948	0.350	0.272	0.166	1.43	0.74	1.47
Rifleman: Smith							
Game	1034 to 1045	0.464	0.379	0.168	1.37	0.73	1.37
Average		0.377	0.284	0.183	1.21	0.81	1.34

Date: 30 June 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0900	2.0	5.6	Scattered clouds	76	WNW, 7	0.987
0930	2.1	5.9	Scattered clouds	80	--	--
1000	2.2	5.8	Scattered clouds	84	W, 5	0.982
1030	2.2	5.8	Clear	84	--	--
1100	2.4	6.0	Broken	86	W, 6	0.972
1130	2.5	6.1	Scattered clouds	87	--	--
1200	2.4	6.1	Scattered clouds	90	NNW, 4	0.965

[a]Reading on G. E. type PR-1 exposure meter (with filter).

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (standard).
Sight Radius: 28.1 inches.
Distance-Rear Sight to Eye: 3.8 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
N.R.A. Smallbore Rifle	1001 to 1012	0.237	0.185	0.115	0.72	0.41	0.73
Rifleman: Hendricks							
N.R.A. Smallbore Rifle	1102 to 1120	0.419	0.387	0.127	1.43	0.44	1.44
Rifleman: Smith							
N.R.A. Smallbore Rifle	1204 to 1218	0.285	0.239	0.098	1.34	0.45	1.36
Average		0.314	0.270	0.113	1.16	0.43	1.18
Rifleman: Davis							
Reduced Canadian Military	1137 to 1147	0.266	0.234	0.104	0.94	0.35	0.96
Rifleman: Hendricks							
Reduced Canadian Military	0925 to 0939	0.293	0.263	0.118	0.72	0.47	0.76
Rifleman: Smith							
Reduced Canadian Military	1033 to 1043	0.322	0.264	0.135	1.06	0.62	1.06
Average		0.294	0.254	0.119	0.91	0.48	0.93
Rifleman: Davis							
Reduced U.S. Military B	1046 to 1101	0.271	0.181	0.168	0.70	0.72	1.01
Rifleman: Hendricks							
Reduced U.S. Military B	1150 to 1201	0.470	0.376	0.199	1.30	0.99	1.38
Rifleman: Smith							
Reduced U.S. Military B	0947 to 0958	0.424	0.375	0.132	1.30	0.56	1.30
Average		0.388	0.311	0.166	1.10	0.76	1.23
Rifleman: Davis							
Game	0915 to 0922	0.429	0.264	0.281	1.19	1.14	1.30
Rifleman: Hendricks							
Game	1015 to 1030	0.281	0.251	0.088	1.01	0.38	1.01
Rifleman: Smith							
Game	1125 to 1134	0.438	0.367	0.147	1.50	0.48	1.50
Average		0.383	0.294	0.172	1.23	0.67	1.27

Date: 29 June 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
1100	6.0	2.4	Clear	87	Calm	0.989
1130	6.0	2.4	Clear	87	--	--
1200	6.0	2.4	Clear	87	SSE, 4	0.989

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (modified Ithaca post).
Sight Radius: 28.1 inches.
Distance-Rear Sight to Eye: 3.8 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
N.R.A. Smallbore Rifle	1050 to 1103	0.276	0.250	0.082	1.10	0.30	1.13
Rifleman: Hendricks							
N.R.A. Smallbore Rifle	1105 to 1116	0.303	0.169	0.191	0.79	1.03	1.04
Rifleman: Smith							
N.R.A. Smallbore Rifle	1119 to 1130	0.312	0.256	0.137	0.83	0.62	0.84
Average		0.297	0.225	0.137	0.91	0.65	1.00

Date: 30 June 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.4	5.2	Scattered clouds	73	SW, 6	0.996
0830	1.7	5.3	Scattered clouds	74	--	--
0900	1.7	5.5	Scattered clouds	75	WNW, 7	0.987

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Rear Sight: M1 Rifle (standard).
Front Sight: M1 Rifle (modified Ithaca post).
Sight Radius: 28.1 inches.
Distance-Rear Sight to Eye: 3.8 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
N.R.A. Smallbore Rifle	0814 to 0827	0.455	0.445	0.091	2.10	0.44	2.12
Rifleman: Hendricks							
N.R.A. Smallbore Rifle	0829 to 0842	0.200	0.141	0.104	0.54	0.52	0.55
Rifleman: Smith							
N.R.A. Smallbore Rifle	0846 to 0857	0.209	0.165	0.110	0.54	0.43	0.59
Average		0.288	0.250	0.102	1.06	0.46	1.09

Date: 5 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0830	0.9	4.5	Broken clouds	72	--	--
0900	0.8	4.3	Overcast to broken	76	Calm	0.994
0930	1.5	5.2	Scattered clouds	80	--	--
1000	0.6	4.0	Overcast	77	Calm	0.994
1030	1.1	4.8	Overcast	78	--	--
1100	1.7	5.2	Overcast	79	Calm	0.988
1130	1.7	5.3	Overcast	78	--	--
1200	1.6	5.2	Overcast	77	W, 8	0.988

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (0.074-inch-wide post).
Sight Radius: 34.0 inches.
Distance-Rear Sight to Eye: 2.0 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis N.R.A. Smallbore Rifle	0833 to 0844	0.103	0.072	0.055	0.28	0.21	0.28
Rifleman: Hendricks N.R.A. Smallbore Rifle	1050 to 1059	0.191	0.175	0.062	0.58	0.29	0.65
Rifleman: Smith N.R.A. Smallbore Rifle	0943 to 0955	0.113	0.094	0.052	0.35	0.26	0.41
Average		0.136	0.114	0.056	0.40	0.25	0.45
Rifleman: Davis Reduced Canadian Military	1115 to 1125	0.142	0.119	0.059	0.50	0.27	0.51
Rifleman: Hendricks Reduced Canadian Military	1015 to 1023	0.177	0.124	0.090	0.48	0.52	0.57
Rifleman: Smith Reduced Canadian Military	0902 to 0914	0.121	0.086	0.071	0.29	0.22	0.32
Average		0.147	0.110	0.073	0.42	0.34	0.47
Rifleman: Davis Reduced U.S. Military B	0958 to 1011	0.101	0.072	0.058	0.25	0.18	0.27
Rifleman: Hendricks Reduced U.S. Military B	0848 to 0858	0.148	0.115	0.082	0.35	0.32	0.43
Rifleman: Smith Reduced U.S. Military B	1101 to 1113	0.183	0.106	0.127	0.64	0.46	0.70
Average		0.144	0.098	0.089	0.41	0.32	0.47
Rifleman: Davis Game	0916 to 0927	0.181	0.101	0.140	0.33	0.58	0.67
Rifleman: Hendricks Game	1127 to 1136	0.171	0.120	0.105	0.42	0.41	0.57
Rifleman: Smith Game	1025 to 1034	0.306	0.269	0.105	0.99	0.47	0.99
Average		0.219	0.163	0.117	0.58	0.49	0.74

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
Fluorescent	1037 to 1047	0.111	0.057	0.078	0.26	0.36	0.36
Rifleman: Hendricks							
Fluorescent	0931 to 0940	0.287	0.229	0.138	0.78	0.46	0.86
Rifleman: Smith							
Fluorescent	1139 to 1149	0.236	0.187	0.117	0.63	0.44	0.65
Average		0.211	0.158	0.111	0.56	0.42	0.62

Date: 10 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0730	1.2	4.9	Clear	72	--	--
0800	1.2	5.0	Clear	72	NW, 5	1.004
0830	1.6	5.3	Clear	72	--	--
0900	1.8	5.5	Clear	72	NW, 5	1.000
0930	1.8	5.7	Clear	77	--	--
1000	2.0	5.8	Clear	77	NNW, 6	0.992
1030	2.1	5.8	Clear	81	--	--
1100	2.1	5.8	Clear	80	NW, 6	0.986
1130	2.0	5.7	Clear	82	--	--

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (0.074-inch-wide post).
Sight Radius: 34.0 inches.
Distance-Rear Sight to Eye: 2.0 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
N.R.A. Smallbore Rifle	0955 to 1006	0.115	0.097	0.052	0.36	0.16	0.38
Rifleman: Hendricks							
N.R.A. Smallbore Rifle	0845 to 0855	0.128	0.111	0.043	0.48	0.14	0.48
Rifleman: Smith							
N.R.A. Smallbore Rifle	1107 to 1118	0.152	0.089	0.101	0.51	0.38	0.52
Average		0.132	0.099	0.065	0.45	0.23	0.46
Rifleman: Davis							
Reduced Canadian Military	0828 to 0839	0.140	0.111	0.046	0.65	0.21	0.65
Rifleman: Hendricks							
Reduced Canadian Military	1056 to 1104	0.104	0.061	0.078	0.21	0.24	0.32
Rifleman: Smith							
Reduced Canadian Military	0941 to 0953	0.230	0.140	0.166	0.54	0.57	0.64
Average		0.158	0.104	0.097	0.47	0.34	0.54
Rifleman: Davis							
Reduced U.S. Military B	1040 to 1052	0.122	0.107	0.045	0.36	0.22	0.37
Rifleman: Hendricks							
Reduced U.S. Military B	0924 to 0937	0.127	0.088	0.069	0.28	0.29	0.34

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Smith							
Reduced U.S. Military B	0815 to 0826	0.094	0.072	0.047	0.28	0.20	0.30
Average		0.114	0.089	0.054	0.31	0.24	0.34
Rifleman: Davis							
Game	0912 to 0921	0.218	0.201	0.062	0.63	0.22	0.65
Rifleman: Hendricks							
Game	0800 to 0811	0.178	0.126	0.118	0.35	0.42	0.47
Rifleman: Smith							
Game	1027 to 1037	0.445	0.190	0.333	0.86	1.36	1.39
Average		0.280	0.172	0.171	0.61	0.67	0.84
Rifleman: Davis							
Fluorescent	0744 to 0757	0.109	0.072	0.073	0.25	0.31	0.33
Rifleman: Hendricks							
Fluorescent	1009 to 1024	0.291	0.240	0.111	0.70	0.54	0.75
Rifleman: Smith							
Fluorescent	0857 to 0909	0.156	0.082	0.112	0.37	0.49	0.51
Average		0.185	0.131	0.099	0.44	0.45	0.53

Date: 11 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0730	1.0	4.6	Clear	72	--	--
0800	1.2	5.0	Clear	72	WSW, 2	1.005
0830	1.2	5.0	Clear	74	--	--
0900	1.6	5.3	Clear	77	W, 3	0.998
0930	1.7	5.5	Clear	79	--	--
1000	2.0	5.7	Clear	84	W, 3	0.987
1030	2.2	5.8	Clear	85	--	--
1100	2.1	5.9	Clear	86	SSW, 5	0.984
1130	2.3	5.9	Clear	86	--	--
1200	2.2	5.8	Clear	88	--	--

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2.0 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis[b]							
N.R.A. Smallbore Rifle	0737 to 0758	0.047	0.035	0.021	0.16	0.09	0.17
Rifleman: Hendricks							
N.R.A. Smallbore Rifle	1047 to 1059	0.095	0.060	0.064	0.21	0.33	0.34
Rifleman: Smith							
N.R.A. Smallbore Rifle	0917 to 0935	0.055	0.034	0.039	0.17	0.12	0.21
Average		0.066	0.043	0.041	0.18	0.18	0.24

[b]The exact location of several shot holes within the group was estimated.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
Reduced Canadian Military	0937 to 0950	0.070	0.047	0.041	0.17	0.20	0.24
Rifleman: Hendricks							
Reduced Canadian Military	0800 to 0812	0.160	0.122	0.083	0.53	0.29	0.55
Rifleman: Smith							
Reduced Canadian Military	1103 to 1114	0.118	0.088	0.076	0.33	0.22	0.40
Average		0.116	0.086	0.067	0.34	0.24	0.40
Rifleman: Davis							
Reduced U.S. Military B	1116 to 1130	0.085	0.059	0.051	0.21	0.18	0.23
Rifleman: Hendricks							
Reduced U.S. Military B	0955 to 1010	0.077	0.066	0.031	0.27	0.12	0.27
Rifleman: Smith							
Reduced U.S. Military B	0816 to 0835	0.098	0.061	0.061	0.28	0.31	0.32
Average		0.087	0.062	0.048	0.25	0.20	0.27
Rifleman: Davis							
Game	0837 to 0850	0.123	0.082	0.074	0.38	0.24	0.42
Rifleman: Hendricks							
Game	1132 to 1140	0.155	0.128	0.070	0.61	0.37	0.71
Rifleman: Smith							
Game	1014 to 1027	0.167	0.115	0.100	0.56	0.35	0.59
Average		0.148	0.108	0.081	0.52	0.32	0.57
Rifleman: Davis							
Fluorescent	1030 to 1045	0.087	0.045	0.062	0.15	0.24	0.26
Rifleman: Hendricks							
Fluorescent	0855 to 0912	0.087	0.059	0.051	0.25	0.19	0.29
Rifleman: Smith							
Fluorescent	1143 to 1157	0.072	0.047	0.043	0.26	0.16	0.29
Average		0.082	0.050	0.052	0.22	0.20	0.28

Date: 12 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0730	1.1	4.6	Scattered	76	--	--
0800	1.3	5.0	Scattered	80	Calm	0.996
0830	1.5	5.2	Scattered	78	--	--
0900	1.8	5.6	Scattered	81	S, 11	0.993
0930	1.6	5.3	Scattered	80	--	--
1000	1.8	5.6	Scattered	82	SW, 9	0.990
1030	2.1	5.7	Overcast	82	--	--
1100	1.8	5.6	Overcast	81	S, 6	0.990
1130	1.7	5.6	Overcast	81	--	--
1200	1.8	5.6	Overcast	80	SW, 4	0.989

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2.0 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
N.R.A. Smallbore Rifle	1016 to 1036	0.069	0.061	0.020	0.23	0.12	0.23
Rifleman: Hendricks							
N.R.A. Smallbore Rifle	0854 to 0908	0.079	0.059	0.043	0.27	0.17	0.29
Rifleman: Smith[b]							
N.R.A. Smallbore Rifle	1144 to 1158	0.058	0.056	0.015	0.24	0.08	0.24
Average		0.069	0.059	0.026	0.25	0.12	0.25
Rifleman: Davis							
Reduced Canadian Military	0841 to 0851	0.110	0.078	0.070	0.35	0.24	0.40
Rifleman: Hendricks							
Reduced Canadian Military	1129 to 1140	0.098	0.070	0.057	0.31	0.28	0.32
Rifleman: Smith							
Reduced Canadian Military	1002 to 1013	0.121	0.103	0.051	0.35	0.22	0.36
Average		0.110	0.084	0.059	0.34	0.25	0.36
Rifleman: Davis							
Reduced U.S. Military B	1118 to 1127	0.066	0.021	0.060	0.08	0.19	0.20
Rifleman: Hendricks							
Reduced U.S. Military B	0943 to 0957	0.108	0.068	0.070	0.24	0.25	0.27
Rifleman: Smith							
Reduced U.S. Military B	0825 to 0837	0.115	0.081	0.057	0.34	0.25	0.34
Average		0.096	0.057	0.062	0.22	0.23	0.27
Rifleman: Davis							
Game	0930 to 0940	0.143	0.073	0.117	0.30	0.32	0.42
Rifleman: Hendricks							
Game	0808 to 0819	0.157	0.100	0.106	0.29	0.50	0.54
Rifleman: Smith							
Game	1102 to 1114	0.165	0.128	0.082	0.52	0.41	0.55
Average		0.155	0.100	0.102	0.37	0.41	0.50
Rifleman: Davis[b]							
Fluorescent	0740 to 0757	0.062	0.044	0.037	0.18	0.13	0.19
Rifleman: Hendricks							
Fluorescent	1040 to 1058	0.101	0.082	0.042	0.37	0.16	0.39
Rifleman: Smith							
Fluorescent	0913 to 0927	0.117	0.073	0.075	0.32	0.27	0.32
Average		0.093	0.066	0.051	0.29	0.19	0.30

Date: 14 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0930	1.8	5.5	Clear	81	--	--
1000	1.9	5.8	Clear	84	NNW, 6	0.992
1030	1.9	5.7	Clear	86	--	--
1100	2.3	5.9	Clear	86	NW, 6	0.986

[a]Reading on G.E. type PR-1 exposure meter (with filter).

[b]The exact location of several shot holes within the group was estimated.

