

RANGE AND BALLISTIC TABLES, 1935

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In Connection with
the Textbook

EXTERIOR BALLISTICS, 1935



RANGE
TABLES

A
1-PDR
B
3" 2700

C
4" 2900

D
5" 3150

E
6" 2600

F
7" 2700

G
3" 2750

H
10" 2700

I
12" 2900

J
13" 2000

K
14" 2000

L
14" 2600

M
16" 2600

N
16" 2000

ALLISTIC
TABLES

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TABLE
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TABLE
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V

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TABLE
VII

PREFACE

Range and Ballistic Tables, 1935 is designed to serve as a companion volume for *Exterior Ballistics, 1935* and contains tables which are required in connection with the course in exterior ballistics at the United States Naval Academy.

This volume consists of two parts. The first part contains samples of range tables for use in connection with practical problems relating to the construction and use of range tables, and the second part contains ballistic tables and some auxiliary tables for use in connection with problems relating to the solution of trajectories and computation of range-table data.

Samples of range tables for all calibers of guns that are, or have previously been, in use in the modern United States Navy are included among the tables printed in this volume. Although some of the calibers represented are obsolete, their tables have been retained for the sake of illustrating some of the features of these guns. Only one sample is given for each caliber, except that for the 14" and 16" guns both full- and reduced-charge tables are given. The tables for the 1 pdr., 3", 4", 5", 12", 14" and 16" guns represent guns that are still in use. The 6" and 8" tables represent guns that were mounted chiefly on the old armored cruisers, and are not representative of the guns of the post-war cruisers. The 7", 10", and 13" tables represent guns that are now altogether obsolete. Except for a few of the smaller guns, the tables of guns still in use, as given herein, are not the latest tables for these guns, since there are objections to the publication of some of the later range tables in a book of this nature. However, the samples given are adequate for the purposes of instruction. It is not intended that the range tables given herein should be used in connection with actual service problems.

The ballistic tables given in this volume include complete tables of the Gâvre retardation function, of the standard altitude-density function employed in the United States, and of auxiliary factors relating to atmospheric density; and extracts from the American translation of the French *A.L.V.F. Tables* of 1918, and from Volume II of *Exterior Ballistic Tables Based on Numerical Integration* (Ordnance Department, U. S. Army, 1931). The retardation and atmospheric-density tables (Tables I to IV) are adequate for the direct solution, by numerical integration, of any trajectory that is likely to occur in naval gunfire. Solutions of trajectories by means of the *A.L.V.F. Tables* and *Ballistic Tables Based on Numerical Integration* are limited, by the extracts of these tables given in Tables VI and VII of this volume, to trajectories of the larger naval guns.

Range and Ballistic Tables, 1935 supersedes *Range and Ballistic Tables, 1930* (the latter was practically a reprint of *Range and Ballistic Tables, 1926*). The range tables given in the present edition are identical with those given in the preceding editions except for the page arrangement and for the omission of Columns 9 and 9a; the reason for the latter is explained in the *Introduction to Range Tables*, which follows. Of the ballistic tables, Tables I, II, and VI of the present edition are practically the same as Tables VII, VIII, and IX, respectively, of the preceding editions, only the page arrangement and introductory notes having been changed. The values given in Table III of the present edition are practically the reciprocals of those given in Table III of the preceding editions; the reason for this is explained in a footnote appearing under that table. Tables IV, V, and VII of the present edition did not appear in the preceding editions. Ingalls' Tables and the altitude-factor table, which appeared as Tables I, II, and V in the preceding editions, have been omitted from *Range and Ballistic Tables, 1935*, since the Ingalls-Siacchi Method is treated, in *Exterior Ballistics, 1935*, as an obsolescent method.

The sources of the sample range tables given in this volume are the official range tables issued by the Bureau of Ordnance, U. S. Navy Department. The sources of the ballistic tables are stated in the introductory notes of the several tables.

1 September, 1935

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PART I—RANGE TABLES

Designating letter	Gun	Extent of table (yards)
A	1-pdr. 2000 f.s.	0 - 3500 (entire table)
B	3" 2700 f.s.	3000 - 4500
C	4" 2900 f.s.	1000 - 4000
D	5" 3150 f.s.	1000 - 22,600 (entire table)
E	6" 2600 f.s.	1000 - 4000
F	7" 2700 f.s.	6000 - 7500
G	8" 2750 f.s.	7000 - 8500
H	10" 2700 f.s.	10,000 - 11,500
I	12" 2900 f.s.	1000-4000 - 19,000-24,000
J	13" 2000 f.s.	10,000 - 11,500
K	14" 2000 f.s.	13,000 - 14,500
L	14" 2600 f.s.	13,000 - 14,500
M	16" 2600 f.s.	1000 - 39,600 (entire table)
N	16" 2000 f.s.	1000-4000 - 23,500-25,100.

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Table VII—Extracts from Volume II of the U. S. Army's *Exterior Ballistic Tables Based on Numerical Integration*, for the arguments, ϕ from 0° to 90°, V from 600 m.s. to 920 m.s. (1968.5 f.s. to 3018.3 f.s.), and $\log C$ from 0.650 to 1.250 (C from 4.467 to 17.78).

A
1-PDR
B
3" 2700C
4" 2900D
5" 3150E
6" 2600F
7" 2700G
3" 2750H
10" 2700I
12" 2900J
13" 2000K
14" 2000L
14" 2600M
16" 2600N
16" 2000ALLISTIC
TABLESTABLE
ITABLE
IITABLE
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INTRODUCTION TO RANGE TABLES

Range tables for guns of the United States Navy are prepared and issued by the Bureau of Ordnance, U. S. Navy Department. Each range table is bound separately, in pamphlet form, and is generally referred to by its short title and serial number, as for example, *Ordnance Pamphlet 519*, or *O.P. 519*. Separate range tables are provided for service velocities and target-practice velocities and, in some cases, also for other special velocities. Separate range tables are provided also for projectiles which differ from the regular service projectile, as for example, illuminating projectiles, flat-nose projectiles, etc.

The headings of recent range tables include information as to the standard initial velocity, weight, length, and radius of ogive of the projectile to which the table pertains. For tables issued prior to about 1920 the value of the coefficient of form used in computing the table was also given; it was the practice, until about that time, to base the entire range table upon a single value of the coefficient of form. For the more recent tables the value of the coefficient of form varies with the angle of departure, and it is not given in the table. The value of the coefficient of form corresponding to the data of any range table may be found, however, by methods outlined in *Exterior Ballistics, 1935*, article 1623 for angles of departure up to 15° , and article 814 for angles of departure of 15° or more.

Particular attention is invited to the differences in the headings of Column 10-18 of the more recent tables as compared to those of the older tables. Tables C, D, M, and N are of the more recent type and the others are of the older type. These differences are discussed in detail in Chapter 10, *Exterior Ballistics, 1935*.

Columns 9 and 9a, which appeared in former printings of the range tables given in this volume, and which contained information relating to the penetration of armor at various ranges, have been omitted in the present edition. The information formerly given in these columns is now obsolete and current penetration data may not be published here. These columns have also been omitted from the latest range tables issued to the service.

All of the tables given in this volume are suitable for exercises dealing with the practical use of range tables. Exercises relating to the computation of range-table data should be confined to the 16"2000 f.s. and 16"2600 f.s. guns, if it is desired to check results with the values given in the tables. The latter tables were computed by methods illustrated in *Exterior Ballistics, 1935*, and results obtained by these methods will generally agree closely with those given in the tables. The 4"2900 f.s. and 5"3150 f.s. range tables given in this volume were also computed by the methods illustrated in *Exterior Ballistics, 1935*, but the extracts of ballistic tables given herein do not extend to the initial velocities and ballistic coefficients of these guns. The remaining range tables were computed by earlier methods, and solutions according to the more recent methods will fail to check with the results in these range tables.

A

RANGE TABLE FOR 1-PDR. GUN.

WEIGHT OF PROJECTILE, 1.057 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

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.
1	2	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Foot-seconds.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
.....	.....	.....	.....	2000	.....	.....	.....
100	4.5	5	.16	1845	.....	100	.....
200	9.2	10	.33	1702	.....	200	.....
300	14.7	17	.51	1573	.....	300	1
400	20.7	26	.71	1454	.....	400	2
500	27.5	36	.92	1342	.1	500	3
600	35.1	48	1.15	1243	.2	600	5
700	43.6	1 03	1.40	1163	.3	700	8
800	53.0	1 19	1.67	1100	.4	800	11
900	1 03.3	1 37	1.95	1049	.5	900	15
1000	1 14.7	1 58	2.24	1007	.7	232	21
1100	1 26.9	2 20	2.54	971	.9	188	27
1200	1 40.1	2 43	2.86	937	1.2	157	34
1300	1 54.1	3 08	3.18	907	1.5	134	43
1400	2 09.0	3 35	3.52	878	1.9	114	53
1500	2 24.8	4 03	3.87	852	2.4	100	64
1600	2 41.5	4 34	4.23	828	3.0	88	77
1700	2 59.0	5 06	4.60	805	3.7	78	91
1800	3 17.6	5 41	4.98	782	4.5	69	107
1900	3 37.0	6 17	5.37	761	5.3	62	125
2000	3 57.5	6 56	5.77	740	6.2	56	144
2100	4 19.0	7 38	6.19	720	7.2	51	164
2200	4 41.5	8 22	6.62	701	8.4	46	187
2300	5 05.0	9 09	7.06	683	9.8	42	213
2400	5 29.6	9 58	7.51	666	11.4	38	243
2500	5 55.2	10 50	7.98	649	13.2	35	277
2600	6 22.3	11 45	8.46	633	15.2	32	312
2700	6 50.6	12 44	8.94	618	17.5	29	350
2800	7 20.2	13 46	9.44	603	20.1	27	391
2900	7 51.0	14 51	9.96	589	23.1	25	435
3000	8 23.0	15 59	10.48	576	26.4	23	482

A

RANGE TABLE FOR 1-PDR. GUN.

WEIGHT OF PROJECTILE, 1.057 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of ± 50 foot- seconds, Initial velocity.	Change of range for variation of $\pm$ pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind com- ponent 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 com- ponent of 12 knots.	Deviation for lateral motion of gun perpen- dicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target per- pendicular to line of fire, speed of 12 knots	Change in height of impact for variation of ± 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards	Yards.	Yards.	Feet.
100	4	.....	1	.....	1	1	.....	1.0	1	.....
200	8	.....	2	.....	2	2	.1	2.0	2	1
300	12	.....	4	1	2	3	.4	3.0	3	1
400	15	.....	7	1	3	4	.7	4.0	4	2
500	18	.....	11	2	4	5	1.2	5.0	5	3
600	21	.....	16	3	5	7	1.7	6.0	7	4
700	23	.....	20	4	5	9	2.4	7.0	9	5
800	25	.....	25	5	6	11	3.1	8.1	11	6
900	27	.....	30	6	6	13	4.0	9.1	13	8
1000	28	.....	36	8	7	15	4.9	10.1	15	10
1100	30	.....	41	9	7	17	6.0	11.1	17	12
1200	31	.....	46	11	8	19	7.1	12.1	19	14
1300	32	.....	51	12	8	21	8.3	13.1	21	16
1400	33	.....	56	14	9	23	9.6	14.2	23	18
1500	33	.....	61	16	9	25	10.9	15.2	25	20
1600	34	.....	66	18	10	28	12.3	16.2	28	23
1700	34	.....	71	20	10	30	13.8	17.2	30	26
1800	35	.....	76	22	11	33	15.3	18.3	33	29
1900	35	.....	81	24	11	36	17.0	19.3	36	32
2000	36	.....	86	26	12	39	18.7	20.3	39	36
2100	36	.....	91	28	13	42	20.6	21.3	42	40
2200	37	.....	96	30	13	45	22.5	22.3	45	44
2300	37	.....	101	33	14	48	24.4	23.4	48	48
2400	38	.....	106	36	14	51	26.4	24.4	51	52
2500	38	.....	111	39	15	54	28.4	25.4	54	57
2600	38	.....	116	42	15	57	30.4	26.5	57	62
2700	38	.....	121	45	16	60	32.5	27.5	60	67
2800	39	.....	126	48	16	63	34.7	28.6	63	73
2900	39	.....	131	51	17	67	37.0	29.6	67	79
3000	39	.....	136	54	17	71	39.4	30.7	71	85

A

RANGE TABLE FOR 1-PDR. GUN.

WEIGHT OF PROJECTILE, 1.057 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

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.
1	2	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Foot-seconds.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
3000	8 23.0	15 59	10.48	576	26.4	23	482
3100	8 56.6	17 12	11.04	564	30.0	21	533
3200	9 32.0	18 28	11.63	552	34.0	19	589
3300	10 08.7	19 48	12.24	541	38.4	18	651
3400	10 46.8	21 12	12.87	530	43.3	17	718
3500	11 26.3	22 41	13.51	519	48.7	16	790

A

RANGE TABLE FOR 1-PDR. GUN.

WEIGHT OF PROJECTILE, 1.057 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of ± 50 foot- seconds, initial velocity.	Change of range for variation of $\pm$ pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind com- ponent 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 com- ponent of 12 knots.	Deviation for lateral motion of gun perpen- dicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target per- pendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
3000	39	.....	136	54	17	71	39.4	30.7	71	85
3100	39	.....	141	57	17	75	41.9	31.8	75	92
3200	40	.....	146	60	18	79	44.7	32.9	79	99
3300	40	.....	151	63	18	83	47.8	33.9	83	107
3400	40	.....	156	67	19	87	51.3	35.0	87	116
3500	40	.....	161	71	19	91	55.1	36.1	91	125

B

RANGE TABLE FOR 3-INCH GUN.

WEIGHT OF PROJECTILE, 13 POUNDS.

INITIAL VELOCITY, 2700 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
3,000	2 02.4	3 26	5.05	1,230	3.4	114	104
3,100	2 09.4	3 42	5.30	1,203	3.8	106	115
3,200	2 16.7	3 58	5.55	1,178	4.2	98	126
3,300	2 24.3	4 15	5.81	1,154	4.7	91	138
3,400	2 32.2	4 32	6.07	1,132	5.2	85	151
3,500	2 40.4	4 50	6.33	1,112	5.7	80	165
3,600	2 48.9	5 08	6.60	1,094	6.3	75	180
3,700	2 57.6	5 27	6.88	1,077	6.9	71	196
3,800	3 06.6	5 47	7.16	1,061	7.6	67	213
3,900	3 15.9	6 08	7.45	1,046	8.3	63	231
4,000	3 25.5	6 30	7.74	1,031	9.0	59	251
4,100	3 35.4	6 52	8.03	1,017	9.8	56	272
4,200	3 45.6	7 14	8.33	1,004	10.7	53	294
4,300	3 56.1	7 37	8.63	992	11.6	50	317
4,400	4 06.9	8 00	8.94	981	12.6	48	341
4,500	4 17.9	8 24	9.25	971	13.7	46	366

B

RANGE TABLE FOR 3-INCH GUN.

WEIGHT OF PROJECTILE, 13 POUNDS.

INITIAL VELOCITY, 2700 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of $\pm$ 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
3,000	68	.....	122	18.5	15.6	34.1	11.6	22.5	34.1	18
3,100	69	.....	129	19.8	16.0	35.8	12.5	23.3	35.8	19
3,200	70	.....	136	21.1	16.4	37.5	13.4	24.0	37.5	21
3,300	71	.....	143	22.5	16.7	39.2	14.4	24.8	39.2	22
3,400	72	.....	150	23.9	17.1	41.0	15.4	25.5	41.0	24
3,500	73	.....	157	25.3	17.5	42.8	16.5	26.3	42.8	25
3,600	74	.....	164	26.8	17.9	44.7	17.6	27.1	44.7	26
3,700	75	.....	171	28.3	18.2	46.6	18.7	27.8	46.6	28
3,800	76	.....	178	29.8	18.6	48.5	19.8	28.6	48.5	30
3,900	77	.....	184	31.4	18.9	50.4	21.0	29.3	50.4	32
4,000	78	.....	190	33.0	19.3	52.3	22.2	30.1	52.3	34
4,100	79	.....	196	34.7	19.6	54.3	23.4	30.8	54.3	36
4,200	80	.....	202	36.4	20.0	56.3	24.7	31.6	56.3	38
4,300	80	.....	208	38.1	20.3	58.3	26.0	32.3	58.3	40
4,400	81	.....	214	39.8	20.7	60.4	27.3	33.1	60.4	42
4,500	82	.....	220	41.5	21.0	62.5	28.6	33.8	62.5	44

C

RANGE TABLE FOR 4-INCH GUN.

