Ordnance Pamphlet No. 253
(Revised)

8-INCH RANGE TABLE

2,100 F. S. INITIAL VELOCITY
TO 16,000 YARDS

LONG-POINTED PROJECTILE, COEFFICIENT OF FORM = .61

WEIGHT OF PROJECTILE = 260 POUNDS

SIACCI'S METHOD

CORRECTED FOR ALTITUDE

INGALLS'S BALLISTIC TABLES

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NAVY DEPARTMENT

BUREAU OF ORDNANCE

WASHINGTON, D. C.

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(Re/a)
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BUREAU OF ORDNANCE CIRCULAR LETTER NO. 78-43

Subject: Range Ballistic Corrections due to curvature and rotation of the earth---method of handling

Reference:
(a) O.P. No. 757 - 16" Range Table
(b) Exterior Ballistics, 1935 Edition by E. E. Herrmann
(c) Buord Circular ltr A-175, Ballistics - Effect of rotation of the earth on flight of projectiles

Enclosure: (A) Curvature of Earth Table
(Herewith)

1. It has come to the attention of the Bureau that there is some question as to the proper method of handling certain small corrections in the range ballistic. Although in most cases these corrections are undoubtedly being properly applied by the forces afloat, it is considered advisable to outline them briefly.

2. CURVATURE OF THE EARTH - U. S. Navy range tables are based on the assumption that the gun trunnions and target are in the horizontal plane tangent to the earth's surface at the gun. Thus, when using pointer fire or direct fire in elevation, the range table range should be used without any correction for curvature of the earth. However, when using the stable vertical type of director for indirect fire in elevation, a correction for curvature must be applied to the range table range since the guns are laid with respect to the horizontal, rather than with respect to the line of sight.

3. To determine range correction for curvature of the earth, enclosure (A) should be used in conjunction with column 19 of the range tables, as follows:

$$\text{Correction (Yds.)} = \frac{\text{curvature (ft. from enc.(A))} \times 100}{\text{Column 19}}$$

This correction represents the amount which the range of the projectile exceeds the range as shown in the range table. The correction is thus applicable as a "down" correction.

4. To illustrate a specific example assume a range of 19,800 yds. From enclosure (A) the curvature of the earth at this range is 85 ft.

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Using the table on pages 24 and 25 of reference (a), column 19, a correction of range can be computed to compensate for this 85 ft. correction in elevation. Thus $\frac{85}{95} \times 100$ = approximately 89 yds. in range represent the amount which the actual range of the projectile exceeds the range as shown in the range table.

5. Actually the curvature of the earth varies as R^2 (where R= range in yards) so that the correction in minutes varies as R; and the elevation correction for earth's curvature (in minutes of arc) can be sufficiently well approximated as the range in yards divided by 4000. For example, at 19,800 yards, the curvature would be 4.95 minutes which by Column 2b of reference (a) gives a correction of 86 yards as compared with 89 yards for the more accurate calculation above.

6. PARALLAX CORRECTION FOR THE MEAN TRUNNION HEIGHT OF GUNS ABOVE THE WATERLINE - Neither the range table nor the fire control equipment include the correction for the mean trunnion height of the guns above the waterline, and since this height in some battleships is 32 ft., this height should be compensated for and added to the correction as calculated in paragraph 2.

7. To illustrate a specific example assume the same range of 19,800 yds. From pages 24 and 25 of reference (a), Column 19, any change in impact must be made from a horizontal reference plane which has the same height as the mean trunnion height of the guns above the waterline. Assume this height to be 32 ft. Thus if it is desired to have the point of impact at the waterline the following correction should be made

$\frac{32}{95} \times 100$ = Approximately 34 yards in range must be applied as a down correction.

8. Typical Values - In the following table (for a mean trunnion height of 32 ft.) the combined corrections for "earth curvature" and for "trunnion height" in automatic fire are shown for several guns at various ranges. And from this it is interesting to note, for range of 15,000 yds. and over, how the subject correction tends to remain approximately constant.

TABLE I

Range in yds.	16"/50 2700 lb. proj. I.V. = 2500 f.s.	16"/45 2700 lb. proj. I.V. = 2300 f.s.	8"/55 335 lb. proj. I.V. = 2500 f.s.	8"/55 260 lb. proj. I.V. = 2700 f.s.
5000	288 yds.	250 yds.	250 yds.	288 yds.
10000	178	149	134	145
15000	154	129	100	100
20000	147	122	81	79
25000	144	118	69	66
30000	140	111	54	53
35000	134	99		
40000	124			

9. In practice it would possibly be simpler to add trunnion height to earth curvature so as to permit the calculation of the combined corrections in a single operation.

10. EFFECT OF ROTATION OF THE EARTH - This subject has been previously covered by reference (c) and section included in late range tables gives the value of this correction.