Rear Sight: M94 open hunting.
Front Sight: Silver-colored bead with a hood.
Sight Radius: 16.8 inches.
Distance-Rear Sight to Eye: 10.3 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis NRA Smallbore Rifle	0930 to 0942	0.357	0.290	0.173	1.32	0.55	1.37
Rifleman: Hendricks NRA Smallbore Rifle	1023 to 1035	0.283	0.218	0.142	0.84	0.69	0.86
Rifleman: Smith NRA Smallbore Rifle	0954 to 1005	0.437	0.387	0.167	1.74	0.73	1.79
Average		0.359	0.298	0.161	1.30	0.66	1.34
Rifleman: Davis Game	1010 to 1020	0.295	0.125	0.245	0.53	1.01	1.02
Rifleman: Hendricks Game	0944 to 0951	0.382	0.291	0.215	0.86	1.02	1.17
Rifleman: Smith Game	1038 to 1046	0.477	0.274	0.314	1.52	1.22	1.52
Average		0.385	0.230	0.258	0.97	1.08	1.24

Date: 18 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.3	5.0	Scatt. Clouds	76	Calm	0.992
0830	1.5	5.3	Scatt. Clouds	79		
0900	1.7	5.5	Scatt. Clouds	80	WNW 3	0.987
0930	1.7	5.5	Clear	82		

[a]Reading on G. E. type PR-1 exposure meter (with filter).

Rear Sight: M94 open hunting.
Front Sight: Silver-colored bead with a hood.
Sight Radius: 16.8 inches.
Distance-Rear Sight to Eye: 10.3 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis NRA Smallbore Rifle	0844 to 0856	0.305	0.247	0.122	0.82	0.55	0.83
Rifleman: Hendricks NRA Smallbore Rifle	0812 to 0826	0.228	0.150	0.138	0.72	0.59	0.78
Rifleman: Smith NRA Smallbore Rifle	0915 to 0927	0.400	0.283	0.228	1.39	0.77	1.40
Average		0.311	0.227	0.163	0.98	0.64	1.00
Rifleman: Davis Game	0800 to 0810	0.577	0.318	0.426	1.42	1.87	2.13
Rifleman: Hendricks Game	0858 to 0911	0.374	0.304	0.181	1.10	0.76	1.10
Rifleman: Smith Game	0830 to 0841	0.630	0.527	0.261	2.23	1.28	2.30
Average		0.527	0.383	0.289	1.58	1.30	1.84

14 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.2	4.9	Clear	82	Calm	0.985
0830	1.4	5.1	Clear	82		
0900	1.6	5.4	Clear	82	Calm	0.977

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Sight: 8-X telescope.
Distance-Rear Sight to Eye: 3.0 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis[b] NRA Smallbore Rifle	0746 to 0802	0.054	0.038	0.030	0.19	0.11	0.19
Rifleman: Hendricks NRA Smallbore Rifle	0848 to 0855	0.098	0.078	0.047	0.28	0.27	0.39
Rifleman: Smith[b] NRA Smallbore Rifle	0824 to 0834	0.053	0.026	0.041	0.09	0.15	0.15
Average		0.068	0.047	0.039	0.19	0.18	0.24
Rifleman: Davis Game	0838 to 0845	0.074	0.046	0.050	0.14	0.16	0.19
Rifleman: Hendricks Game	0808 to 0819	0.159	0.105	0.112	0.39	0.42	0.57
Rifleman: Smith[b] Game	0858 to 0908	0.053	0.021	0.047	0.09	0.15	0.16
Average		0.095	0.057	0.070	0.21	0.24	0.31

Date: 18 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0930	2.0	5.6	Clear	84		
1000	2.0	5.7	Clear	88	Calm	0.976
1030	2.2	5.9	Clear	86		
1100	2.1	5.8	Clear	86	W 5	0.969

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Sight: 8-X telescope.
Distance-Rear Sight to Eye: 3.0 inches.
Range: 100 yards.

Target Type	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis NRA Smallbore Rifle	1018 to 1029	0.055	0.051	0.018	0.18	0.06	0.19
Rifleman: Hendricks NRA Smallbore Rifle	0943 to 0957	0.048	0.039	0.027	0.10	0.08	0.12

[b]The exact location of several shot holes within the group was estimated.

Type Target	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Smith							
NRA Smallbore Rifle	1044 to 1054	0.066	0.052	0.028	0.23	0.10	0.24
Average		0.056	0.047	0.024	0.17	0.08	0.18
Rifleman: Davis[b]							
Game	0932 to 0941	0.062	0.038	0.040	0.19	0.19	0.23
Rifleman: Hendricks							
Game	1031 to 1040	0.098	0.059	0.066	0.14	0.26	0.29
Rifleman: Smith[b]							
Game	1000 to 1014	0.074	0.042	0.052	0.15	0.16	0.19
Average		0.078	0.046	0.053	0.16	0.20	0.24

[b]The exact location of several shot holes within the group was estimated.

SIGHTING ERROR TEST NO. 10

Date: 19 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.2	5.0	Clear	78	WNW, 3	0.988
0830	1.2	5.0	Clear	78		
0900	1.6	5.3	Clear	82	SW, 3	0.980
0930	1.7	5.5	Clear	85		
1000	2.0	5.6	Clear	86	Calm	0.972
1030	2.2	5.9	Clear	90		
1100	2.2	5.8	Clear	89	SW, 3	0.972
1130	2.1	5.7	Clear	88		
1200	2.2	5.8	Clear	89	SW, 4	0.969

[a]Reading on G.E. Type PR-1 Exposure Meter (with filter).

Rear Sight: M1 Rifle.
Front Sight: M1 Rifle.
Sight Radius: 27.9 inches.
Target: N.R.A. 100-yard Smallbore Rifle

Distance-Rear Sight to Eye: 3.8 in.
Range: 100 yards.

Sight Finish	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis Normal	0815 to 0836	0.213	0.143	0.140	0.54	0.49	0.61
Rifleman: Hendricks Normal	1116 to 1124	0.269	0.227	0.112	0.98	0.35	1.00
Rifleman: Smith Normal	1000 to 1012	0.388	0.361	0.113	1.20	0.36	1.20
Average		0.290	0.244	0.122	0.91	0.40	0.94
Rifleman: Davis Blueing removed	1015 to 1023	0.159	0.121	0.095	0.47	0.40	0.57
Rifleman: Hendricks Blueing removed	0841 to 0853	0.359	0.333	0.102	1.20	0.34	1.23
Rifleman: Smith Blueing removed	1133 to 1141	0.351	0.300	0.131	1.15	0.73	1.16
Average		0.290	0.251	0.109	0.94	0.49	0.99
Rifleman: Davis Soot applied with carbide lamp	0919 to 0930	0.268	0.245	0.069	0.81	0.33	0.85
Rifleman: Hendricks Soot applied with carbide lamp	1155 to 1204	0.264	0.190	0.130	1.06	0.68	1.06
Rifleman: Smith Soot applied with carbide lamp	1046 to 1058	0.232	0.149	0.160	0.57	0.60	0.77
Average		0.255	0.195	0.120	0.81	0.54	0.89

Sight Finish	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
Jet black	1143 to 1150	0.203	0.174	0.087	0.75	0.39	0.77
Rifleman: Hendricks							
Jet black	1029 to 1039	0.354	0.303	0.121	1.17	0.50	1.18
Rifleman: Smith							
Jet black	0856 to 0909	0.280	0.215	0.166	0.61	0.60	0.78
Average		0.279	0.231	0.125	0.84	0.50	0.91

19 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
1000	2.0	5.6	Clear	86	Calm	0.972
1030	2.2	5.9	Clear	90		
1100	2.2	5.8	Clear	89	SW, 3	0.972
1130	2.1	5.7	Clear	88		
1200	2.2	5.8	Clear	89	SW, 4	0.969

[a]Reading on G.E. Type PR-1 Exposure Meter (with filer).

Rear Sight: M1 Rifle (standard). Distance-Rear Sight to Eye: 3.8 in.
Front Sight: Modified Ithaca Post. Range: 100 yards.
Sight Radius: 28.1 inches.
Target: N.R.A. 100-yard Smallbore Rifle.

Rifleman: Davis							
	1102 to 1113	0.203	0.148	0.086	0.65	0.51	0.66
Rifleman: Hendricks							
	0948 to 0958	0.207	0.155	0.103	0.74	0.36	0.75
Rifleman: Smith							
	1210 to 1222	0.317	0.267	0.133	0.90	0.63	0.92
Average		0.242	0.190	0.107	0.76	0.50	0.78

25 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0730	1.1	4.7	Clear	81		
0800	1.2	4.8	Clear	83	Calm	0.976
0830	1.4	5.1	Clear	84		
0900	1.6	5.4	Clear	84	W, 4	0.974
0930	1.7	5.6	Clear	86		
1000	2.0	5.6	Clear	88	WNW, 4	0.968
1030	1.9	5.6	Clear	90		
1100	2.1	5.7	Clear	89	WNW, 3	0.961

[a]Reading on G.E. Type PR-1 Exposure Meter (with filter).

Rear Sight: M1 Rifle. Distance Rear Sight to Eye: 3.8 inches.
Front Sight: M1 Rifle. Range: 100 yards.
Sight Radius: 27.9 inches.
Target: N.R.A. 100-yard Smallbore Rifle.

Sight Finish	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
Normal	0853 to 0905	0.159	0.099	0.111	0.39	0.39	0.45
Rifleman: Hendricks							
Normal	0740 to 0753	0.252	0.220	0.104	0.70	0.37	0.79
Rifleman: Smith							
Normal	1013 to 1023	0.267	0.203	0.139	0.78	0.53	0.81
Average		0.226	0.174	0.118	0.62	0.43	0.68
Rifleman: Davis							
Blueing removed	1027 to 1037	0.279	0.217	0.157	0.86	0.54	0.98
Rifleman: Hendricks							
Blueing removed	0907 to 0920	0.312	0.244	0.131	1.16	0.57	1.16
Rifleman: Smith							
Blueing removed	0756 to 0806	0.410	0.360	0.164	1.53	0.62	1.63
Average		0.334	0.274	0.151	1.18	0.58	1.26
Rifleman: Davis							
Soot applied with carbide lamp	0809 to 0821	0.122	0.108	0.048	0.44	0.17	0.45
Rifleman: Hendricks							
Soot applied with carbide lamp	1041 to 1051	0.445	0.405	0.122	1.70	0.63	1.72
Rifleman: Smith							
Soot applied with carbide lamp	0924 to 0936	0.354	0.295	0.141	1.24	0.54	1.26
Average		0.307	0.269	0.104	1.13	0.45	1.14
Rifleman: Davis							
Jet black	0940 to 0952	0.186	0.123	0.114	0.62	0.44	0.66
Rifleman: Hendricks							
Jet black	0824 to 0833	0.246	0.198	0.097	0.62	0.33	0.65
Rifleman: Smith							
Jet black	1058 to 1108	0.240	0.171	0.117	0.73	0.53	0.74
Average		0.224	0.164	0.109	0.66	0.43	0.68

Date: 25 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0730	1.0	4.6	Clear	81		
0800	1.2	4.8	Clear	83	Calm	0.976
0830	1.4	5.1	Clear	84		
0900	1.6	5.4	Clear	84	W, 4	0.974
0930	1.7	5.6	Clear	86		
1000	2.0	5.6	Clear	88	WNW, 4	0.968

[a]Reading on G.E. Type PR-1 exposure meter (with filter).

Rear Sight: M1 Rifle (standard).
Distance-Rear Sight to Eye: 3.8 inches.
Front Sight: Modified Ithaca Post.
Sight Radius: 28.1 inches.
Target: N.R.A. 100-yard Smallbore Rifle.
Range: 100 yards.

Sight Finish	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis	0727 to 0737	0.320	0.272	0.149	1.04	0.61	1.21
Rifleman: Hendricks	0955 to 1009	0.358	0.302	0.145	1.22	0.63	1.26
Rifleman: Smith	0837 to 0850	0.386	0.344	0.096	2.04	0.34	2.05
Average		0.355	0.306	0.130	1.43	0.53	1.51

Date: 21 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.1	4.7	Scattered clouds	81	Calm	0.976
0830	1.2	4.8	Scattered clouds	82		
0900	1.5	5.2	Scattered clouds	87	Calm	0.971
0930	1.4	5.1	Scattered clouds	88		
1000	1.5	5.3	Scattered clouds	86	Calm	0.969
1030	2.1	5.7	Clear	94		
1100	2.2	5.8	Clear	94	SSW, 6	0.966
1130	2.1	5.7	Clear	95		

[a]Reading on G.E. Type PR-1 exposure meter (with filter).

Rear Sight: M1 Rifle. Distance-Rear Sight to Eye: 3.8 inches
Front Sight: M1 Rifle Range: 100 yards
Sight Radius: 27.9 inches
Target: N.R.A. 100-yard Smallbore Rifle

Sight Finish	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis							
Normal	0852 to 0904	0.173	0.149	0.075	0.78	0.36	0.84
Rifleman: Hendricks							
Normal	1110 to 1119	0.342	0.259	0.158	0.96	0.68	0.97
Rifleman: Smith							
Normal	1004 to 1014	0.413	0.281	0.212	1.48	0.95	1.50
Average		0.309	0.230	0.148	1.07	0.66	1.10
Rifleman: Davis							
Blueing removed	1016 to 1025	0.311	0.194	0.170	0.72	1.02	1.02
Rifleman: Hendricks							
Blueing removed	0906 to 0917	0.161	0.130	0.082	0.47	0.36	0.52
Rifleman: Smith							
Blueing removed	1121 to 1133	0.219	0.159	0.131	0.61	0.49	0.64
Average		0.230	0.161	0.128	0.60	0.62	0.73
Rifleman: Davis							
Soot applied with carbide lamp	0934 to 0944	0.179	0.155	0.069	0.54	0.32	0.56
Rifleman: Hendricks							
Soot applied with carbide lamp	0819 to 0834	0.269	0.242	0.060	0.99	0.29	1.00
Rifleman: Smith							
Soot applied with carbide lamp	1045 to 1053	0.328	0.310	0.068	1.32	0.26	1.33
Average		0.259	0.236	0.066	0.95	0.29	0.96
Rifleman: Davis							
Jet black	0801 to 0813	0.266	0.248	0.065	0.91	0.35	0.93
Rifleman: Hendricks							
Jet black	1028 to 1039	0.213	0.123	0.146	0.62	0.59	0.81
Rifleman: Smith							
Jet black	0919 to 0929	0.307	0.284	0.079	1.07	0.42	1.09
Average		0.262	0.218	0.097	0.87	0.45	0.94

Date: 21 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0830	1.2	4.8	Scattered clouds	82		
0900	1.5	5.2	Scattered clouds	87	Calm	0.971
0930	1.4	5.1	Scattered clouds	88		
1000	1.5	5.3	Scattered clouds	86	Calm	0.969
1030	2.1	5.7	Clear	94		
1100	2.2	5.8	Clear	94	SSW, 6	0.966

[a]Reading on G.E. Type PR-1 Exposure Meter (with filter).

Rear Sight: M1 Rifle (standard).
Front Sight: Modified Ithaca post.
Sight Radius: 28.1 inches.
Distance-Rear Sight to Eye: 3.8 inches.
Target: N.R.A. 100-yard Smallbore Rifle.
Range: 100 Yards.

Sight Finish	Time	MR	MVD	MHD	EVD	EHD	ES
Rifleman: Davis	1057 to 1107	0.171	0.124	0.097	0.35	0.36	0.41
Rifleman: Hendricks	0947 to 1000	0.260	0.148	0.181	0.70	0.72	0.73
Rifleman: Smith	0838 to 0848	0.365	0.292	0.191	1.07	0.58	1.09
Average		0.265	0.188	0.156	0.71	0.55	0.74

SIGHTING ERROR TEST NO. 11

Date: 26 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
1000	1.6	5.1	Overcast	72	WNW 12	0.985
1100	1.6	5.2	Scatt. Clouds	72	WNW 15	0.988
1200	1.3	5.3	Scatt. Clouds	71	WNW 18	0.992
1300	1.2	5.2	Scatt. Clouds	71	WNW 20	0.992
1400	1.5	5.0	Scatt. Clouds	72	WNW 20	0.989
1500	1.6	5.0	Scatt. Clouds	70	W 22	0.992

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Individual	Position	Distance, Line of Sight to Comb, in.	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	Prone	1.4	0938 to 0955	0.055	0.036	0.035	0.13	0.14	0.14
Hendricks	Prone	1.6	1118 to 1135	0.092	0.049	0.065	0.23	0.31	0.36
Smith	Prone	1.5	1036 to 1054	0.077	0.060	0.040	0.22	0.17	0.23
Average				0.075	0.048	0.047	0.19	0.21	0.24
Davis[b]	Sitting	1.4	1057 to 1109	0.076	0.049	0.050	0.20	0.18	0.20
Hendricks	Sitting	1.6	1005 to 1020	0.119	0.075	0.082	0.31	0.33	0.46
Smith[b]	Sitting	1.5	1140 to 1156	0.037	0.024	0.026	0.08	0.08	0.11
Average				0.077	0.049	0.053	0.20	0.20	0.26
Davis	Prone	2.5	1240 to 1255	0.066	0.054	0.030	0.26	0.12	0.28
Hendricks	Prone	2.5	1410 to 1428	0.067	0.042	0.049	0.18	0.17	0.25
Smith	Prone	2.5	1325 to 1342	0.067	0.050	0.036	0.16	0.19	0.20
Average				0.067	0.049	0.038	0.20	0.16	0.24
Davis[b]	Sitting	2.5	1346 to 1407	0.058	0.047	0.031	0.18	0.15	0.23
Hendricks	Sitting	2.5	1259 to 1318	0.074	0.060	0.032	0.26	0.18	0.28
Smith[b]	Sitting	2.5	1434 to 1451	0.059	0.035	0.044	0.14	0.14	0.19
Average				0.064	0.047	0.036	0.19	0.16	0.23

[b]The exact location of several shot holes within the group was estimated.