WEIGHT OF PROJECTILE, 33 POUNDS.

INITIAL VELOCITY, 2900 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F}$. changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range	Angle of fall.	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate
1	2	2a	2b	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-secs.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet.</i>
1,000	21.3	21.3	2.3	24	1.09	2,590	.2	1,000	5
1,100	23.6	23.6	2.3	26	1.21	2,560	.2	1,100	6
1,200	25.9	25.9	2.4	29	1.33	2,531	.2	1,200	7
1,300	28.3	28.3	2.4	32	1.45	2,502	.2	1,300	8
1,400	30.7	30.7	2.5	35	1.57	2,473	.3	1,400	9
1,500	33.2	33.2	2.5	38	1.69	2,444	.3	1,500	11
1,600	35.7	35.7	2.5	41	1.81	2,415	.4	1,600	13
1,700	38.2	38.2	2.6	44	1.93	2,387	.4	1,700	15
1,800	40.8	40.8	2.6	47	2.06	2,359	.5	1,800	17
1,900	43.4	43.4	2.7	50	2.19	2,331	.6	1,900	19
2,000	46.1	46.1	2.7	53	2.32	2,303	.7	518	22
2,100	48.8	48.8	2.8	57	2.45	2,275	.8	478	24
2,200	51.6	51.6	2.8	1 01	2.58	2,248	.9	442	27
2,300	54.4	54.4	2.9	1 05	2.71	2,221	1.0	410	30
2,400	57.3	57.3	2.9	1 09	2.85	2,194	1.1	381	33
2,500	1 00.2	60.2	3.0	1 13	2.99	2,168	1.2	355	36
2,600	1 03.2	63.2	3.0	1 17	3.13	2,142	1.3	332	39
2,700	1 06.2	66.2	3.0	1 21	3.27	2,116	1.4	311	43
2,800	1 09.2	69.2	3.1	1 25	3.41	2,090	1.5	292	47
2,900	1 12.3	72.3	3.1	1 30	3.56	2,064	1.6	275	51
3,000	1 15.4	75.4	3.2	1 35	3.71	2,039	1.7	260	55
3,100	1 18.6	78.6	3.2	1 40	3.86	2,014	1.8	246	60
3,200	1 21.8	81.8	3.3	1 45	4.01	1,989	1.9	233	65
3,300	1 25.1	85.1	3.4	1 50	4.16	1,964	2.1	221	70
3,400	1 28.5	88.5	3.4	1 55	4.31	1,940	2.3	210	75
3,500	1 31.9	91.9	3.5	2 01	4.47	1,916	2.5	200	80
3,600	1 35.4	95.4	3.6	2 07	4.63	1,892	2.7	191	86
3,700	1 39.0	99.0	3.6	2 13	4.79	1,868	2.9	182	92
3,800	1 42.6	102.6	3.7	2 19	4.95	1,845	3.1	174	98
3,900	1 46.3	106.3	3.7	2 25	5.11	1,822	3.3	166	105
4,000	1 50.0	110.0	3.8	2 31	5.28	1,799	3.5	158	112

C

RANGE TABLE FOR 4-INCH GUN.

WEIGHT OF PROJECTILE, 33 POUNDS.

INITIAL VELOCITY, 2900 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of pro- jectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind com- ponent in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Devia- tion for lateral wind com- ponent of 10 knots	Devia- tion for lateral motion of gun perpen- dicular to line of fire, speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire, speed of 10 knots.	Change in height of impact for varia- tion of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
Yards	Yards.	Yards.	Yards	Yards	Yards	Yards	Yards	Yards	Yards.	Feet.
1,000	7	19	8	1	7	6	.....	6	6	2
1,100	7	20	9	1	7	7	.....	7	7	2
1,200	8	21	11	1	8	8	.....	7	8	2
1,300	8	22	13	1	8	9	.....	8	9	3
1,400	9	23	15	1	9	9	.....	8	9	3
1,500	9	24	17	1	9	10	1	9	10	3
1,600	10	25	19	2	10	11	1	9	11	3
1,700	11	26	21	2	10	11	1	10	11	3
1,800	11	27	23	2	10	12	1	10	12	4
1,900	12	28	26	2	11	13	1	11	13	4
2,000	12	29	29	2	11	13	1	11	13	4
2,100	13	30	32	2	12	14	1	12	14	4
2,200	13	31	35	3	12	15	2	12	15	5
2,300	14	31	38	3	13	16	2	13	16	5
2,400	14	32	41	3	13	16	2	14	16	6
2,500	15	32	44	4	13	17	2	14	17	6
2,600	15	33	47	4	14	18	2	15	18	6
2,700	16	33	51	4	14	19	2	16	19	7
2,800	16	34	55	5	15	19	3	16	19	7
2,900	17	34	59	5	15	20	3	17	20	8
3,000	17	34	63	5	15	21	3	17	21	8
3,100	18	34	67	6	16	22	3	18	22	8
3,200	18	35	71	6	16	23	3	18	23	9
3,300	19	35	75	7	16	23	4	19	23	9
3,400	19	35	79	7	17	24	4	20	24	10
3,500	19	35	84	8	17	25	4	20	25	10
3,600	20	35	89	8	17	26	4	21	26	11
3,700	20	35	94	9	18	27	5	22	27	11
3,800	21	34	99	9	18	28	5	22	28	12
3,900	21	34	104	10	19	29	5	23	29	12
4,000	21	34	109	10	19	30	6	23	30	13

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure = angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
1,000	17.9	17.9	2.0	19	1.00	2,846	.....	1,000	4
1,100	19.9	19.9	2.0	21	1.11	2,817	.....	1,100	5
1,200	21.9	21.9	2.0	23	1.22	2,788	.....	1,200	6
1,300	23.9	23.9	2.0	25	1.33	2,760	.....	1,300	7
1,400	25.9	25.9	2.0	27	1.44	2,732	.....	1,400	8
1,500	27.9	27.9	2.0	29	1.55	2,704	.....	1,500	9
1,600	29.9	29.9	2.1	32	1.66	2,676	.....	1,600	10
1,700	32.0	32.0	2.1	35	1.77	2,649	.....	1,700	12
1,800	34.1	34.1	2.1	38	1.88	2,622	.....	1,800	14
1,900	36.2	36.2	2.1	41	1.99	2,595	.....	1,900	16
2,000	38.3	38.3	2.1	44	2.10	2,568	1.0	2,000	18
2,100	40.4	40.4	2.2	47	2.22	2,541	1.1	2,100	20
2,200	42.6	42.6	2.2	50	2.34	2,514	1.2	554	22
2,300	44.8	44.8	2.3	53	2.46	2,488	1.3	513	24
2,400	47.1	47.1	2.3	56	2.58	2,462	1.4	476	26
2,500	49.4	49.4	2.4	59	2.70	2,436	1.5	443	29
2,600	51.8	51.8	2.4	1 02	2.82	2,410	1.7	415	32
2,700	54.2	54.2	2.5	1 05	2.94	2,384	1.9	390	35
2,800	56.7	56.7	2.5	1 08	3.07	2,358	2.1	368	38
2,900	59.2	59.2	2.6	1 12	3.20	2,333	2.3	348	41
3,000	1 01.8	61.8	2.6	1 16	3.33	2,308	2.5	330	44
3,100	1 04.4	64.4	2.6	1 20	3.46	2,283	2.7	313	48
3,200	1 07.0	67.0	2.7	1 24	3.59	2,258	2.9	296	52
3,300	1 09.7	69.7	2.7	1 28	3.72	2,234	3.1	281	56
3,400	1 12.4	72.4	2.7	1 32	3.86	2,210	3.3	267	60
3,500	1 15.1	75.1	2.8	1 36	4.00	2,186	3.6	255	64
3,600	1 17.9	77.9	2.8	1 40	4.14	2,162	3.9	244	69
3,700	1 20.7	80.7	2.8	1 44	4.28	2,138	4.2	233	74
3,800	1 23.5	83.5	2.9	1 48	4.42	2,114	4.5	223	79
3,900	1 26.4	86.4	2.9	1 53	4.56	2,091	4.8	213	84
4,000	1 29.3	89.3	3.0	1 58	4.70	2,068	5.1	204	89

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of pro- jectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind com- ponent in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots	Devia- tion for lateral wind com- ponent of 10 knots.	Devia- tion for lateral motion of gun perpen- dicular to line of fire, speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire, speed of 10 knots	Change in height of impact for varia- tion of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards.</i>	<i>Feet.</i>
1,000	6	12	6	..	5	6	..	6	6	2
1,100	7	13	7	..	6	7	..	7	7	2
1,200	7	14	9	..	6	7	..	7	7	2
1,300	8	15	11	..	6	8	..	8	8	2
1,400	8	16	13	..	7	8	..	8	8	3
1,500	9	17	15	1	7	9	..	9	9	3
1,600	9	18	17	1	8	9	..	9	9	3
1,700	10	18	19	2	8	10	..	10	10	3
1,800	10	19	21	2	8	10	..	10	10	3
1,900	11	19	23	2	9	11	..	11	11	4
2,000	11	20	25	3	9	12	1	11	12	4
2,100	12	20	28	3	10	12	1	12	12	4
2,200	12	21	31	3	10	13	1	12	13	4
2,300	13	21	34	4	10	14	2	13	14	5
2,400	13	22	37	4	11	14	2	13	14	5
2,500	14	22	40	4	11	15	2	14	15	5
2,600	14	23	43	5	12	16	2	14	16	6
2,700	15	23	46	5	12	16	2	15	16	6
2,800	15	24	49	5	12	17	3	15	17	6
2,900	16	24	52	6	13	18	3	16	18	6
3,000	16	25	56	6	13	19	3	16	19	7
3,100	17	25	60	6	13	20	3	17	20	7
3,200	17	25	64	7	14	21	3	17	21	7
3,300	18	25	68	7	14	21	4	18	21	8
3,400	18	26	72	7	14	22	4	18	22	8
3,500	19	26	76	8	15	23	4	19	23	8
3,600	19	26	80	8	15	24	4	19	24	8
3,700	19	26	84	9	15	24	5	20	24	9
3,800	20	26	88	9	16	25	5	20	25	9
3,900	20	26	92	10	16	25	5	21	25	9
4,000	20	26	97	10	16	26	5	21	26	10

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Pt.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
4,000	1 29.3	89.3	3.0	1 58	4.70	2,068	5.1	204	89
4,100	1 32.3	92.3	3.0	2 03	4.85	2,045	5.4	196	95
4,200	1 35.3	95.3	3.1	2 08	5.00	2,022	5.7	188	101
4,300	1 38.4	98.4	3.1	2 13	5.15	1,999	6.1	180	107
4,400	1 41.5	101.5	3.2	2 18	5.30	1,977	6.5	173	113
4,500	1 44.7	104.7	3.2	2 23	5.45	1,955	6.9	166	120
4,600	1 47.9	107.9	3.2	2 28	5.60	1,933	7.3	159	127
4,700	1 51.1	111.1	3.3	2 34	5.75	1,911	7.7	153	134
4,800	1 54.4	114.4	3.3	2 40	5.91	1,890	8.1	147	141
4,900	1 57.7	117.7	3.3	2 46	6.07	1,869	8.6	142	148
5,000	2 01.0	121.0	3.4	2 52	6.23	1,848	9.1	137	156
5,100	2 04.4	124.4	3.4	2 58	6.39	1,827	9.6	132	164
5,200	2 07.8	127.8	3.5	3 05	6.55	1,806	10.1	127	172
5,300	2 11.3	131.3	3.6	3 12	6.72	1,786	10.6	122	181
5,400	2 14.9	134.9	3.7	3 19	6.89	1,766	11.1	118	190
5,500	2 18.6	138.6	3.8	3 26	7.06	1,746	11.7	114	200
5,600	2 22.4	142.4	3.8	3 33	7.23	1,726	12.3	110	210
5,700	2 26.2	146.2	3.9	3 40	7.40	1,706	12.9	106	221
5,800	2 30.1	150.1	4.0	3 47	7.58	1,687	13.5	102	232
5,900	2 34.1	154.1	4.1	3 55	7.76	1,668	14.2	99	243
6,000	2 38.2	158.2	4.1	4 03	7.94	1,649	14.9	96	255
6,100	2 42.3	162.3	4.2	4 11	8.12	1,630	15.6	93	267
6,200	2 46.5	166.5	4.2	4 19	8.30	1,611	16.3	90	279
6,300	2 50.7	170.7	4.3	4 28	8.49	1,593	17.1	87	291
6,400	2 55.0	175.0	4.4	4 37	8.68	1,575	17.9	84	304
6,500	2 59.4	179.4	4.4	4 46	8.87	1,557	18.7	81	318
6,600	3 03.8	183.8	4.5	4 55	9.06	1,539	19.6	78	332
6,700	3 08.3	188.3	4.6	5 05	9.26	1,522	20.5	75	347
6,800	3 12.9	192.9	4.6	5 15	9.46	1,505	21.4	73	362
6,900	3 17.5	197.5	4.7	5 25	9.66	1,488	22.4	71	378
7,000	3 22.2	202.2	4.8	5 35	9.86	1,471	23.4	69	394

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
4,000	20	26	97	10	16	26	5	21	26	10
4,100	21	26	102	10	17	27	5	22	27	10
4,200	21	26	107	11	17	27	6	22	27	11
4,300	22	26	112	11	17	28	6	23	28	11
4,400	22	26	117	12	18	29	6	23	29	12
4,500	22	26	122	12	18	30	6	24	30	12
4,600	23	26	127	13	18	31	7	25	31	13
4,700	23	26	132	13	19	32	7	25	32	13
4,800	23	25	137	14	19	33	7	26	33	14
4,900	24	25	142	15	19	34	7	26	34	14
5,000	24	25	148	15	20	35	8	27	35	15
5,100	24	24	154	16	20	36	8	27	36	15
5,200	25	24	160	17	20	37	9	28	37	16
5,300	25	23	166	17	21	38	9	28	38	16
5,400	25	23	172	18	21	39	10	29	39	17
5,500	26	22	178	19	21	40	10	29	40	17
5,600	26	22	184	19	22	41	11	30	41	18
5,700	26	21	190	20	22	42	11	30	42	19
5,800	26	20	196	21	22	43	12	31	43	19
5,900	27	20	203	21	23	44	12	31	44	20
6,000	27	19	209	22	23	45	13	32	45	21
6,100	27	18	216	23	23	46	13	32	46	21
6,200	27	18	222	23	23	47	14	33	47	22
6,300	28	17	229	24	24	48	14	33	48	23
6,400	28	16	235	25	24	49	15	34	49	23
6,500	28	15	242	26	24	50	15	34	50	24
6,600	28	14	249	27	24	51	16	35	51	25
6,700	28	13	256	28	25	52	16	36	52	26
6,800	29	12	263	29	25	53	17	36	53	27
6,900	29	11	270	30	25	54	17	37	54	28
7,000	29	10	277	31	25	56	18	38	56	29