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Chief of Bureau

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ENCLOSURE (A)

CURVATURE OF EARTH, FEET

R.yds.	0	100	200	300	400	500	600	700	800	900
1000	.2	.3	.3	.4	.4	.5	.6	.6	.7	.8
2000	.9	.9	1.0	1.1	1.2	1.3	1.5	1.6	1.7	1.8
3000	1.9	2.1	2.2	2.3	2.5	2.6	1.8	2.9	3.1	3.3
4000	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2
5000	5.4	5.6	5.8	6.1	6.3	6.5	6.8	7.0	7.2	7.5
6000	7.8	8.0	8.3	8.5	8.8	9.1	9.4	9.7	10.0	10.3
7000	10.6	10.9	11.2	11.5	11.8	12.1	12.4	12.8	13.1	13.4
8000	13.8	14.1	14.5	14.8	15.2	15.6	15.9	16.3	16.7	17.1
9000	17.4	17.8	18.2	18.6	19.0	19.4	19.9	20.3	20.7	21.1
10000	21.5	22	22	23	23	24	24	25	25	26
11000	26	27	27	28	28	29	29	30	30	31
12000	31	32	32	33	33	34	34	35	35	36
13000	36	37	38	38	39	39	40	41	41	42
14000	42	43	44	44	45	46	46	47	47	48
15000	48	49	50	51	51	52	53	53	54	55
16000	55	56	57	58	58	59	60	61	61	62
17000	62	63	64	65	66	66	67	68	69	69
18000	70	71	72	73	73	74	75	75	76	77
19000	78	79	80	81	81	82	83	84	85	85
20000	86	87	88	89	90	91	92	93	94	94
21000	95	96	97	98	99	100	101	102	103	103
22000	104	105	106	107	108	109	110	111	112	113
23000	114	115	116	117	118	119	120	121	122	123
24000	124	125	126	127	128	129	131	132	133	134
25000	135	136	137	138	139	141	142	143	144	145
26000	146	147	148	149	150	152	153	154	155	156
27000	157	159	160	161	162	163	164	165	167	168
28000	169	171	172	173	174	175	177	178	179	180
29000	181	183	184	185	186	188	189	190	192	193
30000	194	195	197	198	200	201	202	203	205	206
31000	207	209	210	211	213	214	215	217	218	219
32000	221	222	224	225	226	228	229	231	232	233
33000	235	236	238	239	240	242	243	245	246	247
34000	249	251	252	253	255	257	258	259	261	263
35000	264	265	267	269	270	272	273	275	276	277
36000	279	281	282	284	286	287	289	290	292	293
37000	295	297	298	300	302	303	305	307	308	309
38000	311	313	315	317	318	319	321	323	325	326
39000	328	329	331	333	335	336	338	340	342	343
40000	345									
R,yds	0	100	200	300	400	500	600	700	800	900

EXPLANATORY NOTES.

This table is calculated for a temperature of the atmosphere of 59° F. and a barometric pressure of 29.53 inches, the air being assumed to be half saturated. The powder is assumed to give normal velocity when at 90° F.

Ingalls's ballistic tables have been used for computing columns 2, 3, 4, 5, 6, 8, 10, 11, and 12, as well as for computing the altitude factor in the ballistic coefficient.

Alger's formulas were used for computing columns 7, 13, 14, 15, 16, 17, 18, 19.

De Marre's formula modified, as per reference Naval Gun Factory letter No. 13354–39, Bureau of Ordnance letter No. 31103 (D2), of December 3, 1916, has been used for the computation of column 9.

Computations were made for every 500 yards and the columns completed by interpolation.

Columns 1–5, 7, and 8 need no explanation.

Column 6 gives the total drift in yards, computed by Mayevski's formula, multiplied by 1.5.

To get change of range for variation of ±10 F. S. I. V., multiply figures given by $\frac{1}{4}$. To get change of range for variation of 1 per cent in density of air, multiply figures given by $\frac{1}{10}$. The density of the air is assumed to be unity at 59° F. and 29.53 inches barometric height. The density of the air for any temperature and barometric height is given in Table II, Alger's Exterior Ballistics. To dispense with Alger's book, following the explanatory notes, there is given a Table II modified.

In the table the same arguments—temperature in degrees Fahrenheit and barometric pressure in inches of mercury—are preserved, but the densities of air are replaced by factors to be used in connection with column 12. Multipliers are given for each degree of temperature and for each barometric height of 28, 29, 30, and 31 inches. For fractions of inch, interpolations can be made easily at sight.

To obtain the variation in range, take from the table (multipliers for column 12) the multiplier corresponding to atmospheric conditions and from the range table the number of yards in column 12 corresponding to the range, multiply both together, and the product with the sign of the multiplier will be the variation in yards due to atmospheric conditions.

Column 12 also represents the effect on the range of a variation of ±10 per cent in the ballistic coefficient, I. V. remaining the same.