Date: 27 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0900	1.5	5.3	Scatt. Clouds	56	NNW 5	1.033
1000	1.6	5.4	Scatt. Clouds	57	N 7	1.027
1100	2.0	5.3	Overcast	63	SSE 7	1.031
1200	1.6	5.0	Overcast	62	S 5	1.026
1300	1.5	5.0	Overcast	63	Calm	1.027

[a]Reading on G. E. type PR-1 exposure meter.

Sight: 8-X telescope.
Distance-Sight to Eye: 3.0 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Individual	Position	Distance, Line of Sight to Comb, in.	Time	MR	MVD	MHD	EVD	EHD	ES
Davis	Prone	1.4	0958 to 1010	0.073	0.050	0.045	0.20	0.11	0.22
Hendricks	Prone	1.6	0856 to 0918	0.086	0.067	0.041	0.24	0.12	0.24
Smith[b]	Prone	1.5	1042 to 1057	0.118	0.104	0.045	0.29	0.18	0.32
Average				0.092	0.074	0.044	0.24	0.14	0.26
Davis	Sitting	1.4	0842 to 0853	0.077	0.057	0.044	0.23	0.13	0.24
Hendricks	Sitting	1.6	1014 to 1035	0.103	0.057	0.078	0.26	0.32	0.41
Smith	Sitting	1.5	0928 to 0951	0.071	0.060	0.029	0.34	0.12	0.35
Average				0.084	0.058	0.050	0.28	0.19	0.33
Davis[b]	Prone	2.5	1240 to 1248	0.024	0.010	0.019	0.04	0.07	0.07
Hendricks	Prone	2.5	1116 to 1130	0.083	0.045	0.059	0.14	0.24	0.25
Smith[b]	Prone	2.5	1307 to 1317	0.076	0.062	0.032	0.26	0.13	0.26
Average				0.061	0.039	0.037	0.15	0.15	0.19
Davis[b]	Sitting	2.5	1103 to 1113	0.031	0.029	0.008	0.16	0.06	0.17
Hendricks[b]	Sitting	2.5	1250 to 1259	0.032	0.016	0.024	0.06	0.09	0.09
Smith[b]	Sitting	2.5	1135 to 1146	0.074	0.050	0.044	0.21	0.16	0.21
Average				0.046	0.032	0.025	0.14	0.10	0.16

Date: 28 April 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	1.6	5.0	Broken	53	SSW 8	1.041
0800	0.6	4.3	Overcast	55	SSW 10	1.033
0900	1.3	4.9	Overcast	57	SSW 9	1.032
1000	1.3	4.9	Broken	60	SSW 10	1.030
1100	1.6	5.3	Scatt. Clouds	62	SSW 10	1.019
1200	1.6	5.2	Scatt. Clouds	65	SW 12	1.011

[a]Reading on G.E. type PR-1 exposure meter.
[b]The exact location of several shot holes within the group was estimated.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2.0 inches
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Individual	Position	Distance, Line of Sight to Comb, in.	Time	MR	MVD	MHD	EVD	EHD	ES
Davis[b]	Prone	1.4	0934 to 0948	0.052	0.044	0.022	0.18	0.07	0.18
Hendricks	Prone	1.6	1053 to 1110	0.064	0.047	0.032	0.19	0.14	0.20
Smith	Prone	1.5	1013 to 1029	0.051	0.042	0.021	0.17	0.10	0.19
Average				0.056	0.044	0.025	0.18	0.10	0.19
Davis	Sitting	1.4	1033 to 1048	0.075	0.050	0.044	0.26	0.19	0.30
Hendricks[b]	Sitting	1.6	0951 to 1007	0.022	0.015	0.010	0.09	0.05	0.09
Smith[b]	Sitting	1.5	1114 to 1131	0.039	0.029	0.020	0.16	0.10	0.16
Average				0.045	0.031	0.025	0.17	0.11	0.18
Davis	Prone	2.5	0710 to 0731	0.052	0.035	0.029	0.11	0.15	0.18
Hendricks	Prone	2.5	0850 to 0904	0.059	0.035	0.043	0.14	0.15	0.18
Smith	Prone	2.5	0753 to 0813	0.048	0.032	0.028	0.09	0.13	0.13
Average				0.053	0.034	0.033	0.11	0.14	0.16
Davis	Sitting	2.5	0816 to 0847	0.078	0.047	0.057	0.15	0.18	0.20
Hendricks	Sitting	2.5	0735 to 0748	0.049	0.034	0.030	0.12	0.09	0.13
Smith[b]	Sitting	2.5	0908 to 0928	0.029	0.017	0.021	0.07	0.06	0.07
Average				0.052	0.033	0.036	0.11	0.11	0.13

Date: 1 May 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.2	4.8	Broken	55	SE 10	1.031
0900	0.7	4.0	Overcast	58	SSE 14	1.030
1000	1.6	5.2	Overcast	61	SSE 10	1.028
1100	1.0	4.6	Overcast	62	SE 6	1.025
1200	1.2	4.8	Overcast	61	SE 7	1.023

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2.0 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

[b]The exact location of several shot holes within the group was estimated.

Individual	Position	Distance, Line of Sight to Comb, in.	Time	MR	MVD	MHD	EVD	EHD	ES
Davis[b]	Prone	1.4	0902 to 0917	0.050	0.034	0.031	0.13	0.14	0.19
Hendricks	Prone	1.6	0818 to 0835	0.077	0.040	0.055	0.17	0.17	0.20
Smith	Prone	1.5	0939 to 0955	0.050	0.037	0.025	0.19	0.09	0.20
Average				0.059	0.037	0.037	0.16	0.13	0.20
Davis	Sitting	1.4	0751 to 0813	0.057	0.024	0.049	0.10	0.26	0.27
Hendricks	Sitting	1.6	0920 to 0935	0.075	0.061	0.035	0.29	0.13	0.31
Smith[b]	Sitting	1.5	0838 to 0855	0.051	0.026	0.038	0.09	0.15	0.15
Average				0.061	0.037	0.041	0.16	0.18	0.24
Davis[b]	Prone	2.5	1059 to 1115	0.061	0.049	0.027	0.20	0.11	0.20
Hendricks	Prone	2.5	1022 to 1035	0.072	0.060	0.034	0.18	0.12	0.21
Smith[b]	Prone	2.5	1134 to 1149	0.047	0.021	0.035	0.16	0.14	0.16
Average				0.060	0.043	0.032	0.18	0.12	0.19
Davis[b]	Sitting	2.5	1001 to 1020	0.053	0.040	0.022	0.16	0.08	0.16
Hendricks	Sitting	2.5	1117 to 1130	0.067	0.057	0.030	0.18	0.13	0.19
Smith[b]	Sitting	2.5	1038 to 1055	0.043	0.021	0.035	0.07	0.17	0.17
Average				0.054	0.039	0.029	0.14	0.13	0.17

[b]The exact location of several shot holes within the group was estimated.

SIGHTING ERROR TEST NO. 12

Date: 26 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.7	5.5	Clear	80	NW 3	0.980
0830	2.0	5.7	Clear	81		
0900	2.1	5.9	Clear	82	NW 8	0.980
1400	2.3	6.0	Scatt. Clouds	90	NW 7	0.964
1430	2.0	5.7	Scatt. Clouds	90		
1500	2.2	5.9	Scatt. Clouds	90	NW 8	0.966
1530	2.3	6.0	Scatt. Clouds	90		

[a]Reading on G.E. type PR-1 exposure meter (with filter).

Sight: 20-X telescope.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Individual	Mirage	Time	CI from Index Point V	CI from Index Point H	MR	MVD	MHD	EVD	EHD	ES
Davis[b]	Light	0748 to 0757	-0.38	-0.09	0.010	0.007	0.008	0.02	0.02	0.03
Hendricks[b]	Light	0800 to 0806	-0.45	-0.07	0.018	0.007	0.015	0.03	0.08	0.08
Smith[b]	Light	0810 to 0823	-0.46	-0.12	0.021	0.011	0.017	0.05	0.08	0.09
Average			-0.43	-0.09	0.016	0.008	0.013	0.03	0.06	0.07
Davis[b]	Light	0825 to 0836	-0.50	0.00	0.032	0.024	0.016	0.10	0.06	0.10
Hendricks[b]	Light	0838 to 0849	-0.65	0.00	0.029	0.006	0.027	0.03	0.11	0.11
Smith	Light	0853 to 0906	-0.67	-0.07	0.029	0.016	0.018	0.07	0.08	0.08
Average			-0.61	-0.02	0.030	0.015	0.020	0.07	0.08	0.10
Davis	Heavy	1409 to 1420	-1.12	+0.08	0.102	0.068	0.065	0.22	0.27	0.31
Hendricks[b]	Heavy	1423 to 1436	-1.14	-0.01	0.057	0.007	0.057	0.03	0.18	0.18
Smith[b]	Heavy	1438 to 1450	-1.08	+0.07	0.054	0.027	0.039	0.10	0.14	0.15
Average			-1.11	+0.05	0.071	0.034	0.054	0.12	0.20	0.21
Davis[b]	Heavy	1452 to 1500	-1.12	-0.03	0.055	0.018	0.049	0.08	0.18	0.18
Hendricks[b]	Heavy	1502 to 1515	-1.20	-0.04	0.013	0.008	0.008	0.03	0.03	0.04
Smith[b]	Heavy	1517 to 1529	-1.01	-0.04	0.066	0.030	0.049	0.17	0.19	0.22
Average			-1.11	-0.04	0.045	0.019	0.035	0.09	0.13	0.15

Date: 27 July 1961

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0700	1.0	4.6	Clear	77	NW 3	0.988
0730	1.3	5.0	Clear			
0800	1.6	5.4	Clear	78	NW 3	0.988
0830	2.0	5.7	Clear			

[a]Reading on G.E. type PR-1 exposure meter (with filter).
[b]The exact location of several shot holes within the group was estimated.

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0900	2.1	5.8	Clear	81	N 6	0.982
1300	2.4	6.0	Scatt. Clouds	90	NNE 5	0.971
1330	2.6	6.1	Scatt. Clouds	89		
1400	2.3	5.8	Scatt. Clouds	90	NNE 5	0.965
1430	1.6	5.3	Scatt. Clouds	90		

[a]Reading on G. E. type PR-1 exposure meter (with filter).

Rear Sight: Redfield International Match (0.042-inch-diameter aperture).
Front Sight: Redfield International Match (0.125-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2.0 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Individual	Mirage	Time	CI from Index Point V	CI from Index Point H	MR	MVD	MHD	EVD	EHD	ES
Davis	Light	0711 to 0730	+0.19	-0.02	0.053	0.043	0.027	0.15	0.08	0.16
Hendricks	Light	0733 to 0748	-0.19	-0.38	0.103	0.087	0.042	0.34	0.15	0.36
Smith	Light	0752 to 0813	+0.11	-0.20	0.097	0.070	0.055	0.32	0.30	0.34
Average			+0.04	-0.20	0.084	0.067	0.041	0.27	0.18	0.29
Davis[b]	Light	0816 to 0838	+0.05	-0.02	0.043	0.023	0.035	0.09	0.11	0.14
Hendricks	Light	0842 to 0854	-0.28	-0.33	0.057	0.042	0.037	0.13	0.16	0.17
Smith	Light	0857 to 0911	+0.15	-0.28	0.109	0.055	0.080	0.20	0.39	0.40
Average			-0.03	-0.21	0.070	0.040	0.051	0.14	0.22	0.24
Davis	Heavy	1254 to 1309	-0.32	-0.11	0.065	0.050	0.031	0.19	0.14	0.21
Hendricks[b]	Heavy	1311 to 1323	-0.61	-0.37	0.067	0.061	0.013	0.20	0.06	0.20
Smith	Heavy	1327 to 1343	-0.04	-0.28	0.118	0.085	0.074	0.31	0.23	0.33
Average			-0.32	-0.25	0.083	0.065	0.039	0.23	0.14	0.25
Davis	Heavy	1346 to 1400	-0.10	-0.09	0.055	0.037	0.031	0.15	0.11	0.16
Hendricks	Heavy	1403 to 1415	-0.64	-0.26	0.077	0.068	0.030	0.34	0.11	0.35
Smith	Heavy	1419 to 1434	-0.03	-0.19	0.090	0.069	0.040	0.34	0.15	0.35
Average			-0.26	-0.18	0.074	0.058	0.034	0.28	0.12	0.29

[b]The exact location of several shot holes within the group was established.

APPENDIX C

1957 Test Data

SIGHTING ERROR TEST NO. 1

Date: 19 November 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.2	3.0	Scattered	63	SSE, 12	0.997
0900	0.5	4.0	Broken	64	SSE, 10	.993
1000	0.3	3.5	Broken	65	SSE, 12	.993
1100	2.6	6.1	Scattered	68	S, 16	.985
1300	2.4	6.0	Scattered	68	S, 14	.983
1400	2.3	6.1	Broken	69	SSW, 15	.982
1500	0.0	0.3	Broken	66	W, 18	.986

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (0.110-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Individual	Trial No.	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	1	0845 to 0859	0.19L	0.23A	0.07	0.05	0.06	0.25	0.26	0.28
	2	1012 to 1021	.56L	.23A	.10	.09	.03	.35	.18	.35
	3	1233 to 1249	.30L	.14A	.08	.05	.05	.25	.19	.28
	4	1333 to 1357	.35L	.27A	.14	.08	.10	.35	.36	.39
	Avg	16 minutes	.35L	.22A	.10	.07	.06	.30	.25	.32
Lindley	1	0938 to 0951	.04R	.50A	.14	.09	.10	.26	.36	.42
	2	1031 to 1043	.00R	.31A	.17	.09	.12	.36	.48	.48
	3	1252 to 1305	.35L	.16B	.17	.11	.13	.52	.58	.74
	4	1400 to 1417	.42L	.16B	.29	.14	.25	.42	.72	.72
	Avg	14 minutes	.18L	.12A	.19	.11	.15	.39	.54	.59
Valentini	1	1002 to 1010	.80L	.32A	.10	.08	.06	.29	.19	.30
	2	1052 to 1100	.43L	.34A	.13	.08	.09	.30	.40	.40
	3	1313 to 1323	.89L	.36A	.11	.08	.06	.25	.22	.28
	4	1427 to 1435	.66L	.09A	.14	.07	.10	.32	.41	.48
	Avg	8 minutes	.70L	.28A	.12	.08	.08	.29	.30	.36

Date: 21 November 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	2.3	6.1	Scattered	40	SW, 5	1.064
0900	3.0	6.7	Broken	47	SW, 6	1.050
1000	2.4	6.4	Scattered	50	SW, 8	1.045
1100	3.7	7.0	Clear	53	SW, 12	1.037
1300	3.6	7.0	Scattered	54	SW, 11	1.035
1400	3.5	6.6	Scattered	57	WSW, 15	1.030
1500	2.6	6.6	Scattered	56	SSW, 10	1.033
1600	3.0	6.5	Scattered	56	S, 5	1.032

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (0.110-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Individual	Trial No.	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	1	1015 to 1029	0.78L	0.13A	0.12	0.09	0.08	0.29	0.31	0.35
	2	1244 to 1256	.96L	.74A	.11	.09	.05	.23	.19	.32
	3	1342 to 1357	.96L	.84A	.04	.02	.04	.09	.16	.16
	4	1441 to 1453	.90L	.73A	.11	.09	.04	.35	.19	.35
	Avg	13 minutes	.90L	.61A	.10	.07	.05	.24	.21	.30
Lindley	1	1040 to 1055	.83L	.12B	.17	.13	.07	.67	.27	.67
	2	1300 to 1312	.64L	.54A	.43	.42	.10	1.19	.44	1.20
	3	1401 to 1415	.83L	.52A	.14	.12	.05	0.56	.20	0.57
	4	1458 to 1516	.78L	.48A	.12	.10	.06	.28	.22	.29
	Avg	15 minutes	.77L	.36A	.22	.19	.07	.68	.28	.68
Valentini	1	1102 to 1119	.75L	.14A	.04	.03	.02	.14	.12	.19
	2	1316 to 1331	.80L	.59A	.08	.03	.06	.20	.19	.21
	3	1419 to 1432	.94L	.63A	.08	.06	.04	.24	.18	.27
	4	1521 to 1530	.96L	.34A	.04	.02	.04	.06	.22	.22
	Avg	14 minutes	.86L	.42A	.06	.04	.04	.16	.18	.22