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	
1	2	2a	2b	3		4	5	6	7	8	
Yards.	°	Minutes.	Minutes.	°	'	Seconds.	Pt.-secs.	Yards.	Yards.	Feet.	
7,000	3	22.2	202.2	4.8	5	35	9.86	1,471	23.4	69	394
7,100	3	27.0	207.0	4.9	5	46	10.07	1,455	24.4	67	410
7,200	3	31.9	211.9	5.0	5	57	10.28	1,439	25.5	65	427
7,300	3	36.9	216.9	5.1	6	08	10.49	1,423	26.6	63	445
7,400	3	42.0	222.0	5.2	6	19	10.70	1,407	27.7	61	463
7,500	3	47.2	227.2	5.3	6	31	10.91	1,392	28.9	59	482
7,600	3	52.5	232.5	5.3	6	43	11.13	1,377	30.1	57	502
7,700	3	57.8	237.8	5.4	6	55	11.35	1,362	31.3	55	523
7,800	4	03.2	243.2	5.4	7	07	11.57	1,347	32.6	54	544
7,900	4	08.6	248.6	5.5	7	20	11.79	1,333	33.9	52	566
8,000	4	14.1	254.1	5.5	7	33	12.01	1,319	35.2	51	588
8,100	4	19.6	259.6	5.6	7	46	12.24	1,305	36.6	49	611
8,200	4	25.2	265.2	5.7	7	59	12.47	1,291	38.0	48	635
8,300	4	30.9	270.9	5.9	8	13	12.70	1,278	39.5	46	659
8,400	4	36.8	276.8	6.0	8	27	12.93	1,265	41.0	45	684
8,500	4	42.8	282.8	6.1	8	41	13.17	1,252	42.6	43	710
8,600	4	48.9	288.9	6.3	8	55	13.41	1,240	44.2	42	737
8,700	4	55.2	295.2	6.4	9	10	13.65	1,228	45.8	41	764
8,800	5	01.6	301.6	6.5	9	25	13.89	1,217	47.5	40	792
8,900	5	08.1	308.1	6.7	9	40	14.14	1,206	49.2	39	821
9,000	5	14.8	314.8	6.8	9	56	14.39	1,195	51.0	38	851
9,100	5	21.6	321.6	6.8	10	12	14.64	1,185	52.9	37	881
9,200	5	28.4	328.4	6.9	10	28	14.89	1,175	54.8	36	912
9,300	5	35.3	335.3	7.0	10	44	15.15	1,165	56.8	35	944
9,400	5	42.3	342.3	7.1	11	01	15.41	1,156	58.8	34	977
9,500	5	49.4	349.4	7.2	11	18	15.67	1,147	60.9	33	1,011
9,600	5	56.6	356.6	7.3	11	35	15.93	1,138	63.0	32	1,046
9,700	6	03.9	363.9	7.3	11	53	16.19	1,130	65.2	31	1,083
9,800	6	11.2	371.2	7.4	12	11	16.46	1,122	67.4	30	1,121
9,900	6	18.6	378.6	7.6	12	29	16.73	1,114	69.7	29	1,160
10,000	6	26.2	386.2	7.7	12	48	17.00	1,107	72.0	29	1,200

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of pro- jectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind com- ponent in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Devia- tion for lateral wind com- ponent of 10 knots.	Devia- tion for lateral motion of gun perpen- dicular to line of fire, speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire, speed of 10 knots.	Change in height of impact for varia- tion of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
7,000	29	10	277	31	25	56	18	38	56	29
7,100	29	9	285	32	25	57	18	39	57	30
7,200	29	8	292	33	25	58	19	39	58	31
7,300	30	7	300	34	26	59	19	40	59	32
7,400	30	6	307	35	26	61	20	40	61	33
7,500	30	5	315	36	26	62	20	41	62	34
7,600	30	4	322	37	26	63	21	42	63	35
7,700	30	3	330	38	26	64	22	42	64	36
7,800	31	2	337	39	27	66	22	43	66	37
7,900	31	1	345	40	27	67	23	43	67	38
8,000	31	0	352	41	27	68	24	44	68	39
8,100	31	-1	360	42	27	69	24	44	69	40
8,200	31	-2	367	43	27	71	25	45	71	41
8,300	31	-3	375	44	28	72	26	45	72	43
8,400	32	-4	382	45	28	73	27	46	73	44
8,500	32	-5	390	46	28	74	27	46	74	45
8,600	32	-7	398	47	28	76	28	47	76	46
8,700	32	-8	405	48	28	77	29	47	77	48
8,800	32	-9	413	49	29	78	30	48	78	49
8,900	33	-10	420	50	29	79	31	48	79	50
9,000	33	-11	428	52	29	81	32	49	81	52
9,100	33	-12	435	53	29	82	32	49	82	53
9,200	33	-13	443	54	30	84	33	50	84	55
9,300	33	-14	450	55	30	85	34	50	85	56
9,400	34	-15	458	57	30	87	35	51	87	58
9,500	34	-16	465	58	30	88	36	51	88	59
9,600	34	-17	473	59	31	90	37	52	90	61
9,700	34	-18	480	60	31	91	38	52	91	63
9,800	34	-19	488	62	31	93	39	53	93	64
9,900	35	-20	495	63	31	94	40	53	94	66
10,000	35	-21	503	64	32	96	41	54	96	68

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	
1	2	2a	2b	3		4	5	6	7	8	
Yards.	°	Minutes.	Minutes.	°	'	Seconds.	Ft.-secs.	Yards.	Yards.	Feet.	
10,000	6	26.2	386.2	7.7	12	48	17.00	1,107	72.0	29	1,200
10,100	6	33.9	393.9	7.8	13	07	17.27	1,100	74.4	28	1,241
10,200	6	41.7	401.7	7.9	13	26	17.54	1,094	76.8	27	1,283
10,300	6	49.6	409.6	8.0	13	45	17.81	1,088	79.3	27	1,326
10,400	6	57.6	417.6	8.1	14	04	18.09	1,082	81.9	26	1,370
10,500	7	05.7	425.7	8.3	14	23	18.37	1,076	84.5	26	1,415
10,600	7	14.0	434.0	8.4	14	42	18.65	1,070	87.2	25	1,460
10,700	7	22.4	442.4	8.5	15	02	18.93	1,065	89.9	25	1,506
10,800	7	30.9	450.9	8.6	15	22	19.22	1,060	92.7	24	1,553
10,900	7	39.5	459.5	8.7	15	42	19.51	1,055	95.5	24	1,601
11,000	7	48.2	468.2	8.8	16	02	19.80	1,050	98.4	23	1,650
11,100	7	57.0	477.0	8.9	16	22	20.09	1,045	101.4	23	1,701
11,200	8	05.9	485.9	9.0	16	42	20.38	1,041	104.4	22	1,753
11,300	8	14.9	494.9	9.1	17	03	20.67	1,037	107.5	22	1,806
11,400	8	24.0	504.0	9.2	17	24	20.96	1,033	110.6	21	1,860
11,500	8	33.2	513.2	9.3	17	45	21.26	1,029	113.8	21	1,915
11,600	8	42.5	522.5	9.3	18	06	21.56	1,025	117.0	21	1,971
11,700	8	51.8	531.8	9.4	18	27	21.86	1,022	120.3	20	2,028
11,800	9	01.2	541.2	9.5	18	48	22.16	1,019	123.6	20	2,087
11,900	9	10.7	550.7	9.6	19	09	22.46	1,016	127.0	20	2,147
12,000	9	20.3	560.3	9.8	19	30	22.76	1,013	130.4	19	2,208
12,100	9	30.1	570.1	9.9	19	52	23.07	1,010	133.9	19	2,271
12,200	9	40.0	580.0	10.0	20	14	23.28	1,007	137.5	19	2,335
12,300	9	50.0	590.0	10.1	20	36	23.69	1,004	141.2	18	2,400
12,400	10	00.1	600.1	10.2	20	58	24.00	1,002	144.9	18	2,466
12,500	10	10.3	610.3	10.3	21	20	24.31	1,000	148.6	18	2,534
12,600	10	20.6	620.6	10.4	21	42	24.62	998	152.5	17	2,603
12,700	10	31.0	631.0	10.5	22	04	24.93	996	156.4	17	2,673
12,800	10	41.5	641.5	10.7	22	26	25.24	994	160.4	17	2,745
12,900	10	52.2	652.2	10.8	22	48	25.56	992	164.5	16	2,818
13,000	11	03.0	663.0	10.9	23	10	25.88	990	168.6	16	2,892

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of pro- jectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind com- ponent in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Devia- tion for lateral wind com- ponent of 10 knots.	Devia- tion for lateral motion of gun perpen- dicular to line of fire, speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire, speed of 10 knots.	Change in height of impact for varia- tion of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
10,000	35	-21	503	64	32	96	41	54	96	68
10,100	35	-22	510	65	32	97	42	55	97	69
10,200	35	-23	518	67	32	99	43	55	99	71
10,300	35	-24	525	68	32	100	44	56	100	73
10,400	36	-25	533	69	33	102	45	56	102	74
10,500	36	-26	540	70	33	103	47	57	103	76
10,600	36	-27	547	72	33	105	48	57	105	78
10,700	36	-28	554	73	33	106	49	58	106	80
10,800	36	-29	561	74	33	108	50	58	108	82
10,900	37	-30	568	75	34	109	51	59	109	84
11,000	37	-31	575	77	34	111	52	59	111	86
11,100	37	-32	582	78	34	112	53	60	112	88
11,200	37	-33	589	79	34	114	54	60	114	90
11,300	37	-34	596	81	34	116	55	61	116	92
11,400	38	-35	603	82	35	117	56	61	117	94
11,500	38	-36	610	83	35	119	58	62	119	96
11,600	38	-36	617	85	35	121	59	63	121	98
11,700	38	-37	623	86	35	123	60	63	123	100
11,800	38	-38	630	88	35	124	61	64	124	102
11,900	39	-39	636	89	36	126	62	64	126	104
12,000	39	-40	643	91	36	128	63	65	128	106
12,100	39	-41	649	93	36	130	64	66	130	108
12,200	39	-41	656	94	36	131	66	66	131	110
12,300	39	-42	662	96	37	133	67	67	133	113
12,400	40	-43	668	98	37	135	68	67	135	115
12,500	40	-44	675	99	37	137	69	68	137	117
12,600	40	-45	681	101	37	139	70	69	139	119
12,700	40	-46	687	103	37	140	71	69	140	122
12,800	40	-46	694	104	38	142	72	70	142	124
12,900	41	-47	700	106	38	144	74	70	144	126
13,000	41	-48	707	108	38	146	75	71	146	128

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure = angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3		4	5	6	7	8
<i>Yards.</i>	<i>°</i> <i>'</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>°</i> <i>'</i>		<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
13,000	11 03.0	663.0	10.9	23 10		25.88	990	168.6	16	2,892
13,100	11 13.9	673.9	11.0	23 32		26.20	988	172.8	16	2,968
13,200	11 24.9	684.9	11.1	23 54		26.52	986	177.0	15	3,045
13,300	11 36.0	696.0	11.1	24 16		26.84	984	181.3	15	3,124
13,400	11 47.1	707.1	11.2	24 39		27.16	982	185.6	15	3,204
13,500	11 58.3	718.3	11.3	25 02		27.49	981	190.0	14	3,286
13,600	12 09.6	729.6	11.4	25 25		27.82	980	194.5	14	3,369
13,700	12 21.0	741.0	11.5	25 48		28.15	979	199.1	14	3,454
13,800	12 32.5	752.5	11.6	26 11		28.48	978	203.7	14	3,540
13,900	12 44.1	764.1	11.7	26 34		28.82	977	208.4	13	3,628
14,000	12 55.8	775.8	11.9	26 57		29.16	976	213.1	13	3,717
14,100	13 07.7	787.7	12.0	27 20		29.50	975	217.9	13	3,808
14,200	13 19.7	799.7	12.1	27 43		29.85	974	222.8	13	3,900
14,300	13 31.8	811.8	12.2	28 06		30.20	973	227.7	12	3,994
14,400	13 44.0	824.0	12.3	28 29		30.55	972	232.7	12	4,089
14,500	13 56.3	836.3	12.4	28 52		30.90	971	237.8	12	4,186
14,600	14 08.7	848.7	12.5	29 15		31.25	970	243.0	12	4,284
14,700	14 21.2	861.2	12.6	29 38		31.60	969	248.3	12	4,383
14,800	14 33.8	873.8	12.7	30 02		31.95	968	253.7	11	4,483
14,900	14 46.5	886.5	12.8	30 26		32.30	967	259.1	11	4,585
15,000	14 59.3	899.3	13.0	30 50		32.65	967	264.6	11	4,688
15,100	15 12.3	912.3	13.1	31 13		33.00	967	270.1	11	4,792
15,200	15 25.4	925.4	13.2	31 36		33.35	967	275.7	11	4,897
15,300	15 38.6	938.6	13.4	31 59		33.70	967	281.4	11	5,004
15,400	15 52.0	952.0	13.5	32 22		34.06	968	287.2	10	5,112
15,500	16 05.5	965.5	13.7	32 45		34.42	968	293.0	10	5,222
15,600	16 19.2	979.2	13.8	33 08		34.78	968	298.9	10	5,333
15,700	16 33.0	993.0	14.0	33 31		35.14	968	304.9	10	5,446
15,800	16 47.0	1007.0	14.1	33 54		35.51	968	311.0	10	5,560
15,900	17 01.1	1021.1	14.3	34 17		35.88	969	317.2	10	5,676
16,000	17 15.4	1035.4	14.4	34 40		36.25	969	323.5	10	5,793

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of pro- jectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind com- ponent in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Devia- tion for lateral wind com- ponent of 10 knots.	Devia- tion for lateral motion of gun perpen- dicular to line of fire speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire speed of 10 knots.	Change in height of impact for varia- tion of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
13,000	41	-48	707	108	38	146	75	71	146	128
13,100	41	-49	713	110	38	148	76	72	148	131
13,200	41	-50	719	111	38	150	77	72	150	133
13,300	41	-50	725	113	38	152	78	73	152	135
13,400	42	-51	732	115	38	154	80	73	154	138
13,500	42	-52	738	117	38	155	81	74	155	140
13,600	42	-53	744	118	38	157	82	75	157	142
13,700	42	-54	750	120	38	159	83	75	159	145
13,800	42	-55	756	122	38	161	84	76	161	147
13,900	43	-55	762	124	38	163	86	76	163	149
14,000	43	-56	768	126	39	165	87	77	165	152
14,100	43	-57	774	127	39	167	88	78	167	154
14,200	43	-58	780	129	39	169	89	78	169	157
14,300	43	-59	786	131	39	171	91	79	171	159
14,400	44	-59	792	133	39	172	92	79	172	162
14,500	44	-60	798	135	39	174	93	80	174	164
14,600	44	-61	804	137	39	176	94	81	176	167
14,700	44	-62	810	139	39	178	96	81	178	170
14,800	44	-62	816	141	39	180	97	82	180	173
14,900	45	-63	822	143	39	182	98	82	182	176
15,000	45	-64	828	145	39	184	100	83	184	179
15,100	45	-65	834	147	39	186	101	84	186	181
15,200	45	-65	840	149	39	188	103	84	188	184
15,300	45	-66	845	151	39	190	104	85	190	187
15,400	46	-67	851	153	39	192	106	85	192	190
15,500	46	-68	857	155	39	194	107	86	194	193
15,600	46	-68	863	157	39	196	109	87	196	196
15,700	46	-69	868	159	39	198	110	87	198	199
15,800	46	-70	874	161	39	200	112	88	200	202
15,900	47	-71	880	163	39	202	113	88	202	205
16,000	47	-71	886	165	39	204	115	89	204	208