Column 11 gives the change of range for a variation of ±5 pounds in weight of projectile, the charge remaining the same. For a variation of 1 pound, multiply figures in column 11 by $\frac{1}{5}$.

In columns 13–18 a wind of 24 knots makes twice the effect tabulated.

Column 19 shows how much the point of impact is raised or lowered on a vertical screen by raising or lowering the sight bar 100 yards, the actual range remaining fixed.

The change in range due to a variation of ±1′ in the angle of departure may be deduced directly from the table.

For a variation of ±10° F. in temperature of powder, there is caused corresponding change in the initial velocity of ±20 feet per second approximately.

MULTIPLIERS FOR COLUMN 12.

Alger's "Exterior ballistics," Table II, modified. Arguments: temperature and barometric pressure.

t_F.	28-inch.	29-inch.	30-inch.	31-inch.	t_F.	28-inch.	29-inch.	30-inch.	31-inch.
0	−0.73	−1.12	−1.50	−1.88	25	−0.17	−0.53	−0.88	−1.25
1	− .71	−1.10	−1.48	−1.86	26	− .15	− .51	− .86	−1.23
2	− .69	−1.08	−1.46	−1.84	27	− .13	− .49	− .84	−1.21
3	− .66	−1.05	−1.43	−1.81	28	− .11	− .47	− .82	−1.19
4	− .64	−1.03	−1.40	−1.78	29	− .09	− .45	− .80	−1.17
5	− .62	−1.00	−1.37	−1.75	30	− .07	− .43	− .78	−1.15
6	− .60	− .98	−1.35	−1.73	31	− .05	− .41	− .76	−1.13
7	− .57	− .95	−1.32	−1.70	32	− .03	− .39	− .74	−1.11
8	− .55	− .93	−1.30	−1.68	33	.00	− .36	− .71	−1.08
9	− .52	− .90	−1.27	−1.65	34	.02	− .34	− .69	−1.05
10	− .50	− .88	−1.25	−1.63	35	.04	− .31	− .66	−1.02
11	− .48	− .86	−1.23	−1.61	36	.06	− .29	− .64	−1.00
12	− .46	− .84	−1.21	−1.59	37	.08	− .27	− .62	− .98
13	− .43	− .81	−1.18	−1.56	38	.10	− .25	− .60	− .96
14	− .41	− .79	−1.16	−1.53	39	.12	− .23	− .58	− .94
15	− .39	− .77	−1.13	−1.50	40	.14	− .21	− .56	− .92
16	− .37	− .74	−1.10	−1.47	41	.16	− .19	− .54	− .90
17	− .35	− .72	−1.08	−1.45	42	.18	− .17	− .52	− .88
18	− .32	− .69	−1.05	−1.42	43	.20	− .15	− .50	− .85
19	− .30	− .67	−1.03	−1.40	44	.22	− .13	− .48	− .83
20	− .28	− .65	−1.01	−1.38	45	.24	− .11	− .46	− .81
21	− .26	− .63	− .99	−1.36	46	.26	− .08	− .43	− .78
22	− .24	− .61	− .97	−1.34	47	.28	− .06	− .41	− .76
23	− .21	− .58	− .94	−1.31	48	.30	− .04	− .39	− .73
24	− .19	− .56	− .91	−1.28	49	.32	− .02	− .37	− .71
25	− .17	− .53	− .88	−1.25	50	.34	− .00	− .35	− .69

MULTIPLIERS FOR COLUMN 12.

Alger's "Exterior ballistics" Table II, modified. Arguments: temperature and barometric pressure.

t_F.	28-inch.	29-inch.	30-inch.	31-inch.
50	0.34	0.00	−0.35	−0.69
51	.36	.02	− .33	− .67
52	.38	.04	− .31	− .65
53	.40	.06	− .29	− .63
54	.42	.08	− .27	− .61
55	.44	.10	− .24	− .58
56	.46	.12	− .22	− .56
57	.48	.14	− .20	− .54
58	.50	.16	− .18	− .52
59	.52	.18	− .16	− .50
60	.54	.20	− .14	− .48
61	.56	.22	− .12	− .46
62	.58	.24	− .10	− .44
63	.59	.26	− .08	− .42
64	.61	.28	− .06	− .40
65	.63	.30	− .03	− .37
66	.65	.32	− .01	− .35
67	.67	.34	.01	− .33
68	.69	.36	.03	− .31
69	.71	.38	.05	− .29
70	.73	.40	.07	− .27
71	.75	.42	.09	− .25
72	.77	.44	.11	− .23
73	.79	.46	.13	− .21
74	.81	.48	.15	− .19
75	.83	.50	.18	− .16