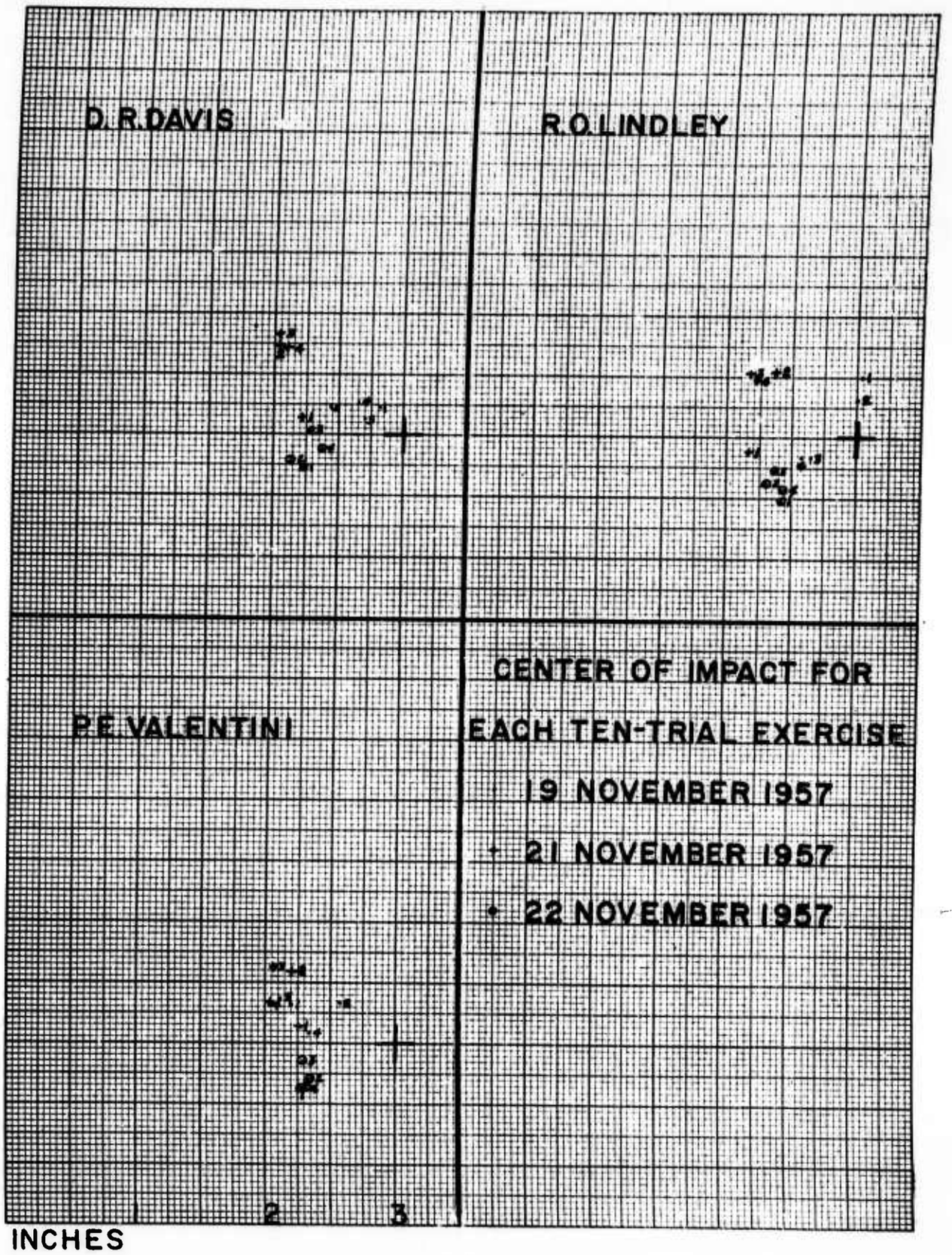
Date: 22 November 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.8	4.3	Scattered	40	W, 5	1.071
0900	2.3	5.9	Scattered	43	W, 9	1.061
1000	2.5	6.3	Scattered	42	W, 13	1.066
1100	2.5	6.2	Overcast	42	W, 12	1.067
1300	3.3	6.5	Overcast	44	W, 10	1.063
1400	2.1	5.2	Broken	44	WNW, 11	1.062
1500	1.9	5.3	Overcast	44	WNW, 11	1.062

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (0.110-inch-diameter aperture).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Individual	Trial No.	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis	1	0802 to 0819	0.77L	0.28B	0.08	0.04	0.06	0.20	0.26	0.28
	2	0917 to 0939	.86L	.22B	.08	.06	.05	.18	.19	.21
	3	1233 to 1255	.71L	.03A	.08	.07	.03	.24	.14	.24
	4	1349 to 1405	.63L	.12B	.13	.08	.09	.40	.35	.50
	Avg	19 minutes	.74L	.15B	.09	.06	.06	.26	.24	.31
Lindley	1	0831 to 0847	.58L	.52B	.12	.10	.05	.48	.24	.48
	2	0949 to 1004	.70L	.38B	.08	.05	.06	.21	.18	.24
	3	1300 to 1316	.64L	.26B	.12	.09	.06	.40	.22	.41
	4	1414 to 1428	.56L	.44B	.13	.08	.10	.21	.32	.35
	Avg	15 minutes	.62L	.40B	.11	.08	.07	.32	.24	.37
Valentini	1	0857 to 0910	.74L	.36B	.10	.06	.07	.29	.21	.30
	2	1010 to 1029	.66L	.30B	.09	.05	.07	.19	.26	.28
	3	1322 to 1338	.72L	.15B	.04	.04	.02	.18	.13	.18
	4	1433 to 1448	.69L	.35B	.08	.06	.05	.24	.20	.29
	Avg	16 minutes	.70L	.29B	.08	.05	.05	.22	.20	.26


D. R. DAVIS
R. O. LINDLEY
P. E. VALENTINI
CENTER OF IMPACT FOR
EACH TEN-TRIAL EXERCISE
19 NOVEMBER 1957
21 NOVEMBER 1957
22 NOVEMBER 1957
1
2
3
INCHES

SIGHTING ERROR TEST NO. 2

Date: 25 November 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.0	4.5	Overcast	40	NW, 7	1.059
0900	1.0	4.5	Overcast	40	NNW, 5	1.059
1000	1.8	5.7	Overcast	41	N, 10	1.056
1100	3.1	6.9	Broken	42	NE, 10	1.054
1200	2.5	6.1	Overcast	42	NE, 10	1.054
1300	2.9	6.5	Broken	44	NNE, 10	1.049
1400	3.3	6.9	Broken	44	NNE, 7	1.048
1500	2.0	5.8	Broken	41	NE, 8	1.054
1600	0.5	3.6	Broken	41	NE, 8	1.053

[a]Reading on G. E. PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Trial No.	Aperture Diameter, inch	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis										
1	0.085	0824 to 0846	0.17L	0.48B	0.09	0.06	0.06	0.36	0.23	0.37
2	.095	0949 to 1004	.37L	.17B	.10	.06	.07	.24	.22	.30
3	.110	1059 to 1112	.70L	.17B	.08	.07	.04	.29	.18	.29
4	.125	1234 to 1247	.72L	.02A	.07	.05	.04	.20	.14	.21
5	.140	1339 to 1355	.62L	.06A	.09	.08	.05	.32	.23	.33
6	.065	1449 to 1505	.74L	.43B	.11	.05	.08	.22	.31	.33
Avg		16 minutes	.55L	.20B	.09	.06	.06	.27	.22	.30
Lindley										
1	.110	0855 to 0915	.50L	.48B	.10	.08	.04	.38	.16	.39
2	.125	1011 to 1031	.32L	.10B	.13	.09	.09	.28	.36	.39
3	.140	1118 to 1134	.70L	.12A	.09	.07	.06	.24	.14	.26
4	.065	1256 to 1313	.92L	.15B	.15	.09	.11	.32	.32	.35
5	.085	1402 to 1422	.52L	.10B	.18	.15	.07	.56	.34	.59
6	.095	1509 to 1526	.68L	.20B	.11	.09	.03	.24	.24	.30
Avg		18 minutes	.61L	.15B	.13	.10	.07	.34	.26	.38
Valentini										
1	.140	0925 to 0945	.53L	.11B	.08	.05	.05	.20	.16	.21
2	.065	1036 to 1054	.71L	.40B	.18	.06	.16	.23	.56	.57
3	.085	1139 to 1155	.71L	.14B	.19	.15	.10	.45	.36	.49
4	.095	1318 to 1333	.30L	.06B	.07	.04	.06	.17	.29	.33
5	.110	1427 to 1443	.80L	.17B	.08	.05	.05	.16	.24	.29
6	.125	1531 to 1548	.84L	.10B	.08	.06	.04	.21	.22	.24
Avg		17 minutes	.65L	.16B	.11	.07	.08	.24	.30	.36

Date: 26 November 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.3	3.7	Broken	34	W, 4	1.072
0900	1.2	4.7	Overcast	35	NW, 5	1.070
1000	1.8	5.6	Overcast	39	NW, 5	1.063
1100	3.0	6.5	Broken	44	NW, 6	1.053
1200	2.1	5.5	Broken	42	NW, 10	1.055
1300	2.3	6.0	Broken	42	NW, 7	1.057
1400	3.3	6.8	Scattered	42	NW, 8	1.056
1500	2.6	6.3	Scattered	42	NW, 9	1.056
1600	0.8	4.3	Scattered	42	WNW, 9	1.058

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches
Target: NRA 100-yard smallbore rifle.
Range: 100 yards

Trial No.	Aperture Diameter, inch	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis										
1	0.110	0811 to 0825	0.66L	0.35B	0.11	0.08	0.07	0.39	0.24	0.40
2	.125	0946 to 1000	.69L	.23B	.08	.06	.03	.28	.18	.30
3	.140	1049 to 1102	.78L	.01B	.10	.06	.07	.20	.29	.29
4	.065	1234 to 1247	.58L	.37B	.21	.15	.12	.62	.40	.65
5	.085	1335 to 1351	.45L	.21B	.11	.08	.05	.32	.20	.32
6	.095	1439 to 1457	.56L	.04A	.09	.06	.05	.16	.30	.30
Avg		15 minutes	.62L	.19B	.12	.08	.06	.33	.27	.38
Lindley										
1	.140	0900 to 0919	.58L	.14B	.12	.10	.04	.36	.24	.38
2	.065	1004 to 1020	.56L	.64B	.13	.07	.09	.36	.30	.40
3	.085	1108 to 1124	.68L	.05A	.14	.14	.04	.44	.16	.46
4	.095	1252 to 1307	.70L	.00B	.10	.08	.05	.37	.16	.39
5	.110	1356 to 1411	.80L	.20A	.08	.06	.04	.21	.13	.23
6	.125	1502 to 1520	.64L	.04B	.08	.06	.05	.20	.23	.27
Avg		17 minutes	.66L	.10B	.11	.08	.05	.32	.20	.36
Valentini										
1	.085	0924 to 0940	.55L	.54B	.10	.06	.05	.26	.37	.37
2	.095	1027 to 1043	.55L	.36B	.11	.06	.09	.25	.36	.38
3	.110	1127 to 1143	.69L	.17B	.05	.04	.03	.13	.13	.14
4	.125	1311 to 1330	.68L	.20B	.07	.05	.05	.28	.22	.34
5	.140	1415 to 1430	.52L	.03A	.11	.07	.07	.26	.28	.32
6	.065	1526 to 1536	.91L	.45B	.19	.12	.13	.69	.42	.78
Avg		15 minutes	.65L	.28B	.10	.07	.07	.31	.30	.39

Date: 27 November 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.3	5.1	Clear	36	E, 7	1.081
0900	2.3	6.3	Clear	38	E, 9	1.077
1000	2.9	6.5	Clear	39	ESE, 9	1.074
1100	3.2	6.6	Clear	42	SE, 9	1.068
1200	3.0	6.6	Scattered	45	SE, 8	1.061
1300	3.4	6.6	Scattered	47	SE, 7	1.055
1400	3.1	6.6	Scattered	48	SSE, 10	1.052
1500	1.1	4.6	Broken	49	SSE, 8	1.049
1600	1.0	4.3	Broken	48	SSE, 8	1.051

[a]Reading on G.E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Trial No.	Aperture Diameter, inch	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis										
1	0.140	0809 to 0833	0.73L	0.15B	0.07	0.04	0.05	0.13	0.21	0.22
2	.065	0932 to 0950	.79L	.58B	.10	.09	.05	.29	.24	.31
3	.085	1046 to 1105	.62L	.18B	.10	.07	.07	.40	.26	.45
4	.095	1239 to 1259	.71L	.26A	.16	.15	.03	.48	.12	.48
5	.110	1359 to 1419	.84L	.36A	.04	.03	.02	.11	.11	.12
6	.125	1512 to 1531	.57L	.09A	.11	.10	.03	.32	.08	.33
Avg		20 minutes	.71L	.03B	.10	.08	.04	.29	.17	.32
Lindley										
1	.085	0837 to 0855	.68L	.34B	.12	.11	.05	.53	.16	.56
2	.095	0956 to 1012	.87L	.14B	.08	.08	.02	.21	.08	.22
3	.110	1109 to 1126	.92L	.12B	.13	.10	.05	.48	.28	.49
4	.125	1303 to 1322	.24L	.12A	.08	.04	.06	.22	.22	.23
5	.140	1423 to 1442	.69L	.66A	.08	.06	.06	.31	.21	.37
6	.065	1535 to 1553	.56L	.60B	.21	.04	.21	.86	.16	.88
Avg		18 minutes	.66L	.07B	.12	.07	.08	.44	.18	.46
Valentini										
1	.110	0902 to 0926	.82L	.45B	.06	.04	.04	.14	.16	.21
2	.125	1017 to 1038	.66L	.18B	.11	.07	.08	.24	.32	.34
3	.140	1130 to 1145	.57L	.15A	.06	.03	.04	.14	.16	.17
4	.065	1328 to 1345	.85L	.11A	.16	.13	.07	.54	.26	.56
5	.085	1445 to 1503	.45L	.04B	.11	.06	.08	.24	.25	.26
6	.095	1557 to 1615	.80L	.08B	.10	.07	.05	.23	.29	.32
Avg		19 minutes	.69L	.08B	.10	.07	.06	.26	.24	.31

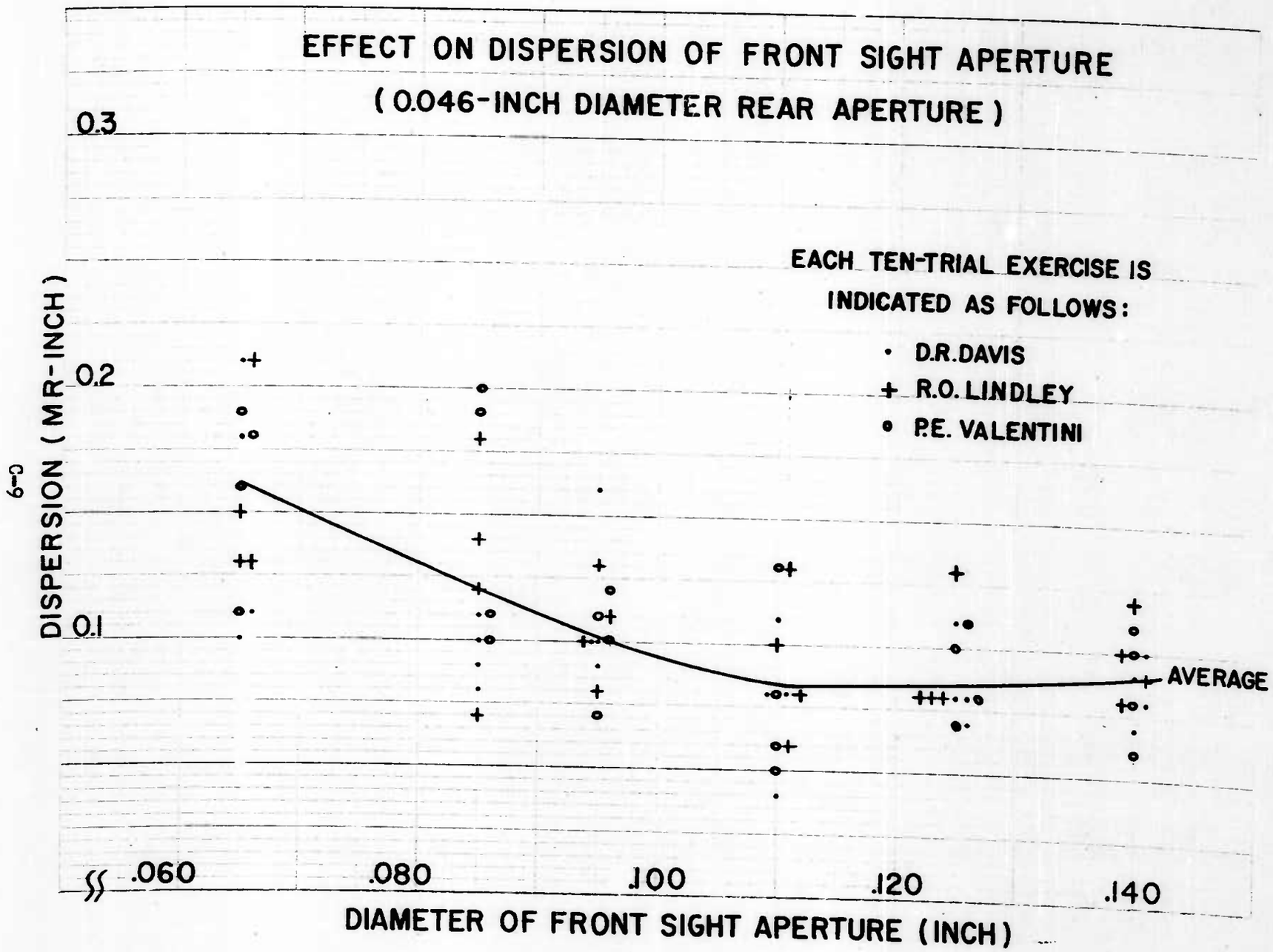
Date: 17 December 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	2.1	6.0	Scattered	35	NW, 4	1.083
0900	2.9	6.6	Scattered	38	NW, 6	1.076
1000	3.2	6.6	Scattered	42	NNE, 8	1.068
1100	3.5	7.0	Scattered	44	NE, 7	1.064
1200	3.6	7.2	Scattered	45	NE, 10	1.062
1300	3.9	7.0	Scattered	46	NNE, 8	1.060
1400	3.6	6.9	Scattered	44	NNE, 9	1.062
1500	3.5	7.0	Scattered	45	N, 6	1.061
1600	1.3	4.3	Overcast	43	N, 6	1.065