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range	Angle of fall.		Time of flight	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3		4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet.</i>	
16,000	17 15.4	1,035.4	14.4	34 40	36.25	969	323.5	10	5,793	
16,100	17 29.8	1,049.8	14.6	35 03	36.62	969	329.9	9	5,913	
16,200	17 44.4	1,064.4	14.7	35 26	36.99	970	336.4	9	6,035	
16,300	17 59.1	1,079.1	14.9	35 49	37.37	970	343.0	9	6,160	
16,400	18 14.0	1,094.0	15.0	36 12	37.75	971	349.6	9	6,287	
16,500	18 29.0	1,109.0	15.2	36 35	38.13	971	356.3	9	6,417	
16,600	18 44.2	1,124.2	15.3	36 58	38.52	971	363.1	9	6,550	
16,700	18 59.5	1,139.5	15.5	37 21	38.91	972	370.0	9	6,686	
16,800	19 15.0	1,155.0	15.6	37 44	39.30	973	377.0	9	6,825	
16,900	19 30.6	1,170.6	15.8	38 07	39.70	973	384.1	8	6,967	
17,000	19 46.4	1,186.4	15.9	38 30	40.10	973	391.3	8	7,112	
17,100	20 02.3	1,202.3	16.1	38 52	40.50	974	398.6	8	7,260	
17,200	20 18.4	1,218.4	16.2	39 14	40.90	975	406.0	8	7,411	
17,300	20 34.6	1,234.6	16.4	39 36	41.31	975	413.5	8	7,565	
17,400	20 51.0	1,251.0	16.5	39 58	41.72	976	421.1	8	7,722	
17,500	21 07.5	1,267.5	16.7	40 20	42.13	977	428.8	8	7,882	
17,600	21 24.2	1,284.2	16.8	40 42	42.55	978	436.6	7	8,045	
17,700	21 41.0	1,301.0	17.0	41 04	42.97	979	444.5	7	8,211	
17,800	21 58.0	1,318.0	17.1	41 26	43.39	980	452.5	7	8,380	
17,900	22 15.1	1,335.1	17.2	41 48	43.82	981	460.7	7	8,552	
18,000	22 32.3	1,352.3	17.3	42 10	44.25	982	469.0	7	8,727	
18,100	22 49.6	1,369.6	17.4	42 32	44.68	983	477.5	7	8,905	
18,200	23 07.0	1,387.0	17.6	42 54	45.11	985	486.1	7	9,086	
18,300	23 24.6	1,404.6	17.7	43 17	45.55	986	494.8	7	9,270	
18,400	23 42.3	1,422.3	17.9	43 40	45.99	988	503.6	7	9,457	
18,500	24 00.2	1,440.2	18.1	44 03	46.43	989	512.5	7	9,647	
18,600	24 18.3	1,458.3	18.3	44 25	46.88	991	521.6	6	9,840	
18,700	24 36.6	1,476.6	18.5	44 47	47.33	992	530.8	6	10,036	
18,800	24 55.1	1,495.1	18.7	45 09	47.78	994	540.2	6	10,235	
18,900	25 13.8	1,513.8	18.9	45 31	48.24	995	549.7	6	10,437	
19,000	25 32.7	1,532.7	19.1	45 53	48.70	997	559.3	6	10,642	

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
16,000	47	-71	886	165	39	204	115	89	204	208
16,100	47	-72	892	167	39	206	116	90	206	211
16,200	47	-73	897	169	39	208	118	90	208	214
16,300	47	-74	903	171	39	210	119	91	210	217
16,400	48	-74	909	174	39	212	121	91	212	220
16,500	48	-75	915	176	39	215	122	92	215	223
16,600	48	-76	921	178	39	217	124	93	217	226
16,700	48	-77	926	180	39	219	125	93	219	230
16,800	48	-78	932	183	39	221	127	94	221	233
16,900	49	-78	938	185	39	223	128	94	223	236
17,000	49	-79	944	187	39	225	130	95	225	239
17,100	49	-80	951	190	39	228	131	96	228	243
17,200	49	-81	958	192	39	230	133	96	230	246
17,300	49	-82	965	194	39	232	134	97	232	249
17,400	50	-83	972	197	39	234	136	98	234	252
17,500	50	-83	979	199	39	237	137	99	237	256
17,600	50	-84	986	201	39	239	139	99	239	259
17,700	50	-85	993	203	39	241	140	100	241	262
17,800	50	-86	1,000	206	39	244	142	101	244	265
17,900	51	-87	1,007	208	39	246	143	102	246	269
18,000	51	-88	1,014	210	39	248	145	103	248	272
18,100	51	-89	1,022	212	39	251	146	103	251	276
18,200	51	-90	1,030	215	39	253	148	104	253	279
18,300	51	-91	1,038	217	39	256	149	105	256	283
18,400	52	-92	1,046	219	39	258	151	106	258	286
18,500	52	-94	1,054	222	39	261	152	107	261	290
18,600	52	-95	1,062	224	39	263	154	108	263	293
18,700	52	-96	1,070	226	39	266	155	109	266	297
18,800	52	-97	1,078	229	39	268	157	110	268	301
18,900	53	-98	1,086	231	39	271	159	111	271	305
19,000	53	-99	1,094	234	39	273	161	112	273	309

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>°</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>°</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
19,000	25	32.7	1,532.7	19.1	45 53	48.70	997	559.3	6 10,642
19,100	25	51.8	1,551.8	19.3	46 15	49.16	998	569.1	6 10,850
19,200	26	11.1	1,571.1	19.6	46 37	49.62	1,000	579.1	6 11,061
19,300	26	30.7	1,590.7	19.9	46 59	50.09	1,001	589.4	6 11,275
19,400	26	50.6	1,610.6	20.2	47 21	50.56	1,003	599.9	6 11,492
19,500	27	10.8	1,630.8	20.5	47 43	51.04	1,004	610.6	6 11,712
19,600	27	31.3	1,651.3	20.8	48 05	51.52	1,006	621.5	6 11,935
19,700	27	52.1	1,672.1	21.1	48 27	52.01	1,008	632.6	6 12,161
19,800	28	13.2	1,693.2	21.4	48 49	52.50	1,010	643.9	6 12,390
19,900	28	34.6	1,714.6	21.8	49 11	53.00	1,012	655.4	6 12,622
20,000	28	56.4	1,736.4	22.1	49 33	53.51	1,014	667.2	6 12,857
20,100	29	18.5	1,758.5	22.4	49 56	54.03	1,016	679.3	6 13,095
20,200	29	40.9	1,780.9	22.9	50 19	54.56	1,018	691.7	6 13,336
20,300	30	03.8	1,803.8	23.3	50 42	55.10	1,020	704.4	6 13,580
20,400	30	27.1	1,827.1	23.6	51 05	55.65	1,022	717.4	6 13,827
20,500	30	50.7	1,850.7	24.2	51 28	56.21	1,024	730.8	5 14,077
20,600	31	14.9	1,874.9	24.6	51 51	56.78	1,026	744.6	5 14,331
20,700	31	39.5	1,899.5	25.2	52 15	57.36	1,028	758.8	5 14,590
20,800	32	04.7	1,924.7	25.7	52 39	57.95	1,030	773.4	5 14,855
20,900	32	30.4	1,950.4	26.2	53 03	58.55	1,032	788.4	5 15,127
21,000	32	56.6	1,976.6	26.9	53 27	59.15	1,034	803.8	5 15,407
21,100	33	23.5	2,003.5	27.6	53 51	59.77	1,036	819.7	5 15,696
21,200	33	51.1	2,031.1	28.3	54 15	60.41	1,038	836.2	5 15,995
21,300	34	19.4	2,059.4	29.1	54 39	61.07	1,040	853.3	5 16,305
21,400	34	48.5	2,088.5	29.9	55 03	61.75	1,042	871.0	5 16,627
21,500	35	18.4	2,118.4	30.9	55 28	62.45	1,044	889.3	4 16,962
21,600	35	49.3	2,149.3	31.9	55 53	63.17	1,046	908.3	4 17,311
21,700	36	21.2	2,181.2	33.1	56 18	63.91	1,048	928.1	4 17,675
21,800	36	54.3	2,214.3	34.3	56 43	64.67	1,050	948.8	4 18,055
21,900	37	28.6	2,248.6	35.8	57 08	65.45	1,052	970.5	4 18,452
22,000	38	04.4	2,284.4	37.4	57 33	66.25	1,054	993.3	4 18,867

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
19,000	53	-99	1,094	234	39	273	161	112	273	309
19,100	53	-101	1,103	236	39	276	162	113	276	313
19,200	53	-102	1,112	239	39	278	164	114	278	317
19,300	53	-103	1,121	241	39	281	166	115	281	321
19,400	54	-104	1,130	244	39	283	168	116	283	325
19,500	54	-106	1,139	246	39	286	169	117	286	329
19,600	54	-107	1,148	249	40	289	171	118	289	333
19,700	54	-108	1,157	252	40	292	173	119	292	337
19,800	54	-109	1,166	255	40	295	175	120	295	342
19,900	55	-111	1,175	258	40	298	177	121	298	347
20,000	55	-112	1,184	261	40	301	179	122	301	352
20,100	55	-113	1,193	264	40	304	181	123	304	357
20,200	55	-114	1,202	267	40	307	183	124	307	362
20,300	55	-116	1,211	270	41	310	185	125	310	367
20,400	56	-117	1,220	273	41	313	187	126	313	372
20,500	56	-118	1,229	276	41	316	189	127	316	377
20,600	56	-119	1,238	279	41	319	191	128	319	382
20,700	56	-121	1,247	282	41	322	193	129	322	387
20,800	56	-122	1,256	285	42	325	195	131	325	393
20,900	57	-123	1,265	288	42	329	197	132	329	399
21,000	57	-125	1,274	291	42	333	199	134	333	405
21,100	57	-126	1,282	294	43	337	201	135	337	411
21,200	57	-127	1,290	297	43	341	203	137	341	417
21,300	57	-128	1,298	300	44	345	205	138	345	423
21,400	58	-130	1,306	303	44	349	207	140	349	430
21,500	58	-131	1,314	306	45	353	209	141	353	436
21,600	58	-132	1,322	309	46	357	211	143	357	442
21,700	58	-133	1,330	312	47	361	214	144	361	449
21,800	58	-135	1,338	315	48	365	217	146	365	457
21,900	59	-136	1,346	319	49	369	220	148	369	464
22,000	59	-137	1,354	323	50	373	223	150	373	472

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
22,000	38 04.4	2,284.4	37.4	57 33	66.25	1,054	993.3	4	18,867
22,100	38 41.8	2,321.8	39.3	58 03	67.07	1,057	1,017.4	4	19,340
22,200	39 21.1	2,361.1	41.4	58 38	67.93	1,061	1,043.0	4	19,910
22,300	40 02.5	2,402.5	61.5	59 18	68.95	1,065	1,070.3	4	20,600
22,400	41 04.0	2,464.0	78.0	60 08	70.28	1,069	1,099.5	4	21,480
22,500	42 22.0	2,542.0	113.0	61 10	72.05	1,073	1,130.8	4	22,560
22,600	44 15.0	2,655.0	.....	62 24	74.45	1,077	1,164.4	3	23,860

D

RANGE TABLE FOR 5-INCH GUN.

WEIGHT OF PROJECTILE, 50 POUNDS.

INITIAL VELOCITY, 3150 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -1 pound in weight of pro- jectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind com- ponent in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Devia- tion for lateral wind com- ponent of 10 knots.	Devia- tion for lateral motion of gun perpen- dicular to line of fire speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire speed of 10 knots.	Change in height of impact for varia- tion of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
22,000	59	-137	1,354	323	50	373	223	150	373	472
22,100	59	-138	1,362	327	50	377	226	151	377	481
22,200	59	-140	1,370	331	51	382	229	153	382	492
22,300	59	-141	1,378	335	53	388	233	155	388	505
22,400	60	-142	1,386	340	56	396	237	159	396	522
22,500	60	-143	1,394	345	61	406	242	164	406	545
22,600	60	-144	1,402	351	68	419	249	170	419	574

E

RANGE TABLE FOR 6-INCH GUN.

WEIGHT OF PROJECTILE, 105 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
1,000	25.6	27	1.20	2,413	0.2	1,000	6
1,100	28.4	30	1.32	2,395	.2	1,100	7
1,200	31.2	33	1.44	2,377	.3	1,200	8
1,300	34.0	36	1.57	2,359	.4	1,300	9
1,400	36.8	39	1.70	2,341	.5	1,400	10
1,500	39.6	43	1.83	2,323	.6	1,500	12
1,600	42.5	46	1.96	2,305	.6	1,600	14
1,700	45.4	50	2.09	2,287	.7	1,700	16
1,800	48.3	53	2.22	2,269	.8	1,800	19
1,900	51.3	57	2.35	2,252	.9	488	22
2,000	54.3	1 00	2.49	2,235	1.0	453	25
2,100	57.3	1 04	2.62	2,218	1.1	421	28
2,200	1 00.4	1 07	2.76	2,201	1.2	392	31
2,300	1 03.5	1 11	2.90	2,184	1.3	366	34
2,400	1 06.6	1 15	3.04	2,167	1.5	343	37
2,500	1 09.8	1 19	3.18	2,150	1.6	322	41
2,600	1 13.0	1 23	3.32	2,133	1.8	303	45
2,700	1 16.2	1 27	3.46	2,116	1.9	286	49
2,800	1 19.5	1 31	3.60	2,099	2.1	271	53
2,900	1 22.8	1 36	3.74	2,083	2.2	258	57
3,000	1 26.1	1 40	3.89	2,067	2.4	246	61
3,100	1 29.5	1 45	4.03	2,051	2.6	234	66
3,200	1 32.9	1 49	4.18	2,035	2.8	223	71
3,300	1 36.3	1 54	4.33	2,019	3.0	213	76
3,400	1 39.8	1 58	4.48	2,003	3.2	204	81
3,500	1 43.3	2 03	4.63	1,987	3.5	195	86
3,600	1 46.8	2 08	4.78	1,971	3.7	187	92
3,700	1 50.4	2 13	4.93	1,955	4.0	179	98
3,800	1 54.0	2 18	5.08	1,939	4.3	172	104
3,900	1 57.7	2 24	5.24	1,924	4.6	165	111
4,000	2 01.4	2 29	5.40	1,909	4.9	159	118

E

RANGE TABLE FOR 6-INCH GUN.

WEIGHT OF PROJECTILE, 105 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 3 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
1	10	11	12	13	14	15	16	17	18	19
Yards	Yards	Yards	Yards	Yards	Yards	Yards	Yards	Yards	Yards	Feet
1,000	35	18	5	1	7	8	.....	8	8	2
1,100	39	20	6	1	8	9	.....	9	9	2
1,200	42	21	7	1	9	10	.....	10	10	2
1,300	45	22	8	1	9	10	.....	10	10	3
1,400	48	23	9	1	10	11	.....	11	11	3
1,500	51	24	10	2	11	12	.....	12	12	3
1,600	55	26	11	2	12	13	.....	13	13	3
1,700	58	27	12	2	12	14	.....	14	14	4
1,800	61	28	14	2	13	15	.....	14	15	4
1,900	64	29	16	2	13	16	.....	15	16	5
2,000	67	30	18	3	14	17	1	16	17	5
2,100	70	31	20	3	15	18	1	17	18	5
2,200	73	32	23	3	15	19	1	18	19	6
2,300	76	33	25	3	16	20	2	18	20	6
2,400	79	34	28	4	16	21	2	19	21	7
2,500	82	35	30	4	17	22	2	20	22	7
2,600	85	36	33	4	18	23	2	21	23	7
2,700	88	37	35	5	18	24	2	21	24	8
2,800	91	38	38	5	19	24	3	22	24	8
2,900	94	39	40	6	19	25	3	22	25	9
3,000	96	39	43	6	20	26	3	23	26	9
3,100	99	40	46	6	21	27	3	24	27	9
3,200	101	40	49	7	21	28	3	25	28	10
3,300	104	41	52	7	22	29	4	25	29	10
3,400	106	41	55	8	22	30	4	26	30	11
3,500	109	42	58	8	23	31	4	27	31	11
3,600	112	42	61	8	24	32	4	28	32	11
3,700	114	43	65	9	24	33	4	29	33	12
3,800	117	43	68	9	25	34	5	29	34	12
3,900	119	44	72	10	25	35	5	30	35	13
4,000	122	44	75	10	26	36	5	31	36	13

F

RANGE TABLE FOR 7-INCH GUN.

WEIGHT OF PROJECTILE, 165 POUNDS.