t_F.	28-inch.	29-inch.	30-inch.	31-inch.
75	0.83	0.50	0.18	−0.16
76	.85	.52	.20	− .14
77	.87	.54	.22	− .12
78	.88	.55	.23	− .10
79	.90	.57	.25	− .08
80	.92	.59	.27	− .06
81	.94	.61	.29	− .04
82	.96	.63	.31	− .02
83	.97	.65	.33	.00
84	.99	.67	.35	.02
85	1.01	.69	.37	.05
86	1.03	.71	.39	.07
87	1.05	.73	.41	.09
88	1.07	.75	.43	.11
89	1.09	.77	.45	.13
90	1.11	.79	.47	.15
91	1.13	.81	.49	.17
92	1.15	.83	.51	.19
93	1.16	.84	.53	.21
94	1.18	.86	.55	.23
95	1.20	.88	.57	.25
96	1.22	.90	.59	.27
97	1.24	.92	.61	.29
98	1.26	.94	.63	.31
99	1.28	.96	.65	.33
100	1.30	.98	.67	.35

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of ± 50 foot-second initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° ′	° ′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
1,000	39.0	41	1.47	1,982	.4	1,000	9	8.7	44
1,100	43.1	45	1.62	1,970	.4	1,100	11	8.6	48
1,200	47.2	49	1.78	1,959	.5	1,200	13	8.6	52
1,300	51.4	53	1.93	1,948	.6	1,300	15	8.5	56
1,400	55.6	58	2.09	1,937	.7	1,400	17	8.5	60
1,500	59.8	1 03	2.24	1,926	.8	449	20	8.4	64
1,600	1 04.1	1 08	2.40	1,915	.9	410	23	8.3	68
1,700	1 08.4	1 13	2.55	1,904	1.0	376	26	8.2	72
1,800	1 12.7	1 18	2.71	1,893	1.1	346	29	8.2	76
1,900	1 17.0	1 23	2.87	1,882	1.2	320	33	8.1	80
2,000	1 21.3	1 28	3.03	1,871	1.3	297	37	8.0	84
2,100	1 25.7	1 33	3.19	1,860	1.5	278	41	7.9	88
2,200	1 30.1	1 38	3.35	1,849	1.7	261	45	7.9	92
2,300	1 34.6	1 43	3.51	1,838	1.9	246	50	7.8	96
2,400	1 39.1	1 48	3.67	1,827	2.1	232	55	7.8	99
2,500	1 43.7	1 54	3.84	1,817	2.3	219	60	7.7	103

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*
12	3	.....	9	10	.....	10	10	4
13	3	.....	10	11	.....	10	11	4
14	4	.....	11	12	.....	11	12	5
15	5	.....	12	13	.....	12	13	5
16	6	.....	13	14	.....	13	14	6
17	7	1	14	15	.....	14	15	6
18	8	1	15	16	.....	15	16	6
18	9	1	16	17	.....	16	17	7
19	11	2	17	18	.....	17	18	7
20	13	2	18	19	.....	18	19	8
21	15	2	18	20	1	19	20	8
22	16	2	19	21	1	20	21	8
22	18	3	20	22	1	21	22	9
23	20	3	21	23	2	22	23	9
24	22	4	22	24	2	23	24	10
25	24	4	22	26	2	24	26	10

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° ′	° ′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
2,500	1 43.7	1 54	3.84	1,817	2.3	219	60	7.7	103
2,600	1 48.3	1 59	4.00	1,806	2.5	207	65	7.6	107
2,700	1 52.9	2 05	4.17	1,796	2.7	196	71	7.5	110
2,800	1 57.6	2 11	4.34	1,785	2.9	186	77	7.5	114
2,900	2 02.3	2 17	4.51	1,775	3.2	177	83	7.4	117
3,000	2 07.1	2 23	4.68	1,764	3.5	169	89	7.3	121
3,100	2 11.9	2 29	4.85	1,754	3.8	162	96	7.2	124
3,200	2 16.7	2 35	5.02	1,744	4.1	155	103	7.2	128
3,300	2 21.6	2 41	5.19	1,734	4.4	149	110	7.1	131
3,400	2 26.5	2 47	5.36	1,724	4.7	143	117	7.1	135
3,500	2 31.5	2 53	5.54	1,714	5.1	137	124	7.0	138
3,600	2 36.5	2 59	5.71	1,704	5.5	132	132	6.9	142
3,700	2 41.5	3 05	5.89	1,694	5.9	127	140	6.9	145
3,800	2 46.6	3 12	6.07	1,685	6.3	122	149	6.8	149
3,900	2 51.7	3 19	6.25	1,675	6.7	118	158	6.8	152
4,000	2 56.8	3 26	6.43	1,666	7.1	114	167	6.7	156

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*
25	24	4	22	26	2	24	26	10
26	26	4	23	27	2	25	27	10
26	28	5	24	28	2	26	28	11
27	30	5	25	29	3	27	29	11
28	32	6	26	30	3	28	30	12
29	34	6	26	32	3	29	32	12
30	36	6	27	33	3	30	33	13
30	39	7	28	34	3	31	34	13
31	41	7	29	35	4	32	35	14
31	44	8	30	36	4	33	36	14
32	46	8	30	37	4	34	37	15
32	48	8	31	38	4	35	38	16
33	51	9	32	39	4	36	39	16
33	53	9	33	40	5	37	40	17
34	56	10	34	41	5	38	41	17
34	58	10	34	43	5	39	43	18