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (0.046-inch-diameter aperture).
Front Sight: Redfield International Match (aperture - see each individual).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Trial No.	Aperture Diameter, inch	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis										
1	0.085	0825 to 0848	0.54L	0.40B	0.08	0.05	0.06	0.13	0.23	0.24
2	.095	0950 to 1007	.72L	.06B	.10	.08	.05	.29	.19	.31
3	.110	1106 to 1125	1.22L	.21A	.08	.06	.03	.22	.16	.23
4	.125	1257 to 1312	1.00L	.80A	.08	.04	.05	.17	.28	.28
5	.140	1409 to 1427	0.95L	.64A	.08	.06	.05	.20	.24	.31
6	.065	1511 to 1525	1.07L	.06B	.18	.13	.11	.48	.36	.50
Avg		18 minutes	0.92L	.19A	.10	.07	.06	.25	.24	.31
Lindley										
1	.110	0853 to 0917	.72L	.54B	.06	.04	.03	.20	.14	.22
2	.125	1014 to 1038	.78L	.08B	.08	.08	.02	.22	.12	.24
3	.140	1128 to 1148	.96L	.38A	.10	.08	.06	.28	.24	.32
4	.065	1316 to 1338	.75L	.20A	.13	.10	.06	.42	.21	.42
5	.085	1431 to 1447	.92L	.34A	.07	.05	.04	.20	.17	.20
6	.095	1529 to 1546	1.04L	.35A	.13	.12	.03	.49	.15	.50
Avg		20 minutes	0.86L	.11A	.10	.08	.04	.30	.17	.32
Valintini										
1	.140	0923 to 0944	.67L	.16B	.10	.06	.05	.25	.28	.33
2	.065	1050 to 1102	.84L	.12A	.11	.05	.10	.21	.32	.32
3	.085	1240 to 1250	.60L	.84A	.20	.06	.18	.25	.57	.57
4	.095	1347 to 1402	.76L	.49A	.12	.10	.04	.42	.22	.42
5	.110	1455 to 1506	1.22L	.43A	.13	.07	.10	.32	.30	.36
6	.125	1552 to 1604	0.90L	.38A	.10	.06	.07	.29	.26	.34
Avg		14 minutes	.83L	.35A	.13	.07	.09	.29	.32	.39


EFFECT ON DISPERSION OF FRONT SIGHT APERTURE
(0.046-INCH DIAMETER REAR APERTURE)
EACH TEN-TRIAL EXERCISE IS INDICATED AS FOLLOWS:
• D.R. DAVIS
+ R.O. LINDLEY
o P.E. VALENTINI
AVERAGE
DISPERSION (MR-INCH)
0.3
0.2
0.1
.060
.080
.100
.120
.140
DIAMETER OF FRONT SIGHT APERTURE (INCH)

SIGHTING ERROR TEST NO. 3

Date: 23 December 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	1.7	5.5	Scattered	33	N, 5	1.091
0900	2.9	6.5	Scattered	40	SW, 4	1.076
1000	3.4	7.0	Broken	46	SW, 12	1.062
1100	3.4	7.1	Broken	48	SW, 15	1.057
1200	3.4	7.1	Broken	50	S, 5	1.053
1300	3.5	7.0	Broken	53	SSW, 9	1.046
1400	3.2	6.9	Broken	54	SSW, 8	1.043
1500	3.0	6.6	Broken	53	SSW, 5	1.044
1600	1.9	5.7	Broken	50	SSW, 4	1.051

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (aperture - see each individual).
Front Sight: Redfield International Match (aperture - 0.110 inches).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Trial No.	Aperture Diameter, inch	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis										
1	0.038	0810 to 0825	0.68L	0.63B	0.09	0.07	0.04	0.38	0.17	0.39
2	.042	0944 to 0958	.84L	.06A	.18	.16	.04	.67	.18	.68
3	.046	1048 to 1104	1.01L	.04A	.04	.03	.03	.15	.12	.18
4	.050	1231 to 1247	1.08L	.54A	.06	.05	.02	.22	.08	.22
5	.058	1343 to 1401	1.11L	.50A	.10	.08	.05	.24	.20	.24
6	.030	1456 to 1515	0.82L	.44A	.09	.06	.06	.24	.25	.33
Avg			.92L	.16A	.09	.08	.04	.32	.17	.34
Lindley										
1	.046	0857 to 0911	1.20L	.28B	.09	.08	.03	.30	.16	.32
2	.050	1003 to 1018	0.92L	.13A	.07	.06	.03	.24	.14	.28
3	.058	1111 to 1130	.86L	.12B	.08	.04	.07	.16	.26	.28
4	.030	1254 to 1312	.82L	.38A	.11	.10	.04	.42	.27	.44
5	.038	1407 to 1424	1.02L	.24A	.08	.06	.05	.26	.22	.28
6	.042	1519 to 1535	0.93L	.05A	.09	.07	.04	.27	.15	.28
Avg			.96L	.07A	.09	.07	.04	.28	.20	.31
Valentini										
1	.058	0919 to 0940	1.06L	.16B	.06	.05	.03	.22	.12	.22
2	.030	1025 to 1044	0.44L	.13B	.14	.10	.08	.47	.28	.47
3	.038	1139 to 1158	1.00L	.12A	.06	.04	.04	.10	.12	.13
4	.042	1319 to 1337	0.85L	.49A	.10	.07	.05	.28	.21	.30
5	.046	1430 to 1452	1.21L	.47A	.09	.08	.04	.30	.25	.39
6	.050	1540 to 1558	1.21L	.31A	.13	.08	.10	.43	.58	.72
Avg			0.96L	.18A	.10	.07	.06	.30	.26	.37

Date: 27 December 1957

Time	Light[a] High	Light[a] Low	Sky Condition	Temperature, °F	Wind, mph	Density
0800	0.4	3.5	Overcast	41	W, 12	1.059
0900	1.3	5.3	Overcast	41	WNW, 11	1.060
1000	2.8	6.4	Broken	44	N, 7	1.057
1100	3.4	6.9	Scattered	45	NW 10	1.052
1200	3.5	7.0	Scattered	46	N, 11	1.051
1300	3.5	6.9	Scattered	47	NW, 10	1.049
1400	3.5	6.9	Clear	46	NW, 5	1.050
1500	3.2	6.6	Clear	47	NW, 7	1.048
1600	2.0	5.7	Clear	46	NW, 5	1.051

[a]Reading on G. E. type PR-1 exposure meter.

Rear Sight: Redfield International Match (aperture - see each individual).
Front Sight: Redfield International Match (aperture -.0.110 inch).
Sight Radius: 34 inches.
Distance-Rear Sight to Eye: 2 inches.
Target: NRA 100-yard smallbore rifle.
Range: 100 yards.

Trial No.	Aperture Diameter, inch	Time	CI from Index Point		MR	MVD	MHD	EVD	EHD	ES
Davis										
1	0.046	0809 to 0830	0.65L	0.40B	0.06	0.05	0.03	0.18	0.14	0.22
2	.050	0929 to 0951	1.04L	.36B	.06	.05	.03	.20	.13	.22
3	.058	1043 to 1102	1.14L	.04A	.06	.04	.04	.26	.13	.26
4	.030	1237 to 1255	0.55L	.53A	.13	.11	.06	.41	.20	.41
5	.038	1348 to 1404	1.06L	.51A	.08	.08	.04	.26	.25	.30
6	.042	1447 to 1510	0.78L	.73A	.09	.08	.04	.34	.16	.37
Avg			.87L	.18A	.08	.07	.04	.28	.17	.30
Lindley										
1	.058	0833 to 0849	.77L	.60B	.10	.08	.05	.34	.20	.35
2	.030	0953 to 1010	.82L	.35B	.09	.08	.03	.36	.15	.37
3	.038	1104 to 1121	.94L	.06A	.09	.09	.02	.34	.08	.35
4	.042	1257 to 1313	.90L	.36A	.08	.07	.04	.31	.14	.31
5	.046	1407 to 1417	1.12L	.52A	.15	.11	.08	.45	.41	.47
6	.050	1515 to 1525	0.79L	.58A	.21	.19	.05	.76	.18	.78
Avg			.89L	.10A	.12	.10	.04	.43	.19	.44
Valentini										
1	.038	0852 to 0915	1.08L	.37B	.07	.06	.04	.32	.14	.35
2	.042	1014 to 1033	1.03L	.08B	.07	.04	.04	.16	.21	.23
3	.046	1127 to 1149	1.20L	.37A	.08	.05	.05	.12	.24	.24
4	.050	1316 to 1337	1.29L	.44A	.08	.06	.05	.21	.28	.32
5	.058	1422 to 1442	1.06L	.44A	.05	.03	.04	.20	.16	.20
6	.030	1529 to 1552	0.59L	.47A	.07	.05	.05	.26	.18	.30
Avg			1.04L	.21A	.07	.05	.04	.21	.20	.27

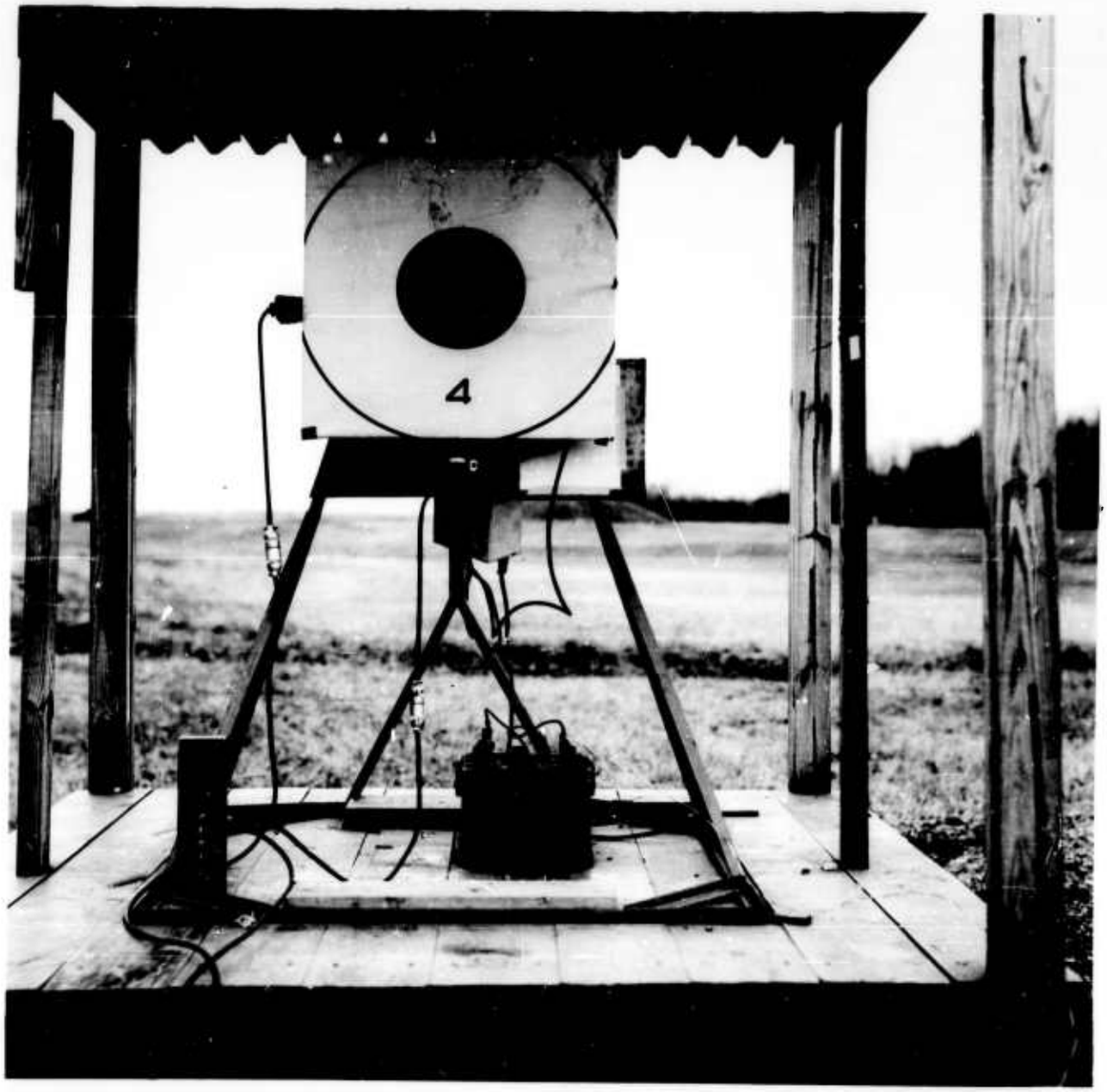
APPENDIX D

Photographs Illustrating Sighting-Error Recorder

ABERDEEN PROVING GROUND

B12955 7 December 1955

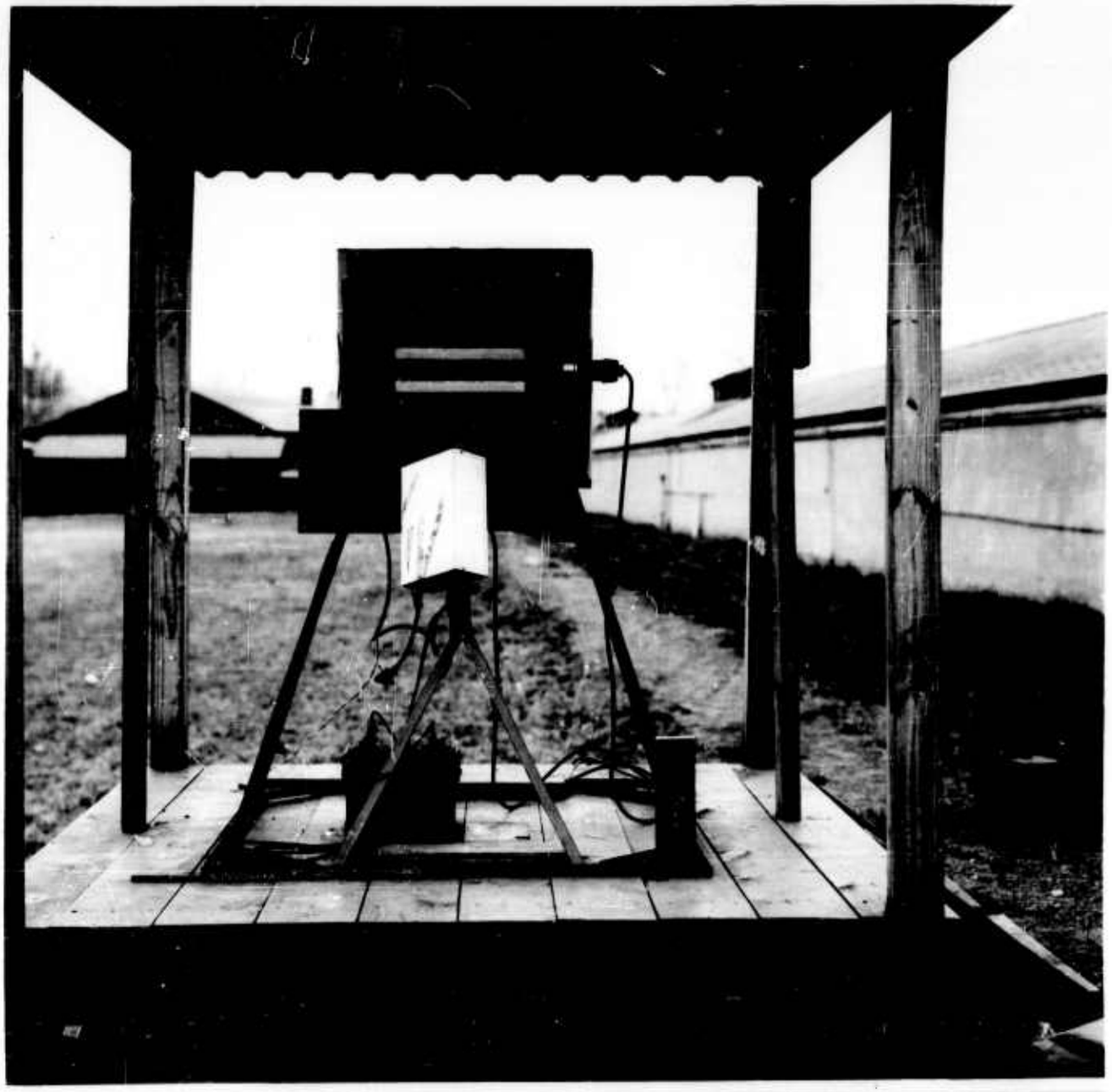
Project No. TS2-2015. Sighting Error Recorder.
An individual conducting an exercise using the M1 Rifle Sights in conjunction with the Sighting Error Recorder.