INITIAL VELOCITY, 2700 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
6,000	3 00.4	3 56	8.17	1,810	11.8	99	269
6,100	3 04.3	4 02	8.33	1,798	12.3	97	280
6,200	3 08.3	4 08	8.50	1,785	12.8	94	291
6,300	3 12.3	4 14	8.67	1,773	13.3	92	303
6,400	3 16.4	4 21	8.84	1,760	13.8	89	315
6,500	3 20.5	4 28	9.01	1,748	14.4	87	328
6,600	3 24.6	4 35	9.18	1,736	15.0	84	341
6,700	3 28.8	4 42	9.35	1,725	15.6	82	354
6,800	3 33.0	4 49	9.53	1,713	16.2	80	367
6,900	3 37.3	4 56	9.71	1,702	16.8	78	381
7,000	3 41.6	5 03	9.89	1,690	17.4	76	395
7,100	3 46.0	5 10	10.07	1,678	18.0	74	409
7,200	3 50.4	5 17	10.25	1,667	18.7	72	424
7,300	3 54.8	5 25	10.43	1,656	19.4	70	439
7,400	3 59.3	5 33	10.61	1,645	20.1	69	455
7,500	4 03.8	5 41	10.80	1,634	20.8	67	471

F

RANGE TABLE FOR 7-INCH GUN.

WEIGHT OF PROJECTILE, 165 POUNDS.

INITIAL VELOCITY, 2700 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 4 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
6,000	169	51	140	19	36	55	10	45	55	20
6,100	171	51	145	20	36	56	10	45	56	21
6,200	173	51	149	20	37	57	11	46	57	21
6,300	175	51	154	21	37	58	11	47	58	22
6,400	177	51	158	21	38	59	12	48	59	22
6,500	179	51	163	22	38	61	12	49	61	23
6,600	182	51	168	23	39	62	12	49	62	24
6,700	184	51	173	23	39	63	13	50	63	24
6,800	186	51	178	24	40	64	13	50	64	25
6,900	188	51	183	24	40	65	14	51	65	25
7,000	190	51	188	25	41	67	14	52	67	26
7,100	192	51	193	25	41	68	14	52	68	27
7,200	194	51	198	26	42	69	15	53	69	27
7,300	196	51	203	27	42	70	15	54	70	28
7,400	198	50	208	28	43	71	16	55	71	28
7,500	200	50	214	29	43	73	16	56	73	29

G

RANGE TABLE FOR 8-INCH GUN.

WEIGHT OF PROJECTILE, 260 POUNDS.

INITIAL VELOCITY, 2750 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	° ' "	° ' "	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
7,000	3 20.7	4 19	9.30	1,876	15.4	90	350
7,100	3 24.4	4 25	9.46	1,866	15.9	88	362
7,200	3 28.1	4 31	9.62	1,855	16.4	86	375
7,300	3 31.9	4 37	9.78	1,845	17.0	84	388
7,400	3 35.7	4 43	9.94	1,834	17.6	82	401
7,500	3 39.5	4 49	10.11	1,824	18.2	80	414
7,600	3 43.4	4 55	10.27	1,813	18.8	78	428
7,700	3 47.3	5 02	10.44	1,803	19.4	77	442
7,800	3 51.2	5 08	10.61	1,793	20.0	75	456
7,900	3 55.1	5 15	10.78	1,783	20.6	74	470
8,000	3 59.1	5 21	10.95	1,773	21.3	72	485
8,100	4 03.1	5 28	11.12	1,763	22.0	71	500
8,200	4 07.2	5 34	11.29	1,753	22.7	69	516
8,300	4 11.3	5 41	11.49	1,743	23.4	68	532
8,400	4 15.4	5 47	11.64	1,733	24.1	66	548
8,500	4 19.6	5 54	11.81	1,724	24.8	65	564

G

RANGE TABLE FOR 8-INCH GUN.

WEIGHT OF PROJECTILE, 260 POUNDS.

INITIAL VELOCITY, 2750 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
7,000	197	43	157	21	42	63	11	52	63	23
7,100	199	43	162	22	42	64	11	53	64	23
7,200	201	43	166	22	43	65	12	53	65	24
7,300	203	43	171	23	43	66	12	54	66	24
7,400	205	43	175	23	44	67	13	54	67	25
7,500	207	43	180	24	44	68	13	55	68	25
7,600	209	43	184	25	44	69	13	55	69	26
7,700	211	43	189	26	45	70	14	56	70	26
7,800	213	42	194	26	45	72	14	57	72	27
7,900	215	42	199	27	46	73	15	58	73	27
8,000	217	42	204	28	47	74	15	59	74	28
8,100	219	42	209	29	47	75	15	60	75	29
8,200	221	42	214	29	48	76	16	61	76	29
8,300	223	41	219	30	48	78	16	61	78	30
8,400	225	41	224	30	49	79	17	62	79	30
8,500	227	41	229	31	49	80	17	63	80	31

H

RANGE TABLE FOR 10-INCH GUN.

WEIGHT OF PROJECTILE, 510 POUNDS.

INITIAL VELOCITY, 2700 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Ycrds</i>	<i>Feet</i>
10,000	5 10.0	6 54	13.93	1,748	34.2	55	784
10,100	5 14.2	7 01	14.10	1,741	35.1	54	804
10,200	5 18.4	7 08	14.28	1,733	36.0	53	824
10,300	5 22.6	7 15	14.45	1,726	36.9	53	844
10,400	5 26.8	7 22	14.63	1,718	37.9	52	865
10,500	5 31.0	7 29	14.80	1,711	38.9	51	886
10,600	5 35.3	7 36	14.98	1,704	39.9	50	908
10,700	5 39.6	7 43	15.15	1,697	40.9	49	930
10,800	5 43.9	7 50	15.33	1,690	41.9	49	952
10,900	5 48.3	7 57	15.51	1,683	42.9	48	974
11,000	5 52.7	8 05	15.69	1,676	44.0	47	997
11,100	5 57.1	8 12	15.87	1,669	45.0	46	1,020
11,200	6 01.6	8 20	16.06	1,662	46.1	46	1,044
11,300	6 06.1	8 27	16.24	1,655	47.2	45	1,068
11,400	6 10.6	8 35	16.43	1,649	48.3	45	1,092
11,500	6 15.1	8 42	16.61	1,642	49.4	44	1,117

H

RANGE TABLE FOR 10-INCH GUN.

WEIGHT OF PROJECTILE, 510 POUNDS.

INITIAL VELOCITY, 2700 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 10 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
10,000	276	56	253	35	59	94	19	75	94	36
10,100	278	56	258	36	60	95	19	76	95	37
10,200	280	56	262	36	60	96	20	77	96	37
10,300	282	56	267	37	61	98	20	77	98	38
10,400	284	56	271	37	61	99	20	78	99	38
10,500	286	55	276	38	62	100	21	79	100	39
10,600	288	55	280	39	62	101	21	80	101	40
10,700	290	55	285	40	63	102	22	81	102	41
10,800	292	55	290	40	63	104	22	81	104	41
10,900	294	54	295	41	64	105	23	82	105	42
11,000	296	54	300	42	64	106	23	83	106	43
11,100	298	54	305	43	64	107	23	84	107	44
11,200	300	53	310	44	65	108	24	85	108	44
11,300	303	53	315	44	65	110	24	85	110	45
11,400	305	53	320	45	66	111	25	86	111	45
11,500	307	52	325	46	66	112	25	87	112	46

I

RANGE TABLE FOR 12-INCH GUN.

WEIGHT OF PROJECTILE, 870 POUNDS.

INITIAL VELOCITY, 2900 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	<i>" ' "</i>	<i>" ' "</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
1,000	20.3	21	1.05	2,802	.....	1,000	5
1,100	22.3	23	1.15	2,792	.....	1,100	6
1,200	24.4	25	1.26	2,783	.....	1,200	7
1,300	26.5	27	1.37	2,773	.....	1,300	8
1,400	28.6	29	1.48	2,764	.....	1,400	9
1,500	30.7	32	1.59	2,754	.....	1,500	10
1,600	32.8	34	1.70	2,744	.....	1,600	11
1,700	34.9	36	1.81	2,735	.....	1,700	12
1,800	37.0	38	1.92	2,725	.....	1,800	14
1,900	39.2	40	2.03	2,716	.....	1,900	16
2,000	41.4	43	2.14	2,706	1.0	2,000	18
2,100	43.6	45	2.25	2,696	1.1	2,100	20
2,200	45.8	48	2.36	2,687	1.2	581	22
2,300	48.0	50	2.47	2,677	1.3	544	24
2,400	50.2	53	2.58	2,668	1.4	511	26
2,500	52.4	55	2.70	2,658	1.5	481	29
2,600	54.6	58	2.81	2,648	1.6	455	31
2,700	56.8	1 00	2.93	2,639	1.7	431	34
2,800	59.0	1 03	3.04	2,630	1.8	409	37
2,900	1 01.2	1 05	3.16	2,621	1.9	390	40
3,000	1 03.5	1 08	3.27	2,612	2.0	373	43
3,100	1 05.7	1 11	3.39	2,602	2.1	356	46
3,200	1 08.0	1 13	3.50	2,593	2.2	340	49
3,300	1 10.3	1 16	3.62	2,584	2.3	326	52
3,400	1 12.6	1 18	3.73	2,575	2.5	314	56
3,500	1 14.9	1 21	3.85	2,566	2.6	304	60
3,600	1 17.2	1 23	3.96	2,557	2.8	294	64
3,700	1 19.5	1 26	4.08	2,548	2.9	284	68
3,800	1 21.8	1 29	4.20	2,539	3.1	274	72
3,900	1 24.2	1 32	4.32	2,530	3.2	264	76
4,000	1 26.6	1 35	4.44	2,521	3.4	255	80

I

RANGE TABLE FOR 12-INCH GUN.

WEIGHT OF PROJECTILE, 870 POUNDS.

INITIAL VELOCITY, 2900 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 10 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
1,000	37	8	.....	.....	7	7	.....	7	7	2
1,100	41	9	.....	.....	8	8	.....	8	8	2
1,200	44	10	.....	.....	8	9	.....	8	9	2
1,300	47	10	.....	.....	9	9	.....	9	9	2
1,400	50	11	1	.....	9	10	.....	9	10	2
1,500	53	12	2	.....	10	11	.....	10	11	3
1,600	56	13	3	.....	11	12	.....	11	12	3
1,700	59	13	4	.....	11	12	.....	12	12	3
1,800	62	14	5	.....	12	13	.....	12	13	3
1,900	65	14	6	.....	12	13	.....	13	13	3
2,000	67	15	7	1	13	14	.....	14	14	4
2,100	70	16	8	1	14	15	.....	15	15	4
2,200	72	16	9	1	14	16	.....	15	16	4
2,300	75	17	10	1	15	16	.....	16	16	4
2,400	77	17	11	1	15	17	.....	16	17	4
2,500	80	18	13	2	16	18	.....	17	18	5
2,600	83	19	14	2	17	19	.....	18	19	5
2,700	85	19	16	2	18	20	.....	19	20	5
2,800	88	20	17	2	18	20	.....	19	20	5
2,900	90	20	19	2	19	21	.....	20	21	5
3,000	93	21	20	2	20	22	1	21	22	6
3,100	96	22	22	2	21	23	1	22	23	6
3,200	99	22	23	2	21	24	1	22	24	6
3,300	102	23	25	3	22	24	1	23	24	6
3,400	105	23	27	3	22	25	1	23	25	6
3,500	107	24	29	3	23	26	1	24	26	7
3,600	110	24	31	3	24	27	1	25	27	7
3,700	113	25	33	3	24	28	1	26	28	7
3,800	115	25	35	4	25	28	1	26	28	7
3,900	118	26	37	4	25	29	2	27	29	7
4,000	121	26	39	4	26	30	2	28	30	8

I

RANGE TABLE FOR 12-INCH GUN.

WEIGHT OF PROJECTILE, 870 POUNDS.

INITIAL VELOCITY, 2900 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump		Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2		3	4	5	6	7	8
<i>Yards</i>	<i>°</i>	<i>'</i>	<i>°</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
19,000	10	15.4	15 44	28.10	1,524	147.3	24	3,195
19,100	10	20.3	15 53	28.30	1,520	149.5	24	3,241
19,200	10	25.2	16 02	28.50	1,517	151.7	24	3,288
19,300	10	30.1	16 11	28.70	1,513	154.0	23	3,335
19,400	10	35.0	16 20	28.90	1,510	156.3	23	3,383
19,500	10	40.0	16 29	29.11	1,506	158.6	23	3,432
19,600	10	45.0	16 38	29.31	1,503	161.0	23	3,481
19,700	10	50.0	16 47	29.52	1,499	163.4	22	3,531
19,800	10	55.0	16 56	29.72	1,496	165.8	22	3,581
19,900	11	00.0	17 06	29.93	1,492	168.2	22	3,631
20,000	11	05.1	17 15	30.13	1,489	170.6	21	3,682
20,100	11	10.2	17 25	30.34	1,485	173.1	21	3,733
20,200	11	15.3	17 34	30.54	1,482	175.6	21	3,785
20,300	11	20.4	17 44	30.75	1,479	178.1	21	3,837
20,400	11	25.5	17 53	30.95	1,476	180.7	21	3,890
20,500	11	30.6	18 03	31.16	1,473	183.3	20	3,944
20,600	11	35.8	18 13	31.37	1,470	185.9	20	3,998
20,700	11	41.0	18 22	31.58	1,467	188.6	20	4,052
20,800	11	46.2	18 32	31.79	1,464	191.3	20	4,107
20,900	11	51.4	18 41	32.00	1,461	194.0	20	4,162
21,000	11	56.6	18 51	32.21	1,458	196.7	19	4,218
21,100	12	01.8	19 00	32.42	1,455	199.5	19	4,274
21,200	12	07.1	19 10	32.63	1,452	202.3	19	4,331
21,300	12	12.4	19 20	32.84	1,449	205.1	19	4,388
21,400	12	17.7	19 30	33.05	1,447	207.9	19	4,446
21,500	12	23.0	19 40	33.27	1,444	210.8	19	4,504
21,600	12	28.3	19 50	33.48	1,442	213.7	19	4,563
21,700	12	33.6	20 00	33.70	1,439	216.6	19	4,622
21,800	12	38.9	20 10	33.91	1,437	219.6	18	4,681
21,900	12	44.3	20 20	34.13	1,434	222.6	18	4,741
22,000	12	49.7	20 30	34.34	1,432	225.6	18	4,801

I

RANGE TABLE FOR 12-INCH GUN.

WEIGHT OF PROJECTILE, 870 POUNDS.

INITIAL VELOCITY, 2900 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 10 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
19,000	440	27	678	95	95	190	55	135	190	84
19,100	441	27	684	96	95	191	56	136	191	85
19,200	443	26	690	97	96	193	56	137	193	86
19,300	444	26	696	98	96	194	57	137	194	87
19,400	446	26	702	99	97	196	57	138	196	88
19,500	447	26	708	100	97	197	58	139	197	89
19,600	448	25	714	101	97	198	59	140	198	90
19,700	450	25	720	102	97	200	59	140	200	91
19,800	451	25	726	103	98	201	60	141	201	91
19,900	453	24	732	104	98	203	60	141	203	92
20,000	454	24	738	105	98	204	61	142	204	93
20,100	456	24	744	106	99	205	62	143	205	94
20,200	457	23	750	107	99	207	62	143	207	95
20,300	459	23	756	108	99	208	63	144	208	96
20,400	460	23	762	109	100	210	63	144	210	97
20,500	462	23	768	110	100	211	64	145	211	98
20,600	464	22	774	111	100	212	65	146	212	99
20,700	465	22	780	112	101	214	65	147	214	100
20,800	467	22	786	113	101	215	66	148	215	100
20,900	468	21	792	114	102	217	66	149	217	101
21,000	470	21	798	115	102	218	67	150	218	102
21,100	472	21	804	116	102	219	68	151	219	103
21,200	473	20	810	117	103	221	69	152	221	104
21,300	475	20	816	118	103	222	69	152	222	105
21,400	476	19	822	119	104	224	70	153	224	106
21,500	478	19	828	121	104	225	71	154	225	107
21,600	480	19	834	122	104	226	72	155	226	108
21,700	481	18	840	123	105	228	72	156	228	109
21,800	483	18	846	124	105	229	73	156	229	110
21,900	484	18	852	125	106	231	73	157	231	111
22,000	486	18	858	127	106	232	74	158	232	112

I

RANGE TABLE FOR 12-INCH GUN.

WEIGHT OF PROJECTILE, 870 POUNDS.