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RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 30 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of + 50 foot-second initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° '	° '	*Seconds.*	*F. seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
4,000	2 56.8	3 26	6.43	1,666	7.1	114	167	6.7	156
4,100	3 02.0	3 33	6.61	1,656	7.5	110	177	6.6	159
4,200	3 07.2	3 40	6.79	1,647	8.0	106	187	6.6	163
4,300	3 12.5	3 47	6.97	1,637	8.5	103	197	6.5	166
4,400	3 17.8	3 54	7.16	1,628	9.0	100	207	6.5	170
4,500	3 23.2	4 02	7.35	1,618	9.5	97	218	6.4	173
4,600	3 28.6	4 09	7.54	1,609	10.0	94	229	6.3	177
4,700	3 34.1	4 17	7.73	1,599	10.5	91	241	6.3	180
4,800	3 39.6	4 24	7.92	1,590	11.1	88	253	6.2	183
4,900	3 45.2	4 32	8.11	1,581	11.7	85	265	6.2	186
5,000	3 50.8	4 40	8.30	1,572	12.3	83	278	6.1	189
5,100	3 56.5	4 48	8.49	1,563	12.9	80	291	6.1	192
5,200	4 02.2	4 56	8.69	1,554	13.5	78	304	6.0	195
5,300	4 07.9	5 04	8.88	1,545	14.1	76	318	6.0	198
5,400	4 13.7	5 12	9.08	1,536	14.8	74	332	5.9	201
5,500	4 19.5	5 21	9.27	1,528	15.5	72	347	5.9	204

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*
34	58	10	34	43	5	39	43	18
34	61	10	35	44	5	40	44	19
35	63	11	35	46	5	41	46	19
35	66	11	36	47	6	42	47	20
36	68	12	36	49	6	43	49	20
36	71	12	37	50	6	44	50	21
36	74	13	38	51	6	45	51	22
37	77	13	39	52	7	46	52	22
37	80	14	40	54	7	46	54	23
38	83	14	41	55	7	47	55	23
38	87	15	41	56	8	48	56	24
38	90	16	42	57	8	49	57	25
38	94	16	42	59	8	50	59	26
39	97	17	43	60	9	51	60	26
39	81	17	44	62	9	52	62	27
39	104	18	44	63	9	53	63	28

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of ± 50 foot-second initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
5,500	4	19.5	5	21	9.27	1,528	15.5	72	347	5.9	204
5,600	4	25.4	5	29	9.47	1,519	16.2	70	362	5.8	207
5,700	4	31.3	5	38	9.67	1,511	16.9	68	377	5.8	210
5,800	4	37.3	5	47	9.87	1,502	17.6	67	393	5.7	213
5,900	4	43.3	5	56	10.07	1,494	18.3	65	409	5.7	216
6,000	4	49.4	6	05	10.27	1,485	19.1	64	426	5.6	219
6,100	4	55.5	6	14	10.47	1,477	19.9	62	443	5.5	222
6,200	5	01.7	6	23	10.68	1,469	20.7	61	461	5.5	225
6,300	5	07.9	6	32	10.89	1,461	21.5	59	479	5.4	227
6,400	5	14.2	6	41	11.10	1,453	22.3	58	497	5.4	230
6,500	5	20.5	6	51	11.31	1,445	23.1	56	516	5.3	233
6,600	5	26.9	7	01	11.52	1,437	24.0	55	535	5.3	236
6,700	5	33.3	7	11	11.73	1,429	24.9	54	555	5.2	238
6,800	5	39.8	7	21	11.94	1,421	25.8	52	575	5.2	241
6,900	5	46.3	7	31	12.16	1,413	26.7	51	596	5.1	243
7,000	5	52.9	7	41	12.38	1,405	27.6	50	618	5.1	246

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet*
39	104	18	44	63	9	53	63	28
39	108	19	45	64	9	54	64	29
39	111	20	46	65	10	55	65	30
39	115	20	47	67	10	56	67	30
40	119	21	48	68	11	57	68	31
40	123	22	48	69	11	58	69	32
40	127	23	49	70	11	59	70	33
40	131	24	49	72	12	60	72	34
40	135	24	50	73	12	61	73	34
40	139	25	50	75	13	62	75	35
40	144	26	51	76	13	63	76	36
40	148	27	52	78	14	64	78	37
40	152	28	52	79	14	65	79	38
40	156	28	53	81	15	66	81	38
40	160	29	53	82	15	67	82	39
40	165	30	54	84	16	68	84	40