ABERDEEN PROVING GROUND

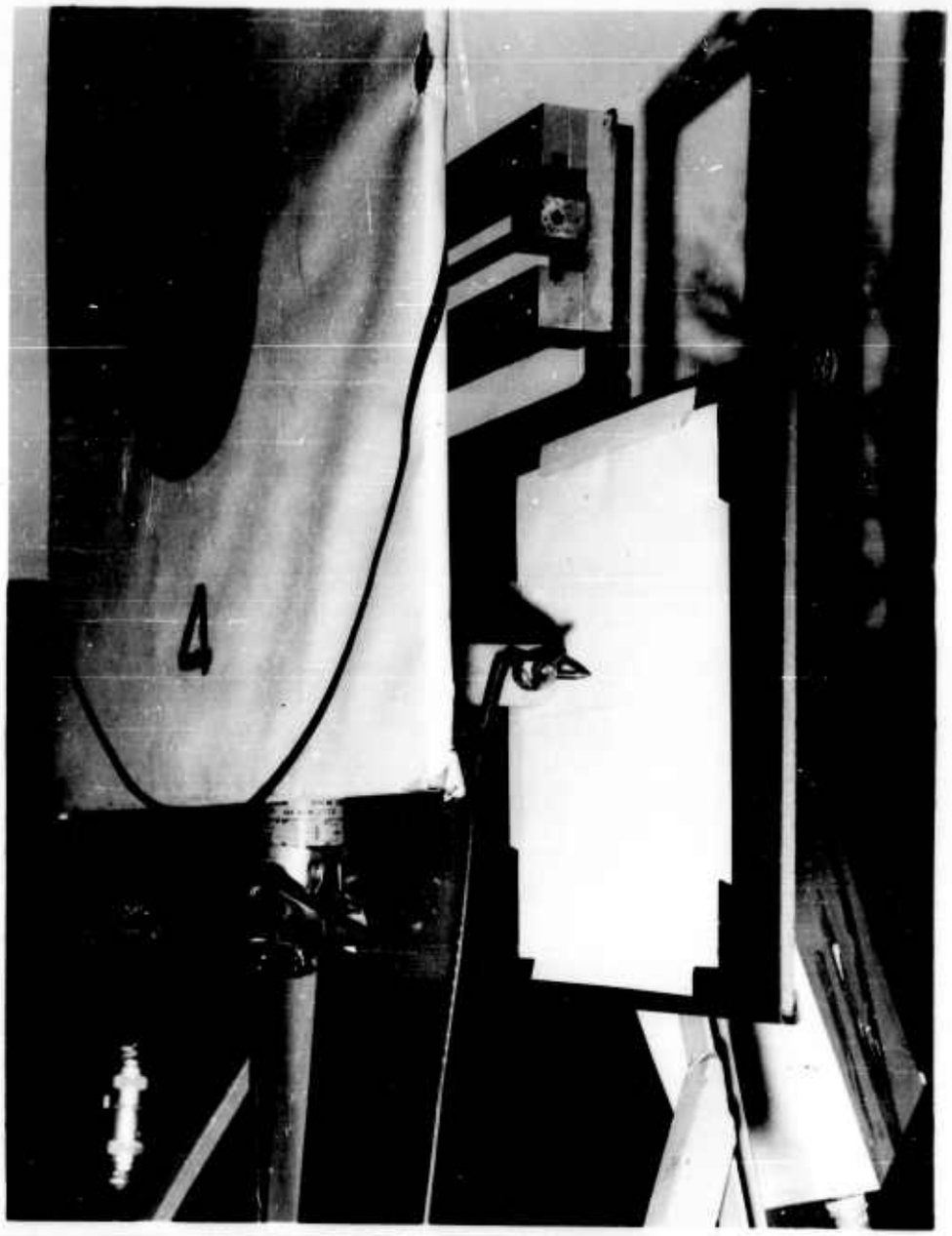
B12956 7 December 1955

Project No. TS2-2015. Sighting Error Recorder.
Front view of the Sighting Error Recorder with a 10-inch A target center mounted on the target board.



ABERDEEN PROVING GROUND

B12957 7 December 1955
Project No. TS2-2015. Sighting Error Recorder.
Rear view of the Sighting Error Recorder.



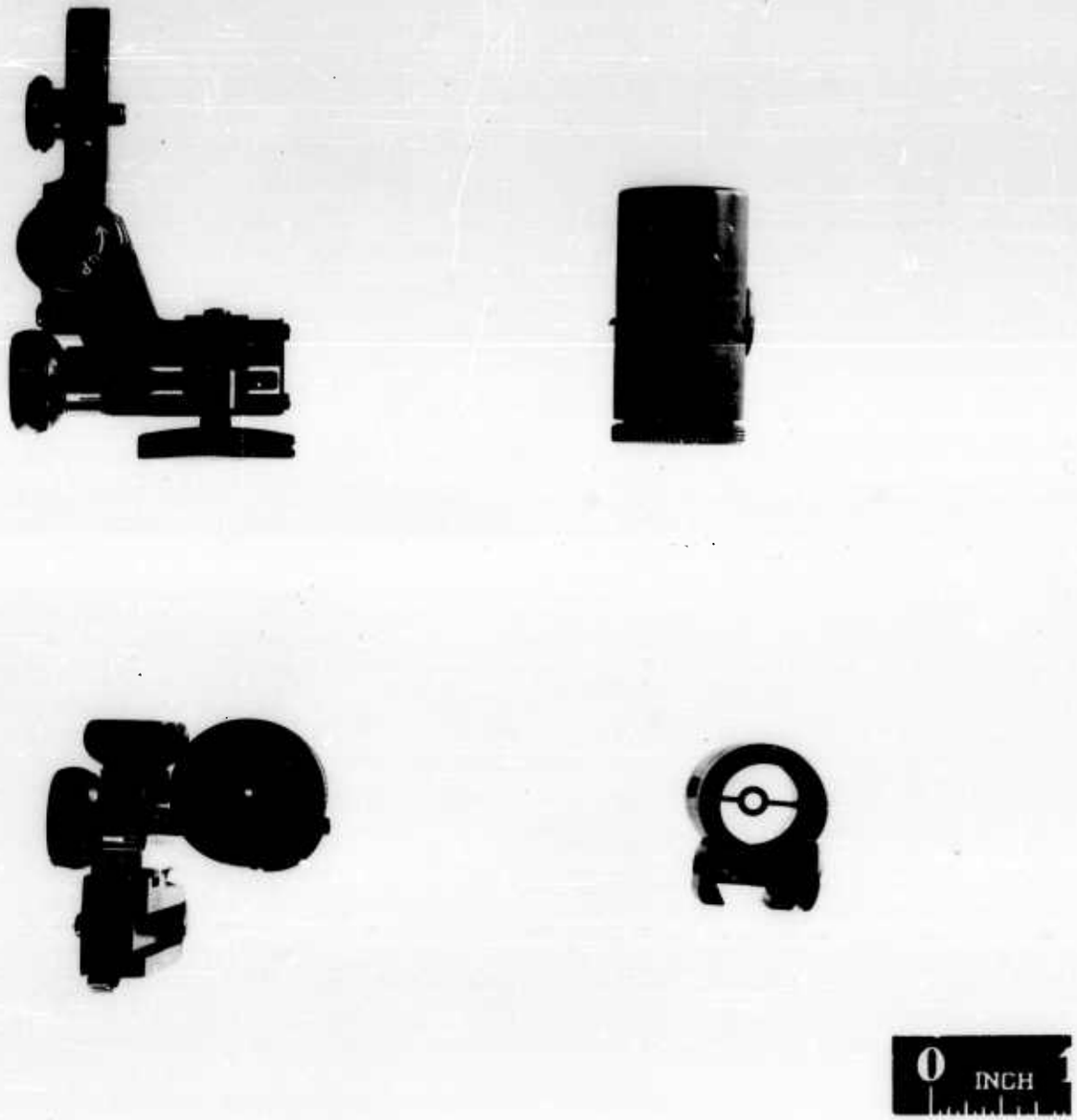
ABERDEEN PROVING GROUND

B12958 7 December 1955

Project No. TS2-2015. Sighting Error Recorder.
A spark passes through a sheet of paper indexed on the record plate to show sight alignment.

APPENDIX E

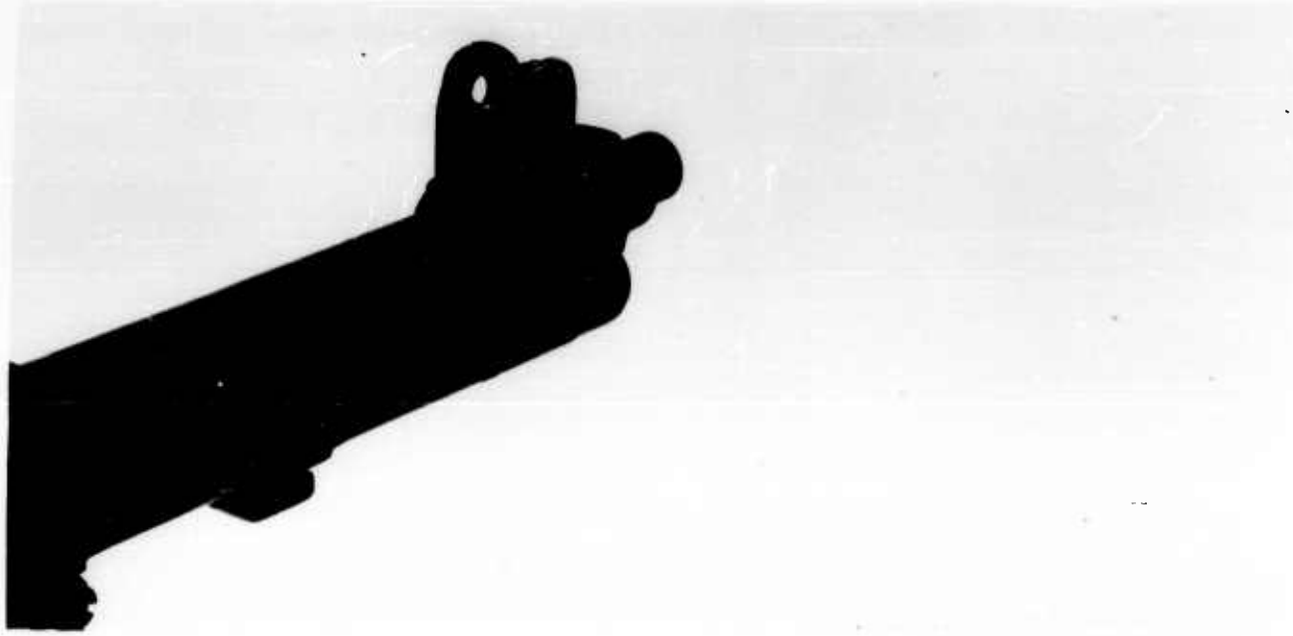
Sights Used In Test

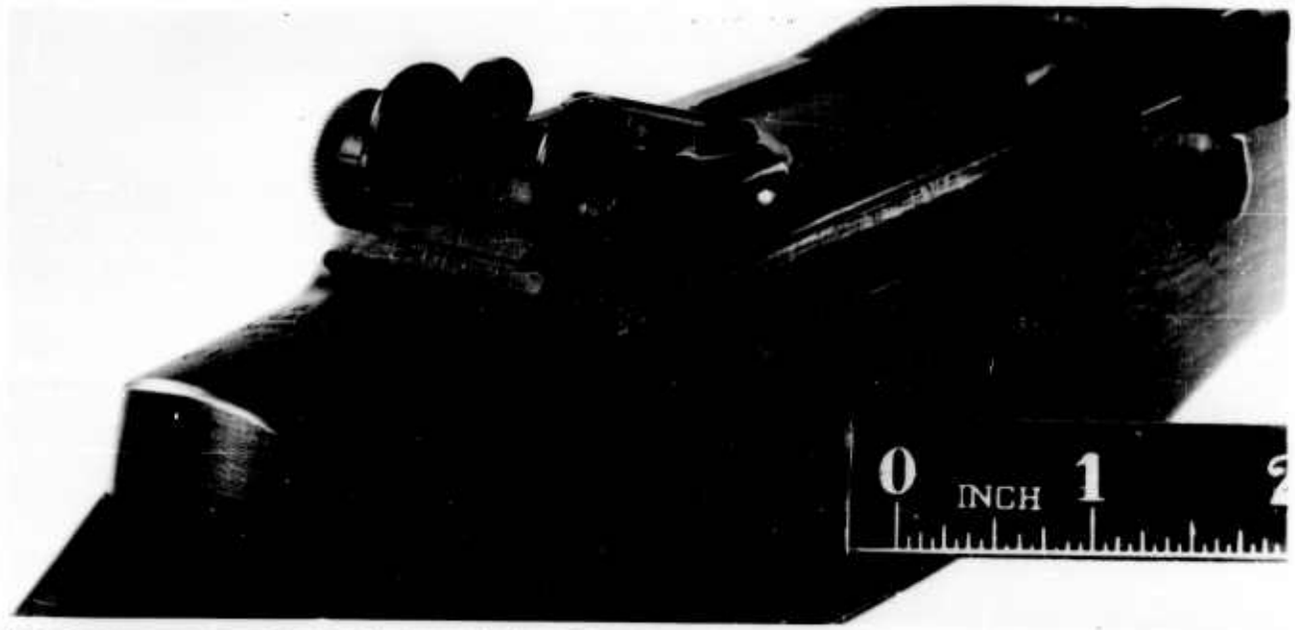


ABERDEEN PROVING GROUND

S18-001-2410-1005-59-17T/ORD-61 13 September 1961
Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Top and rear views of Redfield International match rear (left) and front sights.