INITIAL VELOCITY, 2900 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump		Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2		3	4	5	6	7	8
<i>Yards</i>	<i>°</i>	<i>'</i>	<i>°</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
22,000	12	49.7	20 30	34.34	1,432	225.6	18	4,801
22,100	12	55.1	20 40	34.56	1,430	228.7	18	4,862
22,200	13	00.5	20 50	34.77	1,427	231.8	17	4,923
22,300	13	05.9	21 00	34.99	1,425	234.9	17	4,985
22,400	13	11.3	21 10	35.20	1,422	238.0	17	5,047
22,500	13	16.8	21 20	35.42	1,420	241.1	17	5,109
22,600	13	22.3	21 30	35.64	1,417	244.3	17	5,172
22,700	13	27.8	21 40	35.85	1,415	247.5	17	5,235
22,800	13	33.3	21 50	36.07	1,413	250.7	16	5,299
22,900	13	38.8	22 00	36.29	1,411	254.0	16	5,363
23,000	13	44.3	22 10	36.51	1,409	257.3	16	5,428
23,100	13	49.8	22 20	36.73	1,407	260.6	16	5,493
23,200	13	55.4	22 30	36.95	1,405	264.0	16	5,559
23,300	14	01.0	22 40	37.17	1,403	267.4	16	5,625
23,400	14	06.6	22 50	37.39	1,401	270.8	16	5,691
23,500	14	12.2	23 01	37.61	1,400	274.2	16	5,758
23,600	14	17.9	23 11	37.83	1,398	277.7	15	5,825
23,700	14	23.6	23 22	38.05	1,397	281.2	15	5,893
23,800	14	29.3	23 32	38.27	1,395	284.7	15	5,961
23,900	14	35.0	23 43	38.49	1,394	288.2	15	6,030
24,000	14	40.7	23 53	38.72	1,392	291.8	15	6,099

I

RANGE TABLE FOR 12-INCH GUN.

WEIGHT OF PROJECTILE, 870 POUNDS.

INITIAL VELOCITY, 2900 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F}$. changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 10 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
22,000	486	18	858	127	106	232	74	158	232	112
22,100	488	17	864	128	106	233	75	159	233	113
22,200	489	17	870	129	107	235	76	159	235	114
22,300	491	17	876	130	107	236	76	160	236	115
22,400	492	16	882	131	108	238	77	160	238	116
22,500	494	16	888	132	108	239	78	161	239	117
22,600	496	16	894	133	108	241	79	162	241	118
22,700	497	15	900	134	108	242	79	163	242	119
22,800	499	15	906	135	109	244	80	163	244	120
22,900	500	15	912	136	109	245	80	164	245	121
23,000	502	15	918	137	109	247	81	165	247	122
23,100	504	14	924	138	109	248	82	166	248	123
23,200	505	14	930	139	110	250	82	167	250	124
23,300	507	14	936	140	110	251	83	167	251	125
23,400	508	13	942	141	111	253	83	168	253	126
23,500	510	13	948	143	111	254	84	169	254	127
23,600	512	13	954	144	111	255	85	170	255	128
23,700	513	12	960	145	112	257	86	171	257	129
23,800	515	12	966	146	112	258	86	171	258	130
23,900	516	12	972	147	113	260	87	172	260	131
24,000	518	12	978	149	113	261	88	173	261	132

J

RANGE TABLE FOR 13-INCH GUN.

WEIGHT OF PROJECTILE, 1130 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
10,000	9 29.7	12 28	18.89	1,327	63.6	30	1,438
10,100	9 37.4	12 40	19.12	1,323	65.3	30	1,474
10,200	9 45.2	12 52	19.36	1,318	67.0	29	1,511
10,300	9 53.0	13 04	19.60	1,314	68.7	29	1,549
10,400	10 00.8	13 16	19.84	1,309	70.5	28	1,587
10,500	10 08.7	13 28	20.08	1,305	72.3	28	1,626
10,600	10 16.6	13 40	20.32	1,301	74.2	28	1,665
10,700	10 24.6	13 53	20.56	1,297	76.1	27	1,705
10,800	10 32.7	14 05	20.80	1,293	78.0	27	1,746
10,900	10 40.8	14 18	21.04	1,289	80.0	26	1,788
11,000	10 48.9	14 30	21.29	1,285	82.0	26	1,830
11,100	10 57.1	14 43	21.53	1,281	84.0	26	1,873
11,200	11 05.3	14 55	21.78	1,278	86.1	25	1,916
11,300	11 13.6	15 08	22.03	1,274	88.2	25	1,960
11,400	11 21.9	15 21	22.28	1,271	90.4	24	2,005
11,500	11 30.2	15 34	22.53	1,267	92.6	24	2,051

J

RANGE TABLE FOR 13-INCH GUN.

WEIGHT OF PROJECTILE, 1130 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 10 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
10,000	363	25	243	48	79	128	25	103	128	66
10,100	366	25	247	49	80	130	26	104	130	67
10,200	369	25	251	50	80	131	26	105	131	68
10,300	372	25	255	51	81	133	27	106	133	69
10,400	375	25	259	52	81	134	27	107	134	70
10,500	378	25	264	53	82	136	28	108	136	72
10,600	381	25	268	54	83	138	28	109	138	73
10,700	383	25	273	55	84	139	29	110	139	74
10,800	386	25	277	56	84	141	29	111	141	75
10,900	388	25	282	57	85	142	30	112	142	76
11,000	391	24	286	58	86	144	30	114	144	78
11,100	394	24	291	59	87	146	31	115	146	79
11,200	396	24	295	60	87	147	31	116	147	80
11,300	399	24	300	61	88	149	32	117	149	81
11,400	401	24	304	62	88	150	32	118	150	82
11,500	404	24	309	64	89	152	33	119	152	84

K

RANGE TABLE FOR 14-INCH GUN. (REDUCED CHARGE)

WEIGHT OF PROJECTILE, 1400 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
13,000	13 02.5	17 32	25.53	1,280	119.9	21	2,637
13,100	13 11.0	17 45	25.78	1,277	122.4	21	2,690
13,200	13 19.5	17 58	26.04	1,275	125.0	21	2,744
13,300	13 28.1	18 11	26.29	1,272	127.6	20	2,799
13,400	13 36.7	18 24	26.55	1,270	130.2	20	2,855
13,500	13 45.3	18 37	26.80	1,267	132.9	20	2,912
13,600	13 54.0	18 50	27.06	1,265	135.6	20	2,969
13,700	14 02.7	19 04	27.32	1,262	138.3	20	3,027
13,800	14 11.5	19 17	27.58	1,260	141.1	19	3,085
13,900	14 20.3	19 31	27.84	1,258	143.9	19	3,144
14,000	14 29.1	19 44	28.10	1,256	146.7	19	3,204
14,100	14 38.0	19 58	28.36	1,254	149.6	19	3,264
14,200	14 46.9	20 11	28.63	1,252	152.5	18	3,325
14,300	14 55.9	20 25	28.89	1,250	155.4	18	3,387
14,400	15 05.0	20 39	29.16	1,248	158.3	17	3,450
14,500	15 14.1	20 53	29.42	1,246	161.3	17	3,513

K

RANGE TABLE FOR 14-INCH GUN. (REDUCED CHARGE)

WEIGHT OF PROJECTILE, 1400 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 10 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
13,000	458	23	347	73	100	172	37	135	172	95
13,100	461	23	352	74	101	174	38	136	174	96
13,200	463	23	356	75	101	176	38	137	176	97
13,300	466	23	361	76	102	177	39	139	177	98
13,400	468	23	365	77	102	179	39	140	179	99
13,500	471	23	370	78	103	181	40	141	181	101
13,600	474	23	374	79	104	183	41	142	183	102
13,700	476	23	379	80	104	185	41	143	185	104
13,800	479	23	383	81	105	186	42	144	186	105
13,900	481	23	388	82	105	188	42	145	188	107
14,000	484	22	392	84	106	190	43	146	190	108
14,100	486	22	397	85	106	192	44	147	192	109
14,200	489	22	401	86	107	194	44	148	194	110
14,300	491	22	406	87	107	195	45	150	195	112
14,400	494	22	410	88	108	197	45	151	197	113
14,500	496	22	415	90	108	199	46	152	199	114

L

RANGE TABLE FOR 14-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 1400 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Angle of de- parture= angle of ele- vation plus jump	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Max- imum ordinate
1	2	3	4	5	6	7	8
<i>Yards</i>	<i>° ' "</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-Sec.</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
13,000	7 26.2	10 05	19.16	1,645	66.0	38	1,480
13,100	7 30.9	10 13	19.35	1,640	67.3	37	1,509
13,200	7 35.6	10 20	19.53	1,635	68.7	37	1,539
13,300	7 40.3	10 28	19.72	1,630	70.0	36	1,569
13,400	7 45.0	10 36	19.91	1,625	71.4	36	1,599
13,500	7 49.8	10 44	20.10	1,620	72.8	35	1,630
13,600	7 54.6	10 52	20.29	1,615	74.3	34	1,661
13,700	7 59.4	11 00	20.48	1,610	75.7	34	1,693
13,800	8 04.3	11 08	20.67	1,605	77.2	34	1,725
13,900	8 09.2	11 16	20.86	1,600	78.7	33	1,757
14,000	8 14.1	11 24	21.05	1,595	80.2	33	1,790
14,100	8 19.0	11 32	21.24	1,590	81.7	33	1,823
14,200	8 23.9	11 40	21.44	1,585	83.3	32	1,857
14,300	8 28.9	11 49	21.63	1,580	84.8	32	1,891
14,400	8 33.9	11 57	21.83	1,575	86.4	31	1,925
14,500	8 38.9	12 05	22.02	1,571	88.0	31	1,960

L

RANGE TABLE FOR 14-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 1400 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range	Change of range for variation of ± 50 foot-seconds initial velocity	Change of range for variation of ± 10 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
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Feet</i>
13,000	368	24	345	51	79	129	27	102	129	53
13,100	370	24	350	52	79	130	28	103	130	54
13,200	372	24	355	53	80	132	28	104	132	55
13,300	374	24	360	53	80	133	29	104	133	55
13,400	376	24	365	54	81	135	29	105	135	56
13,500	378	23	370	55	81	136	30	106	136	57
13,600	380	23	375	56	81	137	30	107	137	58
13,700	382	23	380	57	82	138	31	108	138	59
13,800	384	23	385	57	82	140	31	108	140	59
13,900	386	23	390	58	83	141	32	109	141	60
14,000	388	23	395	59	83	142	32	110	142	61
14,100	390	23	400	60	84	143	33	111	143	61
14,200	392	23	405	61	84	145	33	112	145	62
14,300	394	23	410	61	85	146	34	112	146	62
14,400	396	23	415	62	85	148	34	113	148	63
14,500	398	22	420	63	86	149	35	114	149	64

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
1,000	25.0	25.0	2.5	26	1.17	2,532	0.3	1,000	5
1,100	27.5	27.5	2.6	29	1.29	2,525	.3	1,100	6
1,200	30.1	30.1	2.6	31	1.41	2,518	.4	1,200	7
1,300	32.7	32.7	2.6	34	1.53	2,512	.5	1,300	8
1,400	35.3	35.3	2.6	36	1.65	2,505	.6	1,400	10
1,500	37.9	37.9	2.6	39	1.77	2,499	.7	1,500	12
1,600	40.5	40.5	2.6	41	1.89	2,492	.8	1,600	14
1,700	43.1	43.1	2.6	44	2.01	2,486	.9	1,700	16
1,800	45.7	45.7	2.6	47	2.13	2,479	1.0	1,800	18
1,900	48.3	48.3	2.6	50	2.26	2,473	1.1	1,900	20
2,000	50.9	50.9	2.6	53	2.38	2,466	1.2	528	22
2,100	53.5	53.5	2.7	55	2.50	2,460	1.3	493	25
2,200	56.2	56.2	2.7	58	2.62	2,453	1.4	462	28
2,300	58.9	58.9	2.7	1 01	2.75	2,447	1.5	434	31
2,400	1 01.6	61.6	2.7	1 04	2.87	2,440	1.6	409	34
2,500	1 04.3	64.3	2.7	1 07	2.99	2,434	1.8	387	37
2,600	1 07.0	67.0	2.7	1 10	3.12	2,427	2.0	368	40
2,700	1 09.7	69.7	2.7	1 13	3.24	2,421	2.2	350	43
2,800	1 12.4	72.4	2.7	1 16	3.36	2,414	2.4	334	46
2,900	1 15.1	75.1	2.7	1 19	3.49	2,408	2.6	319	49
3,000	1 17.8	77.8	2.7	1 22	3.61	2,401	2.8	305	52
3,100	1 20.5	80.5	2.7	1 25	3.73	2,395	3.0	293	56
3,200	1 23.2	83.2	2.8	1 28	3.86	2,388	3.2	281	60
3,300	1 26.0	86.0	2.8	1 31	3.98	2,382	3.4	270	64
3,400	1 28.8	88.8	2.8	1 34	4.11	2,375	3.6	260	68
3,500	1 31.6	91.6	2.8	1 37	4.23	2,369	3.8	250	72
3,600	1 34.4	94.4	2.8	1 40	4.36	2,362	4.0	241	76
3,700	1 37.2	97.2	2.8	1 43	4.49	2,356	4.2	233	80
3,800	1 40.0	100.0	2.8	1 47	4.62	2,350	4.5	225	85
3,900	1 42.8	102.8	2.8	1 50	4.75	2,343	4.8	218	90
4,000	1 45.6	105.6	2.8	1 53	4.88	2,337	5.1	212	95

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
1,000	8	3	2	.....	7	7	.....	6	7	2
1,100	8	3	2	.....	8	8	.....	7	8	2
1,200	9	3	3	.....	9	8	.....	8	8	3
1,300	10	4	3	.....	9	9	.....	8	9	3
1,400	11	4	4	.....	10	9	.....	9	9	3
1,500	11	4	4	.....	11	10	.....	10	10	4
1,600	12	5	5	.....	11	10	.....	10	10	4
1,700	13	5	5	.....	12	11	.....	11	11	4
1,800	14	5	6	.....	13	12	.....	12	12	4
1,900	14	6	6	.....	13	12	.....	12	12	5
2,000	15	6	7	1	14	13	.....	13	13	5
2,100	15	6	7	1	14	13	.....	13	13	5
2,200	16	7	8	1	15	14	.....	14	14	5
2,300	17	7	9	1	16	15	.....	15	15	6
2,400	18	7	10	1	16	15	.....	15	15	6
2,500	18	8	11	2	17	16	.....	16	16	6
2,600	19	8	12	2	18	17	.....	17	17	6
2,700	20	8	13	2	18	18	.....	17	18	7
2,800	21	9	14	2	19	18	.....	18	18	7
2,900	21	9	15	2	19	19	.....	19	19	7
3,000	22	9	16	2	20	20	1	19	20	7
3,100	22	10	17	2	21	21	1	20	21	8
3,200	23	10	18	2	21	21	1	21	21	8
3,300	24	10	19	2	22	22	1	21	22	8
3,400	25	11	20	2	23	23	1	22	23	9
3,500	25	11	21	3	23	24	1	23	24	9
3,600	26	11	22	3	24	24	1	23	24	9
3,700	27	12	23	3	24	25	1	24	25	9
3,800	28	12	25	3	25	26	1	25	26	10
3,900	28	12	26	3	25	27	1	25	27	10
4,000	29	12	28	3	26	28	1	26	28	10