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RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectile, corrected for angle of fall.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° ′	° ′	Seconds.	Foot-seconds.	Yards.	Yards.	Feet.	Inches.	Yards.
7,000	5 52.9	7 41	12.38	1,405	27.6	50	618	5.1	246
7,100	5 59.6	7 51	12.60	1,397	28.6	48	640	5.0	249
7,200	6 06.3	8 02	12.82	1,389	29.6	47	663	5.0	252
7,300	6 13.1	8 13	13.04	1,382	30.6	46	686	4.9	254
7,400	6 19.9	8 24	13.26	1,375	31.6	45	709	4.9	257
7,500	6 26.8	8 35	13.48	1,368	32.7	44	733	4.8	260
7,600	6 33.8	8 46	13.70	1,361	33.8	43	758	4.8	262
7,700	6 40.8	8 57	13.92	1,354	34.9	42	783	4.7	265
7,800	6 47.9	9 08	14.15	1,347	36.0	42	809	4.7	267
7,900	6 55.0	9 20	14.38	1,340	37.2	41	835	4.6	270
8,000	7 02.2	9 32	14.61	1,333	38.4	40	862	4.6	272
8,100	7 09.5	9 44	14.84	1,326	39.6	39	890	4.5	274
8,200	7 16.8	9 56	15.07	1,319	40.9	38	918	4.5	277
8,300	7 24.2	10 08	15.30	1,313	42.2	38	947	4.4	279
8,400	7 31.6	10 20	15.53	1,307	43.5	37	976	4.4	282
8,500	7 39.1	10 32	15.77	1,301	44.8	36	1,006	4.3	284

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*
40	165	30	54	84	16	68	84	40
40	169	31	55	85	16	69	85	41
40	174	32	55	87	17	70	87	42
39	178	32	56	88	17	71	88	43
39	183	33	56	90	18	72	90	44
39	187	34	57	91	18	73	91	45
39	192	35	58	93	19	74	93	46
39	196	36	58	94	19	75	94	47
39	201	37	59	96	20	76	96	48
38	205	38	59	97	20	77	97	49
38	210	39	60	99	21	78	99	50
38	215	40	61	101	22	79	101	51
38	220	41	61	102	22	80	102	52
38	225	42	62	104	23	81	104	53
37	230	43	62	105	23	82	105	54
37	235	44	63	107	24	83	107	56

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure—angle of elevation plus jump.	Angle of fall.	Time of flight	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° ′	° ′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
8,500	7 39.1	10 32	15.77	1,301	44.8	36	1,006	4.3	284
8,600	7 46.7	10 44	16.01	1,295	46.2	35	1,036	4.3	287
8,700	7 54.3	10 56	16.25	1,289	47.6	35	1,067	4.2	289
8,800	8 02.0	11 09	16.49	1,283	49.0	34	1,099	4.2	291
8,900	8 09.7	11 22	16.73	1,278	50.5	34	1,132	4.1	293
9,000	8 17.5	11 35	16.97	1,272	52.0	33	1,166	4.1	295
9,100	8 25.3	11 48	17.21	1,267	53.5	32	1,200	4.1	298
9,200	8 33.2	12 01	17.45	1,261	55.1	32	1,235	4.0	300
9,300	8 41.2	12 14	17.70	1,256	56.7	31	1,270	4.0	302
9,400	8 49.2	12 28	17.95	1,250	58.4	31	1,306	3.9	304
9,500	8 57.3	12 42	18.20	1,245	60.1	30	1,343	3.9	306
9,600	9 05.5	12 56	18.45	1,240	61.8	29	1,380	3.8	309
9,700	9 13.8	13 10	18.70	1,236	63.6	29	1,418	3.8	311
9,800	9 22.1	13 24	18.95	1,231	65.4	28	1,457	3.8	313
9,900	9 30.4	13 38	19.20	1,227	67.3	28	1,497	3.7	315
10,000	9 38.8	13 52	19.46	1,222	69.2	27	1,538	3.7	317

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of + 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*
37	235	44	63	107	24	83	107	56
37	240	45	64	109	25	84	109	57
37	245	46	64	110	25	85	110	58
36	250	47	65	112	26	86	112	59
36	255	48	65	113	26	87	113	60
36	260	49	66	115	27	88	115	62
36	265	50	66	117	28	89	117	63
35	270	51	67	118	28	90	118	64
35	275	52	67	120	29	91	120	65
35	280	53	68	121	29	92	121	66
34	285	54	68	123	30	93	123	68
34	290	55	69	125	31	94	125	69
34	295	56	69	127	32	95	127	70
34	300	57	70	128	32	96	128	71
33	305	58	70	130	33	97	130	72
33	311	60	71	132	34	98	132	74