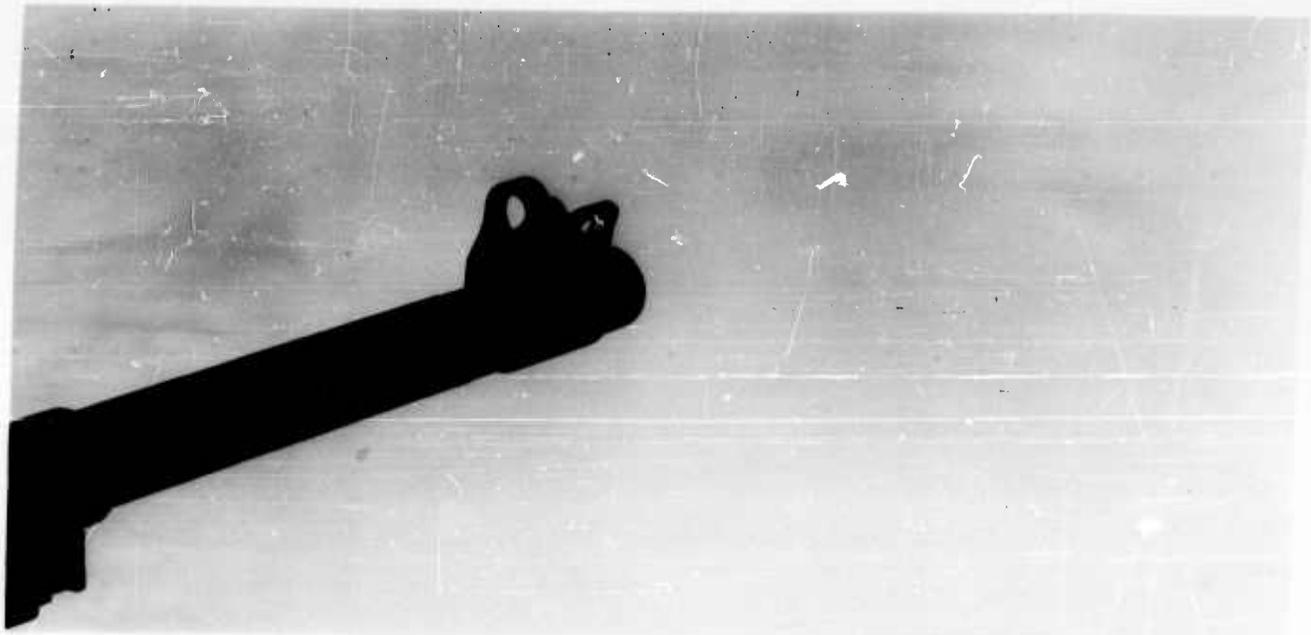


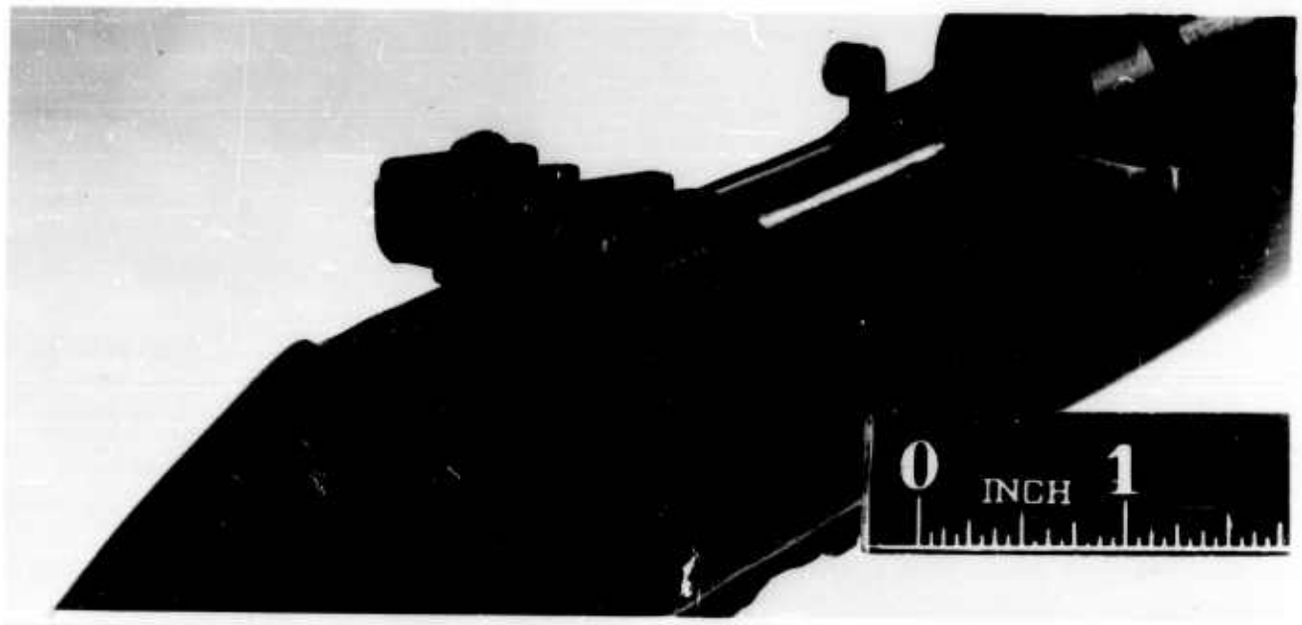
ABERDEEN PROVING GROUND

S18-001-1005-55-1P/ORD-60 4 February 1960

Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Standard sights on Rifle, U. S., Cal. .30, M1.



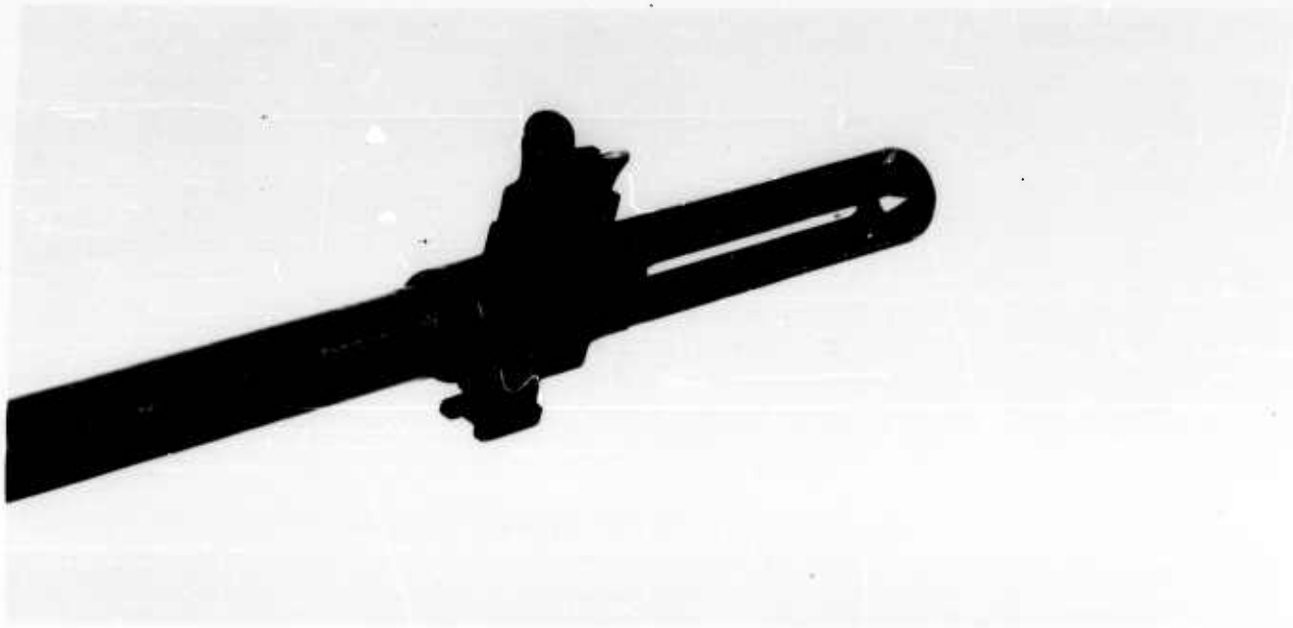


ABERDEEN PROVING GROUND

S18-001-1005-55-2P/ORD-60 4 February 1960

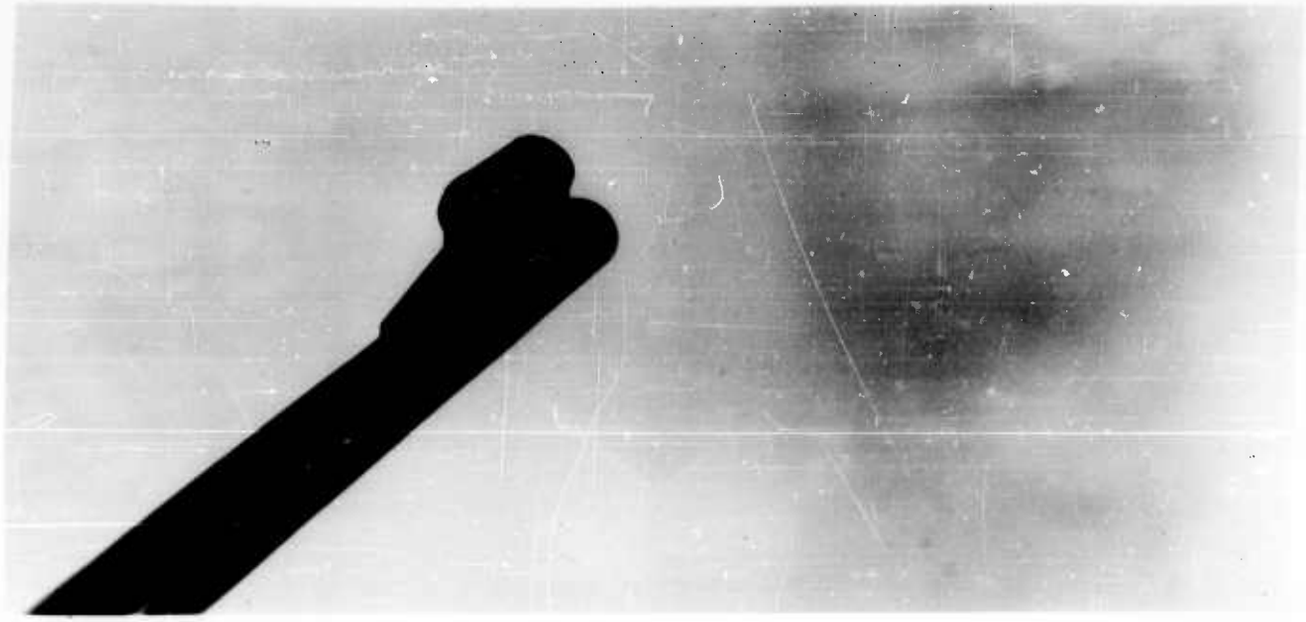
Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

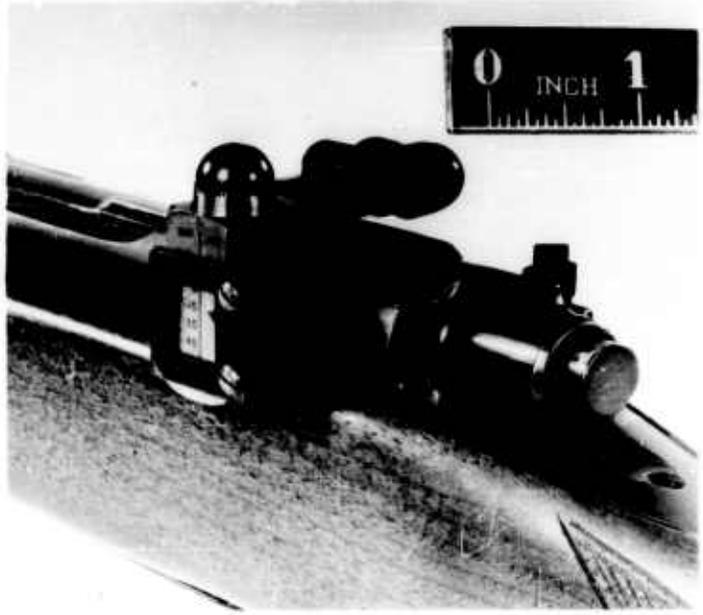
Standard sights on Carbine, U. S., Cal. .30, M2.



ABERDEEN PROVING GROUND

S18-001-1005-55-3P/ORD-60 4 February 1960
Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.
Standard sights on Rifle, U. S., 7.62-MM, M14.





ABERDEEN PROVING GROUND

S18-001-1005-55-4P/ORD-60 4 February 1960

Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

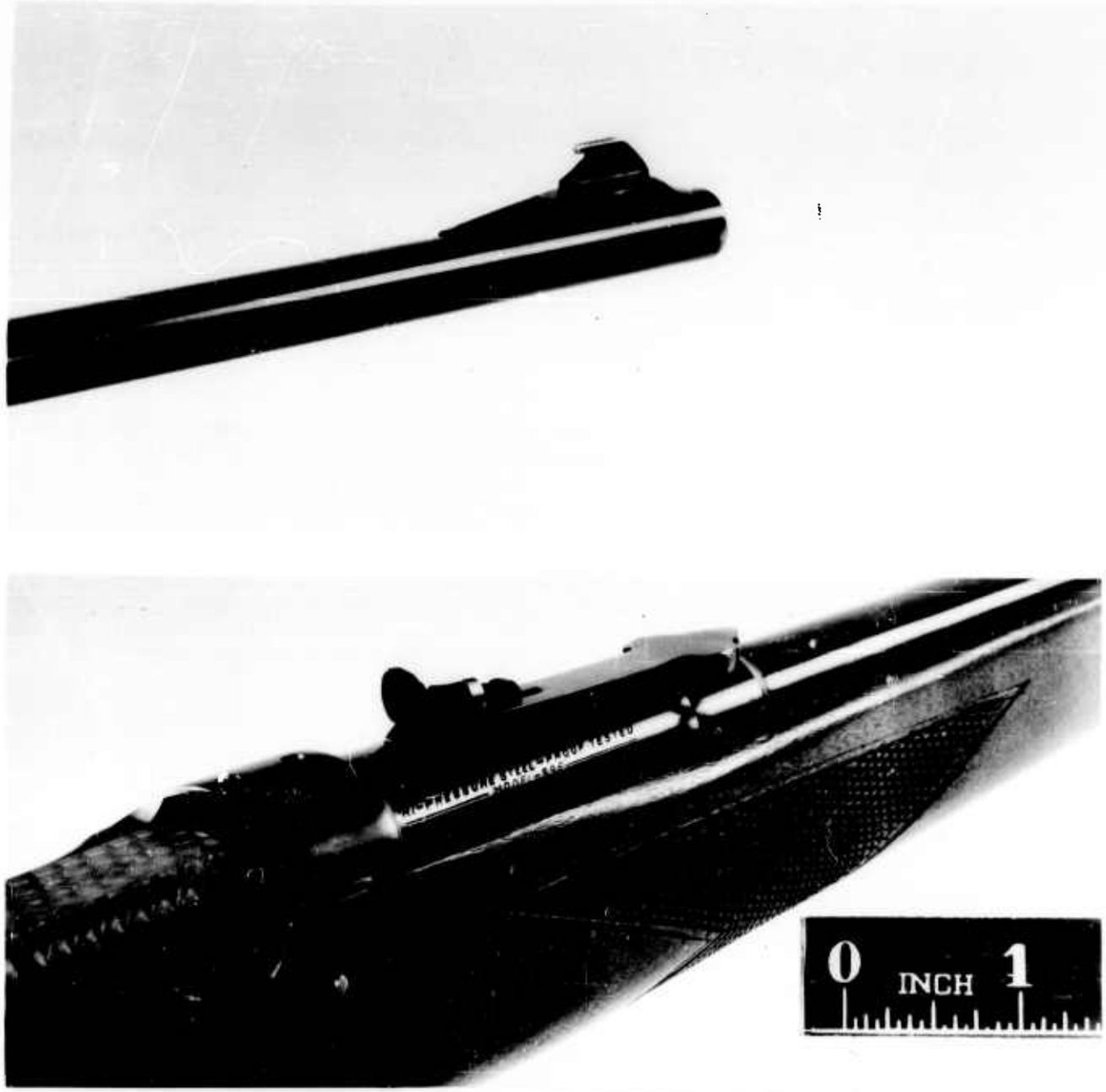
Metallic sights used on Rifle, Cal. .30, M70.

ABERDEEN PROVING GROUND

S18-001-1005-55-6P/ORD-60 4 February 1960

Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Factory sights on Rifle, Cal. .30, M760.

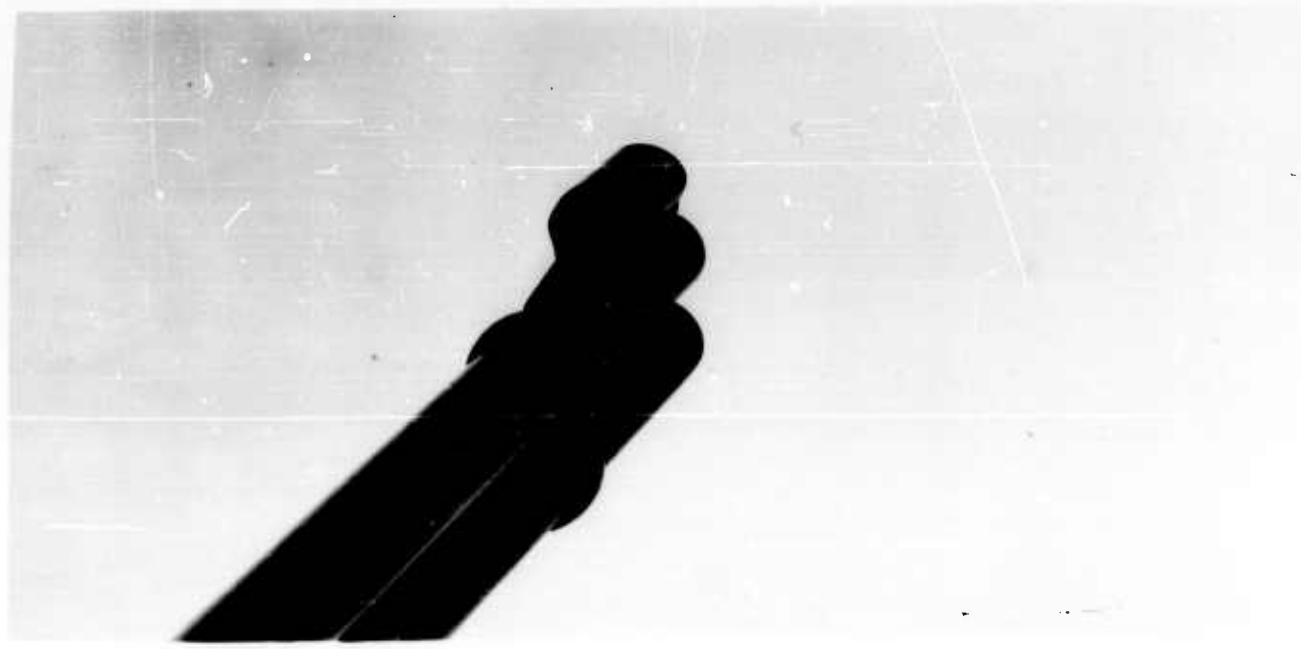


ABERDEEN PROVING GROUND

S18-001-1005-55-7P/ORD-60 4 February 1960

Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Factory sights on Rifle, Cal. .308, M99.