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
4,000	1 45.6	105.6	2.8	1 53	4.88	2,337	5.1	212	95
4,100	1 48.4	108.4	2.8	1 57	5.01	2,331	5.4	206	100
4,200	1 51.2	111.2	2.9	2 00	5.14	2,325	5.7	200	105
4,300	1 54.1	114.1	2.9	2 03	5.27	2,318	6.0	194	110
4,400	1 57.0	117.0	2.9	2 07	5.40	2,312	6.3	189	116
4,500	1 59.9	119.9	2.9	2 10	5.53	2,306	6.6	184	122
4,600	2 02.8	122.8	2.9	2 13	5.66	2,300	6.9	179	128
4,700	2 05.7	125.7	2.9	2 16	5.79	2,294	7.2	174	134
4,800	2 08.6	128.6	2.9	2 20	5.92	2,287	7.5	169	140
4,900	2 11.5	131.5	2.9	2 23	6.06	2,281	7.8	165	146
5,000	2 14.4	134.4	3.0	2 26	6.19	2,275	8.2	161	153
5,100	2 17.4	137.4	3.0	2 30	6.32	2,269	8.6	157	160
5,200	2 20.4	140.4	3.0	2 33	6.45	2,263	9.0	153	167
5,300	2 23.4	143.4	3.0	2 37	6.59	2,257	9.4	149	174
5,400	2 26.4	146.4	3.0	2 40	6.72	2,251	9.8	146	181
5,500	2 29.4	149.4	3.0	2 44	6.85	2,244	10.2	143	188
5,600	2 32.4	152.4	3.0	2 47	6.99	2,238	10.6	140	195
5,700	2 35.4	155.4	3.0	2 51	7.12	2,232	11.0	137	203
5,800	2 38.4	158.4	3.0	2 55	7.25	2,226	11.4	134	211
5,900	2 41.4	161.4	3.1	2 59	7.39	2,220	11.8	131	219
6,000	2 44.5	164.5	3.1	3 03	7.52	2,214	12.2	128	227
6,100	2 47.6	167.6	3.1	3 06	7.66	2,208	12.6	125	235
6,200	2 50.7	170.7	3.1	3 10	7.79	2,202	13.1	122	243
6,300	2 53.8	173.8	3.1	3 14	7.93	2,196	13.6	119	252
6,400	2 56.9	176.9	3.1	3 18	8.06	2,190	14.1	117	261
6,500	3 00.0	180.0	3.1	3 22	8.20	2,184	14.6	115	270
6,600	3 03.1	183.1	3.1	3 26	8.34	2,178	15.1	113	279
6,700	3 06.2	186.2	3.1	3 30	8.48	2,172	15.6	111	288
6,800	3 09.3	189.3	3.2	3 34	8.62	2,166	16.1	109	298
6,900	3 12.5	192.5	3.2	3 38	8.76	2,161	16.6	107	308
7,000	3 15.7	195.7	3.2	3 42	8.90	2,155	17.1	105	318

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
4,000	29	12	28	3	26	28	1	26	28	10
4,100	29	12	29	3	26	28	2	26	28	11
4,200	30	13	31	4	27	29	2	27	29	11
4,300	31	13	32	4	28	30	2	28	30	11
4,400	32	13	34	4	29	31	2	28	31	11
4,500	32	13	35	4	29	31	2	29	31	12
4,600	33	14	37	4	30	32	2	30	32	12
4,700	34	14	38	4	30	33	2	30	33	12
4,800	35	14	40	5	31	34	2	31	34	12
4,900	35	14	41	5	31	34	2	32	34	13
5,000	36	14	43	5	32	35	2	32	35	13
5,100	36	14	44	5	32	36	3	33	36	13
5,200	37	14	46	5	33	37	3	34	37	13
5,300	38	14	47	5	33	37	3	34	37	14
5,400	38	14	49	6	34	38	3	35	38	14
5,500	39	14	51	6	35	39	3	36	39	14
5,600	40	15	53	6	35	40	3	36	40	14
5,700	40	15	55	6	36	40	3	37	40	15
5,800	41	15	57	7	36	41	3	38	41	15
5,900	42	15	59	7	37	42	3	38	42	15
6,000	42	15	61	7	38	42	3	39	42	16
6,100	43	15	63	7	38	43	4	40	43	16
6,200	44	15	65	7	39	44	4	40	44	16
6,300	44	15	67	8	39	45	4	41	45	17
6,400	45	15	69	8	40	45	4	42	45	17
6,500	46	15	71	8	40	46	4	42	46	17
6,600	46	16	73	9	41	47	4	43	47	18
6,700	47	16	75	9	41	48	4	44	48	18
6,800	48	16	77	9	42	48	4	44	48	18
6,900	48	16	79	10	42	49	4	45	49	19
7,000	49	16	82	10	43	50	4	46	50	19

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.

variation of $\pm 10^\circ\text{F}$. changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>°</i> <i>'</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>°</i> <i>'</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
7,000	3 15.7	195.7	3.2	3 42	8.90	2,155	17.1	105	318
7,100	3 18.9	198.9	3.2	3 46	9.04	2,149	17.7	103	328
7,200	3 22.1	202.1	3.2	3 50	9.18	2,143	18.3	101	338
7,300	3 25.3	205.3	3.2	3 54	9.32	2,138	18.9	99	349
7,400	3 28.5	208.5	3.3	3 58	9.46	2,132	19.5	97	360
7,500	3 31.8	211.8	3.3	4 02	9.60	2,126	20.1	95	371
7,600	3 35.1	215.1	3.3	4 06	9.75	2,120	20.7	94	382
7,700	3 38.4	218.4	3.3	4 10	9.89	2,115	21.3	92	393
7,800	3 41.7	221.7	3.3	4 14	10.03	2,109	21.9	91	404
7,900	3 45.0	225.0	3.3	4 18	10.18	2,103	22.5	89	416
8,000	3 48.3	228.3	3.3	4 23	10.32	2,097	23.1	88	428
8,100	3 51.6	231.6	3.3	4 27	10.47	2,092	23.8	86	440
8,200	3 54.9	234.9	3.3	4 32	10.61	2,086	24.5	85	452
8,300	3 58.2	238.2	3.3	4 36	10.76	2,080	25.2	83	465
8,400	4 01.5	241.5	3.3	4 41	10.90	2,075	25.9	82	478
8,500	4 04.8	244.8	3.4	4 45	11.05	2,069	26.6	80	491
8,600	4 08.2	248.2	3.4	4 50	11.19	2,063	27.3	79	504
8,700	4 11.6	251.6	3.4	4 54	11.34	2,058	28.0	78	517
8,800	4 15.0	255.0	3.4	4 59	11.48	2,052	28.7	77	530
8,900	4 18.4	258.4	3.4	5 03	11.63	2,046	29.4	76	544
9,000	4 21.8	261.8	3.4	5 07	11.77	2,041	30.1	75	558
9,100	4 25.2	265.2	3.4	5 12	11.92	2,035	30.9	74	572
9,200	4 28.6	268.6	3.5	5 16	12.07	2,030	31.7	73	586
9,300	4 32.1	272.1	3.5	5 21	12.22	2,024	32.5	72	601
9,400	4 35.6	275.6	3.5	5 25	12.37	2,019	33.3	71	616
9,500	4 39.1	279.1	3.5	5 30	12.52	2,013	34.1	70	631
9,600	4 42.6	282.6	3.5	5 35	12.67	2,008	34.9	69	646
9,700	4 46.1	286.1	3.5	5 40	12.82	2,003	35.7	68	661
9,800	4 49.6	289.6	3.6	5 45	12.97	1,997	36.5	67	677
9,900	4 53.2	293.2	3.6	5 50	13.12	1,992	37.4	66	693
10,000	4 56.8	296.8	3.6	5 55	13.27	1,987	38.3	65	709

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F}$. changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
7,000	49	16	82	10	43	50	4	46	50	19
7,100	49	16	84	10	44	51	4	46	51	19
7,200	50	16	87	10	44	51	4	47	51	20
7,300	51	16	89	11	45	52	4	48	52	20
7,400	51	16	92	11	45	53	4	48	53	20
7,500	52	17	94	11	46	54	5	49	54	21
7,600	53	17	97	12	46	54	5	50	54	21
7,700	53	17	99	12	47	55	5	50	55	22
7,800	54	17	102	12	47	56	5	51	56	22
7,900	55	17	104	13	48	57	5	52	57	23
8,000	55	17	107	13	48	58	6	52	58	23
8,100	56	17	109	13	49	58	6	53	58	24
8,200	57	17	112	13	49	59	6	54	59	24
8,300	57	17	114	14	50	60	6	54	60	24
8,400	58	17	117	14	50	61	6	55	61	25
8,500	59	18	120	14	51	62	7	56	62	25
8,600	59	18	123	15	51	62	7	56	62	26
8,700	60	18	126	15	52	63	7	57	63	26
8,800	61	18	129	15	52	64	7	58	64	26
8,900	61	18	132	16	53	65	7	58	65	27
9,000	62	18	135	16	53	66	8	59	66	27
9,100	63	18	138	16	54	67	8	60	67	28
9,200	63	18	141	16	54	68	8	60	68	28
9,300	64	18	144	17	55	68	8	61	68	28
9,400	64	18	147	17	55	69	8	62	69	29
9,500	65	19	150	17	56	70	9	62	70	29
9,600	65	19	153	18	56	71	9	63	71	30
9,700	66	19	156	18	57	72	9	64	72	30
9,800	66	19	159	18	57	73	9	64	73	30
9,900	67	19	162	19	58	74	9	65	74	31
10,000	67	19	165	19	58	75	10	65	75	31

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards</i>	<i>°</i> <i>'</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>°</i> <i>'</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
10,000	4 56.8	296.8	3.6	5 55	13.27	1,987	38.3	65	709
10,100	5 00.4	300.4	3.6	6 00	13.42	1,981	39.2	64	725
10,200	5 04.0	304.0	3.6	6 05	13.57	1,976	40.1	63	742
10,300	5 07.6	307.6	3.6	6 10	13.72	1,971	41.0	62	759
10,400	5 11.2	311.2	3.6	6 15	13.87	1,965	41.9	62	776
10,500	5 14.8	314.8	3.7	6 20	14.02	1,960	42.8	61	793
10,600	5 18.5	318.5	3.7	6 25	14.17	1,955	43.8	60	811
10,700	5 22.2	322.2	3.7	6 30	14.33	1,950	44.8	59	829
10,800	5 25.9	325.9	3.7	6 35	14.49	1,944	45.8	59	847
10,900	5 29.6	329.6	3.7	6 40	14.65	1,939	46.8	58	866
11,000	5 33.3	333.3	3.7	6 46	14.81	1,934	47.8	57	885
11,100	5 37.0	337.0	3.7	6 51	14.97	1,929	48.8	56	904
11,200	5 40.7	340.7	3.8	6 56	15.13	1,924	49.9	56	923
11,300	5 44.5	344.5	3.8	7 02	15.29	1,919	51.0	55	943
11,400	5 48.3	348.3	3.8	7 07	15.45	1,913	52.1	54	963
11,500	5 52.1	352.1	3.8	7 13	15.61	1,908	53.2	53	983
11,600	5 55.9	355.9	3.8	7 18	15.77	1,903	54.3	53	1,003
11,700	5 59.7	359.7	3.8	7 24	15.93	1,898	55.4	52	1,023
11,800	6 03.5	363.5	3.8	7 29	16.09	1,893	56.5	51	1,043
11,900	6 07.3	367.3	3.8	7 35	16.25	1,888	57.6	50	1,064
12,000	6 11.1	371.1	3.9	7 40	16.41	1,883	58.7	50	1,085
12,100	6 15.0	375.0	3.9	7 46	16.58	1,878	59.9	49	1,106
12,200	6 18.9	378.9	3.9	7 51	16.74	1,873	61.1	49	1,128
12,300	6 22.8	382.8	3.9	7 57	16.91	1,868	62.3	48	1,150
12,400	6 26.7	386.7	3.9	8 02	17.07	1,864	63.5	48	1,172
12,500	6 30.6	390.6	4.0	8 08	17.24	1,859	64.7	47	1,195
12,600	6 34.6	394.6	4.0	8 14	17.40	1,854	65.9	47	1,218
12,700	6 38.6	398.6	4.0	8 20	17.57	1,849	67.2	46	1,241
12,800	6 42.6	402.6	4.0	8 26	17.73	1,845	68.5	46	1,265
12,900	6 46.6	406.6	4.0	8 32	17.90	1,840	69.8	45	1,289
13,000	6 50.6	410.6	4.0	8 38	18.06	1,835	71.1	44	1,313

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of pro- jectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind com- ponent in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Devia- tion for lateral wind com- ponent of 10 knots.	Devia- tion for lateral motion of gun perpen- dicular to line of fire speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire speed of 10 knots.	Change in height of impact for varia- tion of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
10,000	67	19	165	19	58	75	10	65	75	31
10,100	68	19	168	19	59	75	10	66	75	32
10,200	68	19	171	20	59	76	10	67	76	32
10,300	69	19	174	20	60	77	10	67	77	33
10,400	69	19	177	20	60	78	10	68	78	33
10,500	70	19	180	21	61	79	11	69	79	34
10,600	70	19	184	21	61	80	11	69	80	34
10,700	71	19	187	22	61	81	11	70	81	35
10,800	71	19	191	22	62	82	11	71	82	35
10,900	72	19	194	22	62	82	11	71	82	36
11,000	72	19	198	23	62	83	12	72	83	36
11,100	73	19	201	23	63	84	12	72	84	36
11,200	73	19	205	24	63	85	12	73	85	37
11,300	74	19	208	24	64	86	12	74	86	37
11,400	74	19	212	25	64	87	12	74	87	38
11,500	75	19	215	25	65	88	13	75	88	38
11,600	75	19	219	25	65	88	13	76	88	38
11,700	76	19	222	26	66	89	13	76	89	39
11,800	76	19	226	26	66	90	13	77	90	39
11,900	77	19	229	27	67	91	13	78	91	40
12,000	77	19	233	27	67	92	14	78	92	40
12,100	78	19	236	28	68	93	14	79	93	41
12,200	78	19	240	28	68	94	14	80	94	41
12,300	79	19	244	29	69	95	14	80	95	42
12,400	79	19	248	29	69	96	14	81	96	42
12,500	80	19	252	30	70	97	15	82	97	43
12,600	80	20	256	30	70	98	15	82	98	43
12,700	81	20	260	31	71	99	15	83	99	44
12,800	81	20	264	31	71	100	15	84	100	44
12,900	82	20	268	32	72	101	15	84	101	45
13,000	83	20	272	32	72	102	16	85	102	45

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high	Maximum ordinate
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards</i>	<i>Feet</i>
13,000	6 50.6	410.6	4.0	8 38	18.06	1,835	71.1	44	1,313
13,100	6 54.6	414.6	4.1	8 44	18.23	1,831	72.4	44	1,337
13,200	6 58.7	418.7	4.1	8 50	18.39	1,826	73.7	43	1,362
13,300	7 02.8	422.8	4.1	8 56	18.56	1,821	75.1	43	1,387
13,400	7 06.9	426.9	4.1	9 02	18.72	1,817	76.5	42	1,412
13,500	7 11.0	431.0	4.1	9 08	18.89	1,812	77.9	42	1,437
13,600	7 15.1	435.1	4.1	9 14	19.06	1,807	79.3	41	1,463
13,700	7 19.2	439.2	4.1	9 20	19.23	1,803	80.7	41	1,489
13,800	7 23.3	443.3	4.2	9 26	19.40	1,798	82.1	40	1,515
13,900	7 27.5	447.5	4.2	9 33	19.57	1,793	83.6	40	1,542
14,000	7 31.7	451.7	4.2	9 39	19.74	1,789	85.1	39	1,569
14,100	7 35.9	455.9	4.2	9 46	19.91	1,784	86.6	39	1,596
14,200	7 40.1	460.1	4.2	9 52	20.08	1,780	88.1	38	1,624
14,300	7 44.3	464.3	4.2	9 59	20.26	1,776	89.6	38	1,652
14,400	7 48.5	468.5	4.3	10 05	20.43	1,771	91.1	37	1,680
14,500	7 52.8	472.8	4.3	10 12	20.61	1,767	92.7	37	1,709
14,600	7 57.1	477.1	4.3	10 18	20.78	1,763	94.3	36	1,738
14,700	8 01.4	481.4	4.3	10 25	20.96	1,758	95.9	36	1,767
14,800	8 05.7	485.7	4.3	10 31	21.13	1,754	97.5	36	1,797
14,900	8 10.0	490.0	4.3	10 38	21.31	1,750	99.2	35	1,827
15,000	8 14.3	494.3	4.4	10 44	21.48	1,746	100.9	35	1,857
15,100	8 18.7	498.7	4.4	10 51	21.66	1,742	102.6	35	1,888
15,200	8 23.1	503.1	4.4	10 57	21.83	1,738	104.3	34	1,919
15,300	8 27.5	507.5	4.4	11 04	22.01	1,734	106.0	34	1,950
15,400	8 31.9	511.9	4.4	11 11	22.19	1,730	107.8	34	1,982
15,500	8 36.3	516.3	4.5	11 18	22.37	1,726	109.6	33	2,014
15,600	8 40.8	520.8	4.5	11 25	22.55	1,722	111.4	33	2,046
15,700	8 45.3	525.3	4.5	11 32	22.73	1,718	113.2	33	2,079
15,800	8 49.8	529.8	4.5	11 39	22.91	1,714	115.0	32	2,112
15,900	8 54.3	534.3	4.5	11 46	23.09	1,710	116.8	32	2,145
16,000	8 58.8	538.8	4.6	11 53	23.27	1,706	118.7	32	2,179