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure—angle of elevation plus jump.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° ′	° ′	*Seconds.*	*Foot seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
10,000	9 38.8	13 52	19.46	1,222	69.2	27	1,538	3.7	317
10,100	9 47.3	14 06	19.71	1,218	71.2	27	1,579	3.7	320
10,200	9 55.9	14 20	19.97	1,213	73.2	26	1,621	3.6	322
10,300	10 04.5	14 35	20.23	1,209	75.2	26	1,664	3.6	324
10,400	10 13.2	14 50	20.49	1,205	77.3	25	1,708	3.5	326
10,500	10 22.0	15 05	20.75	1,201	79.4	25	1,752	3.5	328
10,600	10 30.8	15 20	21.01	1,197	81.6	25	1,797	3.4	330
10,700	10 39.7	15 35	21.27	1,193	83.8	24	1,843	3.4	332
10,800	10 48.7	15 50	21.53	1,189	86.1	24	1,890	3.4	334
10,900	10 57.7	16 06	21.80	1,185	88.4	23	1,938	3.3	336
11,000	11 06.8	16 21	22.07	1,182	90.8	23	1,986	3.3	338
11,100	11 15.9	16 37	22.34	1,178	93.2	23	2,035	3.3	340
11,200	11 25.1	16 52	22.61	1,175	95.7	22	2,085	3.2	342
11,300	11 34.4	17 08	22.88	1,172	98.2	22	2,136	3.2	344
11,400	11 43.8	17 23	23.15	1,169	100.8	21	2,188	3.1	346
11,500	11 53.2	17 39	23.42	1,166	103.5	21	2,241	3.1	348

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of 4 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*
33	311	60	71	132	34	98	132	74
33	316	61	72	134	35	99	134	75
32	321	62	72	135	35	100	135	77
32	326	63	73	137	36	101	137	78
31	331	64	73	138	36	102	138	80
31	337	66	74	140	37	103	140	81
31	342	67	74	142	38	104	142	82
30	347	68	75	144	39	105	144	84
30	352	69	75	145	39	106	145	85
29	357	70	76	147	40	107	147	87
29	363	72	76	149	41	108	149	88
29	368	73	77	151	42	109	151	89
28	373	75	77	153	43	110	153	91
28	378	76	78	154	43	111	154	92
27	383	78	78	156	44	112	156	94
27	389	79	79	158	45	113	158	95

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of + 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards*
11,500	11	53.2	17	39	23.42	1,166	103.5	21	2,241	3.1	348
11,600	12	02.7	17	55	23.69	1,163	106.2	21	2,295	3.1	350
11,700	12	12.3	18	11	23.97	1,160	109.0	20	2,350	3.0	352
11,800	12	22.0	18	27	24.25	1,157	111.8	20	2,405	3.0	354
11,900	12	31.7	18	43	24.53	1,155	114.7	19	2,461	3.0	356
12,000	12	41.4	18	59	24.81	1,152	117.6	19	2,518	2.9	358
12,100	12	51.2	19	15	25.09	1,150	120.6	19	2,576	2.9	360
12,200	13	01.1	19	31	25.37	1,147	123.7	19	2,635	2.9	362
12,300	13	11.1	19	47	25.65	1,145	126.8	18	2,695	2.8	364
12,400	13	21.1	20	03	25.94	1,143	130.0	18	2,756	2.8	366
12,500	13	31.2	20	20	26.23	1,141	133.2	18	2,818	2.8	368
12,600	13	41.3	20	37	26.52	1,139	136.5	18	2,881	2.8	370
12,700	13	51.5	20	54	26.81	1,137	139.9	18	2,945	2.8	372
12,800	14	01.8	21	11	27.10	1,135	143.3	17	3,010	2.8	374
12,900	14	12.1	21	28	27.39	1,134	146.8	17	3,077	2.8	376
13,000	14	22.5	21	45	27.68	1,132	150.3	17	3,145	2.8	378

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile. 11	Change of range for variation of density of air of ± 10 per cent. 12	Change of range for wind component in plane of fire of 12 knots. 13	Change of range for motion of gun in plane of fire of 12 knots. 14	Change of range for motion of target in plane of fire of 12 knots. 15	Deviation for lateral wind component of 12 knots. 16	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots. 17	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots. 18	Change in height of impact for variation of ± 100 yards in sight bar. 19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*
27	389	79	79	158	45	113	158	95
27	394	80	80	160	46	114	160	97
26	399	82	80	162	47	115	162	98
26	404	83	81	164	47	116	164	100
25	409	85	81	166	48	117	166	101
25	414	86	82	168	49	119	168	103
25	419	87	82	170	50	120	170	105
24	424	89	83	172	51	121	172	106
24	429	90	83	173	51	122	173	108
23	434	92	84	175	52	123	175	109
23	440	93	84	177	53	124	177	111
23	445	94	84	179	54	125	179	113
22	450	96	85	181	55	126	181	115
22	455	97	85	183	56	127	183	116
21	460	99	86	185	57	128	185	118
21	465	100	86	187	58	130	187	120