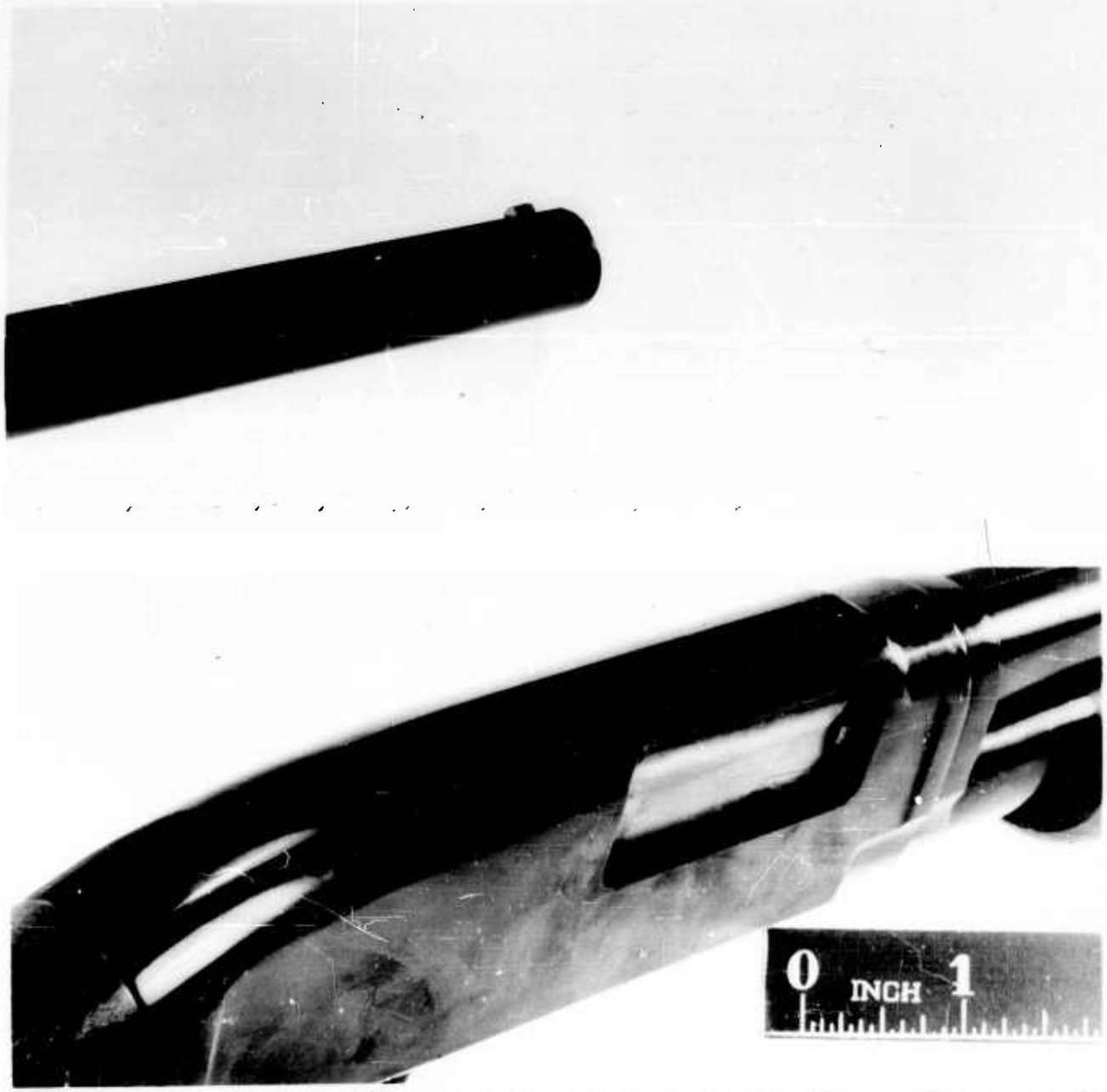


ABERDEEN PROVING GROUND

S18-001-1005-55-8P/ORD-60 4 February 1960

Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Factory sights on Carbine, Cal. .30-30, M94.



ABERDEEN PROVING GROUND

S18-001-1005-55-5P/ORD-60 4 February 1960

Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

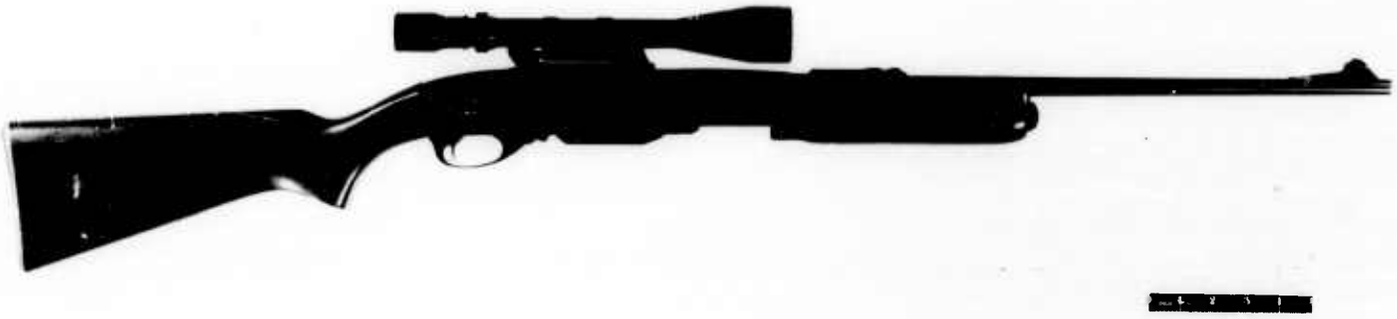
Sights on Shotgun, 12-Gage, M12.

ABERDEEN PROVING GROUND

59P680 14 October 1959

Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Rifle, Cal. .30, M760 with 1X Telescope Sight.

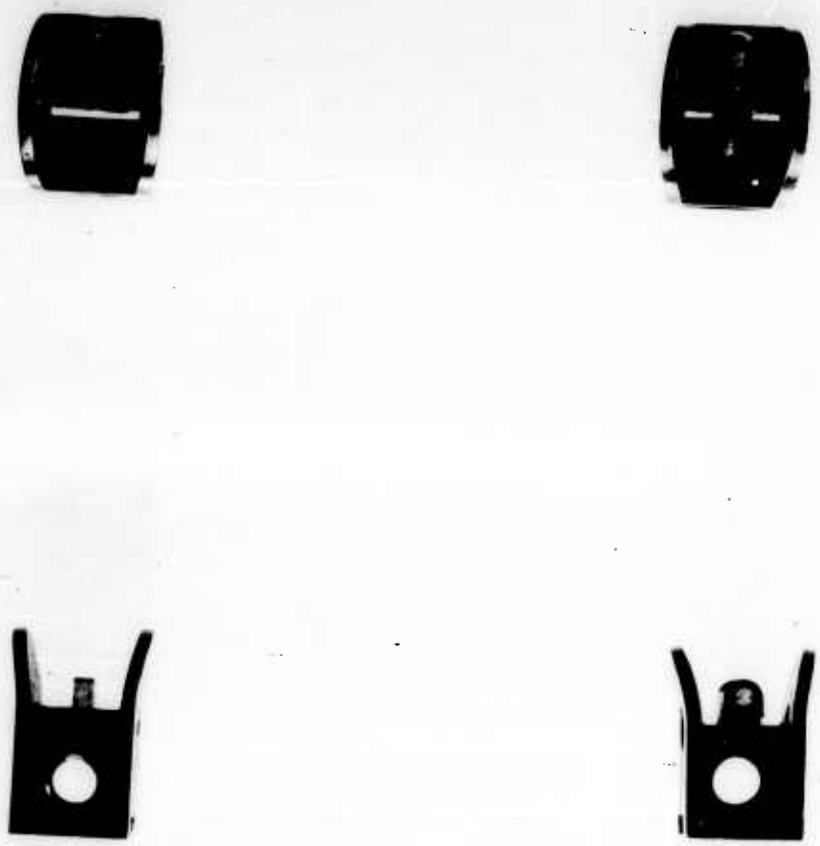


ABERDEEN PROVING GROUND

59P681 14 October 1959

Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Rifle, Cal. .30, M760 with variable power telescope sight.

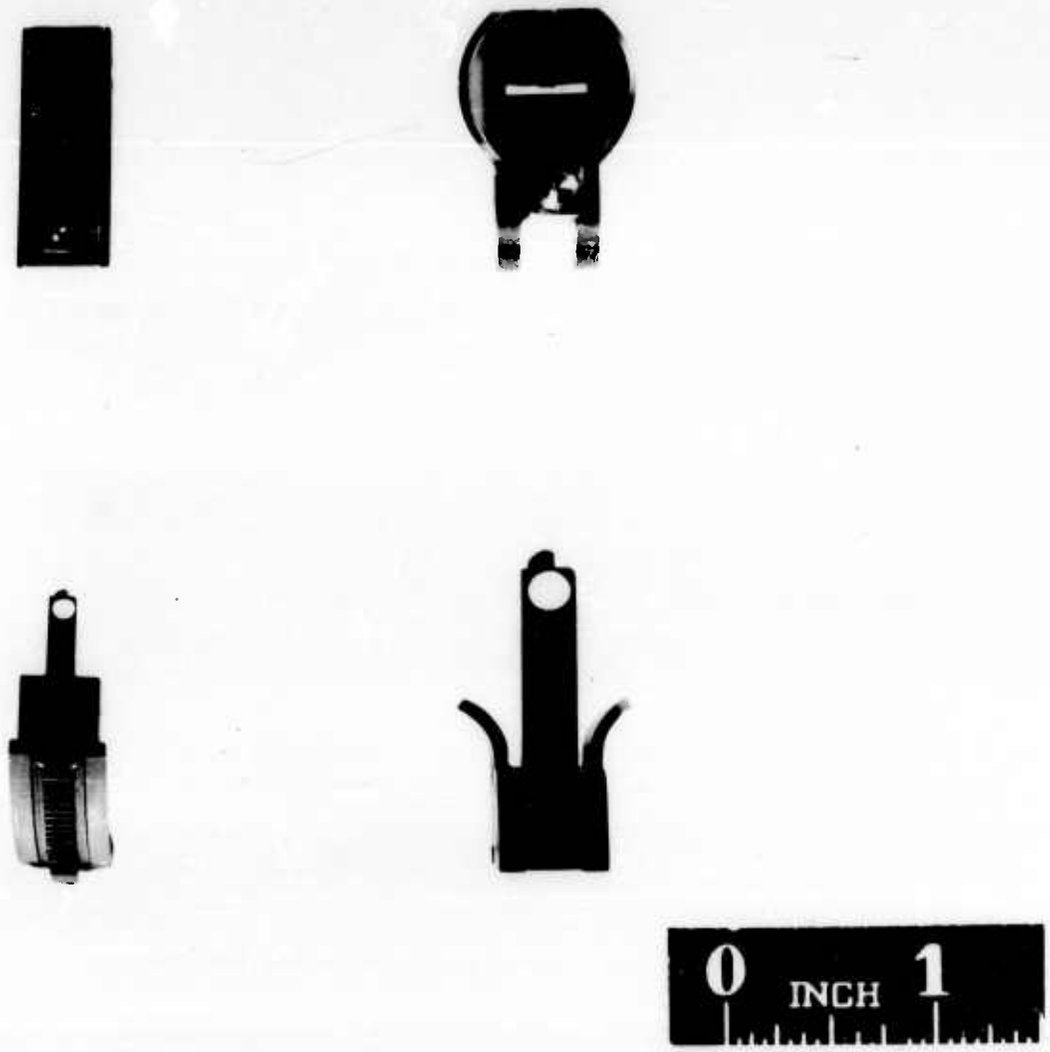


ABERDEEN PROVING GROUND

S18-001-2408-1005-59-15T/ORD-61 13 September 1961
Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Top and rear views of Ithaca post (left) and bead front sights for M1 rifle.

E-12



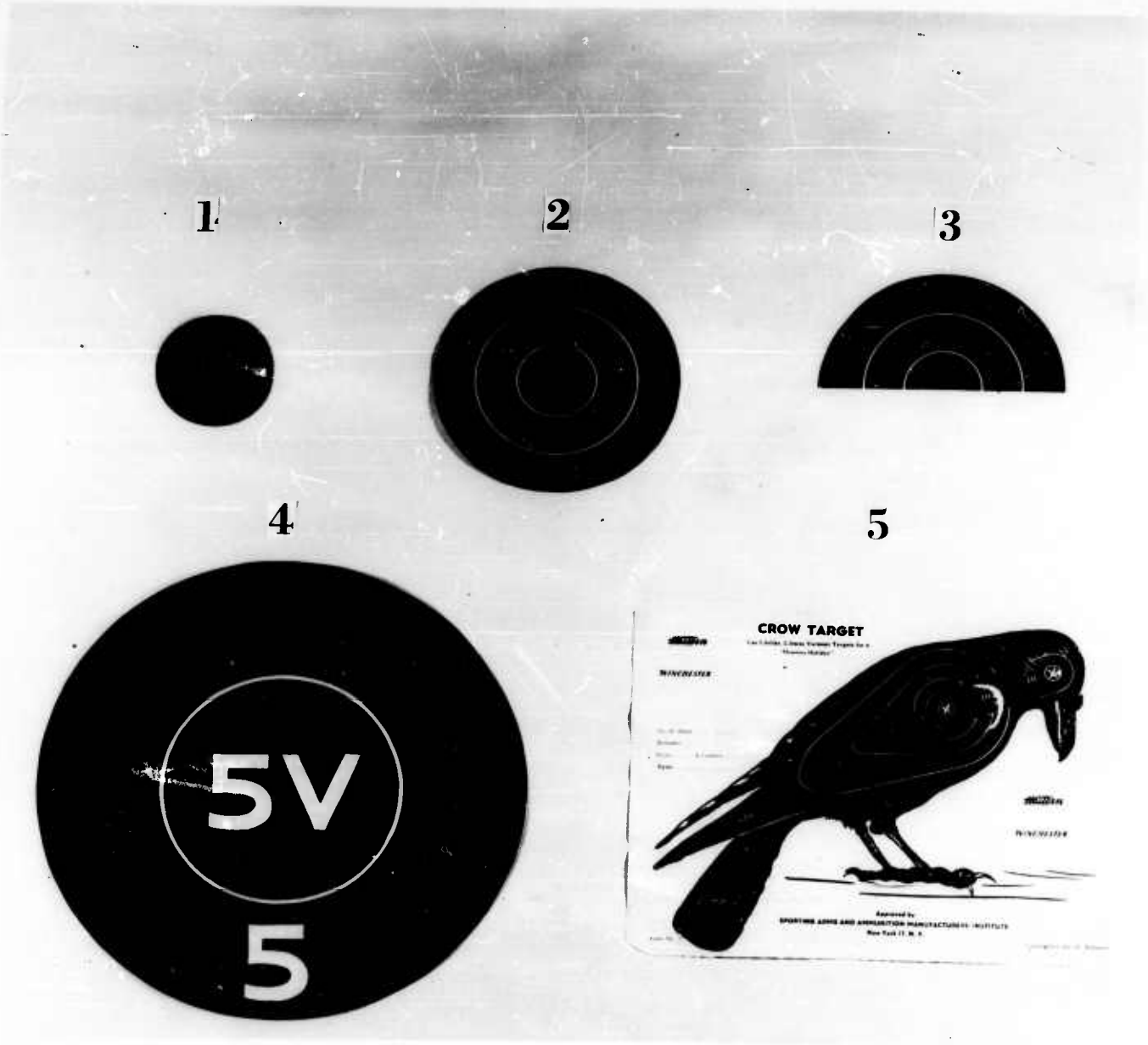
ABERDEEN PROVING GROUND

S18-001-2409-1005-59-16T/ORD-61 13 September 1961
Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Top and rear views of Multilite rear (left) and front sights for M1 rifle. E-13

ABERDEEN PROVING GROUND

S18-001-2494-1005-59-19T/ORD-61 28 September 1961
Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.
Twenty-power Lyman Super Targetspot Telescope Sight.



ABERDEEN PROVING GROUND

S18-001-2411-1005-59-18T/ORD-61 13 September 1961
Project TS2-2015/11. A Test to Investigate Various Factors of Sighting Error.

Aiming points used in various sighting-error tests are NRA 50-yard smallbore rifle (1), NRA 100-yard smallbore rifle (2), reduced Canadian military (3), U. S. military A (4), and game (5).

APPENDIX F

Distribution

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OMS Code No. 5520.12.433C
D. A. Project No. 502-08-006
Unclassified Report

A test was conducted to investigate various factors of sighting-error. It was recommended that these data be considered in markmanship training and in weapon design, and that further tests be conducted in areas where quantitative data are desired.

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