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure—angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
13,000	14	22.5	21	45	27.68	1,132	150.3	17	3,145	2.8	378
13,100	14	33.0	22	02	27.97	1,131	153.9	17	3,214	2.7	380
13,200	14	43.6	22	19	28.26	1,129	157.6	17	3,284	2.7	382
13,300	14	54.2	22	36	28.56	1,128	161.3	16	3,355	2.7	384
13,400	15	04.8	22	53	28.86	1,126	165.1	16	3,427	2.7	386
13,500	15	15.5	23	11	29.16	1,125	168.9	16	3,500	2.7	387
13,600	15	26.3	23	28	29.46	1,123	172.8	15	3,574	2.7	389
13,700	15	37.2	23	46	29.76	1,122	176.7	15	3,649	2.7	391
13,800	15	48.2	24	03	30.06	1,120	180.7	15	3,725	2.7	393
13,900	15	59.2	24	21	30.36	1,119	184.7	15	3,802	2.7	395
14,000	16	10.3	24	38	30.66	1,118	188.8	15	3,879	2.7	397
14,100	16	21.5	24	55	30.97	1,117	192.9	14	3,958	2.7	399
14,200	16	32.7	25	13	31.27	1,116	197.1	14	4,038	2.7	401
14,300	16	44.0	25	31	31.58	1,115	201.3	14	4,119	2.7	402
14,400	16	55.3	25	49	31.88	1,114	205.6	14	4,202	2.7	404
14,500	17	06.7	26	07	32.19	1,114	210.0	14	4,286	2.7	406

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*
21	465	100	86	187	58	130	187	120
21	470	102	87	189	59	131	189	122
20	475	103	87	191	60	132	191	124
20	480	105	88	193	61	133	193	125
19	485	106	88	195	62	134	195	127
19	490	108	89	197	62	135	197	129
18	495	110	89	199	63	136	199	131
17	500	111	90	201	64	137	201	133
17	505	113	90	203	64	139	203	134
17	510	114	91	205	65	140	205	136
16	515	116	91	207	66	141	207	138
16	520	118	91	209	67	142	209	140
15	525	119	92	211	68	143	211	142
15	530	121	92	213	69	144	213	143
15	535	122	93	215	70	145	215	145
14	540	124	93	217	71	146	217	147

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of face-hardened armor with capped projectiles, corrected for angle of fall.	Change of range for variation of + 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
14,500	17	06.7	26	07	32.19	1,114	210.0	14	4,286	2.7	406
14,600	17	18.1	26	24	32.50	1,113	214.4	13	4,371	2.7	408
14,700	17	29.6	26	42	32.82	1,113	218.9	13	4,457	2.7	410
14,800	17	41.2	27	00	33.13	1,113	223.5	13	4,544	2.7	411
14,900	17	52.9	27	18	33.45	1,112	228.2	13	4,633	2.7	413
15,000	18	04.7	27	36	33.76	1,112	233.0	13	4,723	2.7	415
15,100	18	16.5	27	54	34.07	1,112	237.9	13	4,814	2.7	417
15,200	18	28.4	28	12	34.39	1,112	242.9	12	4,906	2.7	419
15,300	18	40.3	28	30	34.71	1,111	248.0	12	5,000	2.7	420
15,400	18	52.3	28	48	35.03	1,111	253.1	12	5,095	2.7	422
15,500	19	04.4	29	06	35.35	1,111	258.3	12	5,191	2.7	424
15,600	19	16.5	29	24	35.67	1,111	263.6	12	5,288	2.7	426
15,700	19	28.7	29	42	36.00	1,111	269.0	12	5,387	2.7	428
15,800	19	40.9	30	00	36.33	1,111	274.6	12	5,487	2.7	429
15,900	19	53.2	30	18	36.66	1,111	280.3	11	5,588	2.7	431
16,000	20	05.6	30	37	36.99	1,111	286.2	11	5,691	2.7	433

RANGE TABLE FOR 8-INCH GUN.

Weight of projectile for which this table is calculated, 260 pounds. Initial velocity, 2,100 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 5 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.
11	12	13	14	15	16	17	18	19
Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Feet.
14	540	124	93	217	71	146	217	147
14	545	126	93	219	72	147	219	149
13	550	128	94	221	73	148	221	151
13	554	129	94	224	74	150	224	153
13	559	131	95	226	75	151	226	155
12	564	133	95	228	76	152	228	157
12	569	135	95	230	77	153	230	159
12	574	136	96	232	78	154	232	161
11	578	138	96	235	79	156	235	163
11	583	139	97	237	80	157	237	165
10	588	141	97	239	81	158	239	167
10	593	143	97	241	82	159	241	169
10	597	145	98	243	83	160	243	171
9	602	146	98	246	84	162	246	174
9	606	148	99	248	85	163	248	176
8	611	150	99	250	85	164	250	178