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F}$. changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile	Change of range for variation in density of air of -10 per cent	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
13,000	83	20	272	32	72	102	16	85	102	45
13,100	83	20	276	33	73	103	16	86	103	46
13,200	84	20	280	33	73	104	16	87	104	46
13,300	84	20	284	34	74	105	17	87	105	47
13,400	85	20	288	34	74	106	17	88	106	47
13,500	85	20	292	35	75	106	17	89	106	48
13,600	86	20	296	35	75	107	18	89	107	48
13,700	86	20	300	36	76	108	18	90	108	49
13,800	87	20	304	36	76	109	18	91	109	50
13,900	87	20	308	37	77	110	19	91	110	51
14,000	88	20	312	37	77	111	19	92	111	51
14,100	88	20	316	38	78	112	19	92	112	52
14,200	89	20	320	38	78	113	19	93	113	52
14,300	89	20	324	39	79	114	20	94	114	53
14,400	90	20	328	39	79	115	20	94	115	53
14,500	90	21	332	40	80	116	20	95	116	54
14,600	91	21	336	40	80	117	21	96	117	54
14,700	91	21	340	41	81	118	21	96	118	55
14,800	92	21	345	41	81	119	21	97	119	56
14,900	92	21	349	42	82	120	22	98	120	56
15,000	93	21	354	42	82	121	22	98	121	57
15,100	93	21	358	43	83	122	22	99	122	58
15,200	94	21	363	43	83	123	22	100	123	58
15,300	94	21	367	44	83	124	23	100	124	59
15,400	95	21	372	44	84	125	23	101	125	59
15,500	95	21	376	45	84	126	23	102	126	60
15,600	96	21	381	45	84	127	24	102	127	60
15,700	96	21	385	46	85	128	24	103	128	61
15,800	97	21	390	46	85	129	24	104	129	62
15,900	97	21	394	47	85	130	25	104	130	62
16,000	98	21	399	47	86	131	25	105	131	63

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
16,000	8 58.8	538.8	4.6	11 53	23.27	1,706	118.7	32	2,179
16,100	9 03.4	543.4	4.6	12 00	23.45	1,702	120.6	31	2,213
16,200	9 08.0	548.0	4.6	12 07	23.63	1,698	122.5	31	2,248
16,300	9 12.6	552.6	4.6	12 15	23.81	1,694	124.4	31	2,283
16,400	9 17.2	557.2	4.6	12 22	23.99	1,690	126.4	30	2,318
16,500	9 21.8	561.8	4.6	12 30	24.17	1,686	128.4	30	2,354
16,600	9 26.4	566.4	4.6	12 37	24.35	1,683	130.4	30	2,390
16,700	9 31.0	571.0	4.7	12 45	24.54	1,679	132.4	30	2,426
16,800	9 35.7	575.7	4.7	12 52	24.73	1,675	134.4	29	2,463
16,900	9 40.4	580.4	4.7	13 00	24.92	1,671	136.4	29	2,500
17,000	9 45.1	585.1	4.7	13 07	25.11	1,667	138.5	29	2,537
17,100	9 49.8	589.8	4.7	13 15	25.30	1,664	140.6	29	2,575
17,200	9 54.5	594.5	4.7	13 22	25.49	1,660	142.7	28	2,613
17,300	9 59.2	599.2	4.8	13 30	25.68	1,656	144.8	28	2,651
17,400	10 04.0	604.0	4.8	13 38	25.87	1,652	147.0	28	2,690
17,500	10 08.8	608.8	4.8	13 45	26.06	1,649	149.2	27	2,729
17,600	10 13.6	613.6	4.8	13 53	26.25	1,645	151.4	27	2,769
17,700	10 18.4	618.4	4.8	14 01	26.44	1,641	153.6	27	2,809
17,800	10 23.2	623.2	4.9	14 08	26.63	1,637	155.8	27	2,849
17,900	10 28.1	628.1	4.9	14 16	26.82	1,634	158.1	26	2,890
18,000	10 33.0	633.0	4.9	14 24	27.01	1,630	160.4	26	2,931
18,100	10 37.9	637.9	4.9	14 32	27.20	1,626	162.7	26	2,973
18,200	10 42.8	642.8	4.9	14 40	27.39	1,623	165.0	26	3,015
18,300	10 47.7	647.7	5.0	14 48	27.58	1,619	167.4	26	3,058
18,400	10 52.7	652.7	5.0	14 56	27.77	1,616	169.8	25	3,101
18,500	10 57.7	657.7	5.0	15 04	27.96	1,612	172.2	25	3,145
18,600	11 02.7	662.7	5.0	15 12	28.16	1,609	174.6	25	3,189
18,700	11 07.7	667.7	5.1	15 20	28.36	1,606	177.1	25	3,234
18,800	11 12.8	672.8	5.1	15 28	28.56	1,602	179.6	25	3,279
18,900	11 17.9	677.9	5.1	15 36	28.76	1,599	182.1	24	3,325
19,000	11 23.0	683.0	5.1	15 44	28.96	1,596	184.6	24	3,371

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
16,000	98	21	399	47	86	131	25	105	131	63
16,100	98	20	404	48	87	132	25	106	132	64
16,200	99	20	408	48	87	133	25	106	133	65
16,300	99	20	413	49	88	134	26	107	134	65
16,400	100	20	418	49	88	135	26	108	135	66
16,500	100	20	422	50	89	136	26	108	136	67
16,600	101	20	427	50	89	137	27	109	137	67
16,700	101	20	432	51	90	138	27	110	138	68
16,800	102	20	436	51	90	139	27	110	139	69
16,900	102	20	441	52	91	140	28	111	140	69
17,000	103	20	446	52	91	141	28	112	141	70
17,100	103	20	450	53	91	142	28	112	142	71
17,200	104	20	455	53	92	143	29	113	143	71
17,300	104	20	460	54	92	144	29	114	144	72
17,400	105	20	464	54	92	145	29	114	145	73
17,500	105	20	469	55	93	147	30	115	147	73
17,600	106	20	474	55	93	148	30	116	148	74
17,700	106	20	478	56	93	149	31	116	149	75
17,800	107	20	483	56	94	150	31	117	150	75
17,900	107	20	488	57	94	151	31	118	151	76
18,000	108	19	492	57	95	152	32	119	152	77
18,100	108	19	497	58	95	153	32	119	153	77
18,200	109	19	502	58	96	154	33	120	154	78
18,300	109	19	506	59	96	155	33	121	155	79
18,400	110	19	511	59	97	156	33	121	156	79
18,500	110	19	516	60	97	157	34	122	157	80
18,600	111	19	520	60	98	159	34	123	159	81
18,700	111	19	525	61	98	160	35	124	160	81
18,800	112	19	530	61	99	161	35	124	161	82
18,900	112	19	535	62	99	162	36	125	162	83
19,000	113	19	540	62	100	163	36	126	163	84

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>°</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>°</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
19,000	11	23.0	683.0	5.1	15 44	28.96	1,596	184.6	24 3,371
19,100	11	28.1	688.1	5.1	15 52	29.16	1,593	187.2	24 3,418
19,200	11	33.2	693.2	5.1	16 00	29.36	1,590	189.8	24 3,465
19,300	11	38.3	698.3	5.2	16 08	29.56	1,587	192.4	24 3,513
19,400	11	43.5	703.5	5.2	16 16	29.76	1,584	195.0	23 3,561
19,500	11	48.7	708.7	5.2	16 24	29.96	1,581	197.7	23 3,609
19,600	11	53.9	713.9	5.2	16 32	30.16	1,578	200.4	23 3,658
19,700	11	59.1	719.1	5.2	16 40	30.36	1,575	203.1	23 3,707
19,800	12	04.3	724.3	5.3	16 48	30.56	1,572	205.8	23 3,757
19,900	12	09.6	729.6	5.3	16 56	30.76	1,569	208.5	22 3,807
20,000	12	14.9	734.9	5.3	17 04	30.96	1,566	211.2	22 3,857
20,100	12	20.2	740.2	5.3	17 12	31.16	1,563	214.0	22 3,908
20,200	12	25.5	745.5	5.3	17 20	31.36	1,560	216.8	22 3,959
20,300	12	30.8	750.8	5.4	17 28	31.56	1,557	219.6	22 4,011
20,400	12	36.2	756.2	5.4	17 36	31.76	1,555	222.5	21 4,064
20,500	12	41.6	761.6	5.4	17 45	31.97	1,552	225.4	21 4,117
20,600	12	47.0	767.0	5.4	17 54	32.18	1,549	228.3	21 4,171
20,700	12	52.4	772.4	5.4	18 03	32.39	1,546	231.3	21 4,225
20,800	12	57.8	777.8	5.5	18 12	32.60	1,544	234.3	21 4,280
20,900	13	03.3	783.3	5.5	18 21	32.81	1,541	237.3	20 4,335
21,000	13	08.8	788.8	5.5	18 30	33.02	1,538	240.4	20 4,391
21,100	13	14.3	794.3	5.5	18 39	33.23	1,535	243.5	20 4,447
21,200	13	19.8	799.8	5.6	18 48	33.44	1,533	246.6	20 4,504
21,300	13	25.4	805.4	5.6	18 57	33.65	1,530	249.7	20 4,561
21,400	13	31.0	811.0	5.6	19 06	33.86	1,527	252.9	19 4,619
21,500	13	36.6	816.6	5.6	19 15	34.07	1,524	256.1	19 4,677
21,600	13	42.2	822.2	5.7	19 24	34.28	1,522	259.3	19 4,736
21,700	13	47.9	827.9	5.7	19 33	34.49	1,519	262.6	19 4,796
21,800	13	53.6	833.6	5.7	19 42	34.70	1,516	265.9	19 4,856
21,900	13	59.3	839.3	5.8	19 51	34.92	1,513	269.2	18 4,917
22,000	14	05.1	845.1	5.8	20 00	35.14	1,511	272.5	18 4,978

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of pro- jectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind com- ponent in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Devia- tion for lateral wind com- ponent of 10 knots.	Devia- tion for lateral motion of gun perpen- dicular to line of fire speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire speed of 10 knots.	Change in height of impact for varia- tion of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
19,000	113	19	540	62	100	163	36	126	163	84
19,100	113	19	545	63	101	164	36	127	164	85
19,200	114	19	550	63	101	165	37	128	165	86
19,300	114	19	555	64	102	166	37	129	166	86
19,400	115	19	560	64	102	167	37	129	167	87
19,500	115	19	565	65	103	168	38	130	168	88
19,600	116	19	570	66	103	170	38	131	170	89
19,700	116	19	575	66	104	171	39	131	171	89
19,800	117	19	580	67	104	172	39	132	172	90
19,900	117	19	585	67	105	173	39	133	173	91
20,000	118	19	590	68	105	174	40	133	174	92
20,100	118	19	595	68	106	175	40	134	175	92
20,200	119	19	600	69	106	177	41	135	177	93
20,300	119	19	605	69	107	178	41	135	178	94
20,400	120	19	610	70	107	179	42	136	179	95
20,500	120	19	615	71	108	180	42	137	180	95
20,600	121	19	620	71	108	181	43	137	181	96
20,700	121	19	625	72	109	182	43	138	182	97
20,800	122	19	630	73	109	184	44	139	184	98
20,900	122	19	635	73	110	185	44	139	185	99
21,000	123	19	640	74	110	186	45	140	186	100
21,100	124	19	645	74	111	187	45	141	187	101
21,200	124	19	650	75	112	188	46	141	188	102
21,300	125	19	655	75	112	189	46	142	189	102
21,400	125	19	660	76	113	191	47	143	191	103
21,500	126	19	665	77	113	192	47	143	192	104
21,600	126	19	670	77	114	193	48	144	193	105
21,700	127	19	675	78	115	194	48	145	194	106
21,800	127	19	680	79	115	195	49	145	195	107
21,900	128	19	685	79	116	196	49	146	196	108
22,000	129	19	690	80	116	198	50	147	198	109

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i> Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
22,000	14 05.1	845.1	5.8	20 00	35.14	1,511	272.5	18	4,978
22,100	14 10.9	850.9	5.8	20 09	35.36	1,508	275.9	18	5,040
22,200	14 16.7	856.7	5.9	20 18	35.58	1,506	279.3	18	5,102
22,300	14 22.6	862.6	5.9	20 27	35.80	1,503	282.7	18	5,165
22,400	14 28.5	868.5	5.9	20 36	36.02	1,501	286.2	18	5,228
22,500	14 34.4	874.4	5.9	20 45	36.24	1,498	289.7	18	5,292
22,600	14 40.3	880.3	6.0	20 54	36.46	1,496	293.2	17	5,356
22,700	14 46.3	886.3	6.0	21 04	36.68	1,493	296.8	17	5,421
22,800	14 52.3	892.3	6.1	21 14	36.90	1,491	300.4	17	5,487
22,900	14 58.4	898.4	6.1	21 24	37.12	1,488	304.0	17	5,553
23,000	15 04.5	904.5	6.1	21 34	37.34	1,486	307.6	17	5,620
23,100	15 10.6	910.6	6.2	21 44	37.56	1,483	311.3	17	5,687
23,200	15 16.8	916.8	6.2	21 54	37.78	1,481	315.0	17	5,755
23,300	15 23.0	923.0	6.2	22 04	38.00	1,479	318.7	16	5,823
23,400	15 29.2	929.2	6.2	22 14	38.22	1,477	322.5	16	5,892
23,500	15 35.4	935.4	6.3	22 24	38.44	1,475	326.3	16	5,962
23,600	15 41.7	941.7	6.3	22 34	38.66	1,473	330.1	16	6,032
23,700	15 48.0	948.0	6.3	22 44	38.88	1,471	334.0	16	6,103
23,800	15 54.3	954.3	6.4	22 54	39.10	1,469	337.9	16	6,175
23,900	16 00.7	960.7	6.4	23 04	39.33	1,467	341.8	16	6,247
24,000	16 07.1	967.1	6.4	23 14	39.56	1,465	345.8	15	6,320
24,100	16 13.5	973.5	6.5	23 24	39.79	1,463	349.8	15	6,393
24,200	16 20.0	980.0	6.5	23 34	40.02	1,461	353.8	15	6,467
24,300	16 26.5	986.5	6.5	23 44	40.25	1,459	357.9	15	6,542
24,400	16 33.0	993.0	6.5	23 54	40.48	1,457	362.0	15	6,617
24,500	16 39.5	999.5	6.6	24 04	40.71	1,455	366.1	15	6,693
24,600	16 46.1	1,006.1	6.6	24 14	40.94	1,453	370.3	15	6,770
24,700	16 52.7	1,012.7	6.6	24 24	41.17	1,451	374.5	14	6,847
24,800	16 59.3	1,019.3	6.6	24 34	41.40	1,449	378.7	14	6,925
24,900	17 05.9	1,025.9	6.6	24 44	41.63	1,447	382.9	14	7,003
25,000	17 12.5	1,032.5	6.7	24 54	41.86	1,445	387.2	14	7,082

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F}$. changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
22,000	129	19	690	80	116	198	50	147	198	109
22,100	129	19	695	81	117	199	50	148	199	110
22,200	130	19	701	81	118	200	51	149	200	111
22,300	130	19	706	82	118	201	51	150	201	112
22,400	131	19	712	83	119	202	52	150	202	113
22,500	131	19	717	83	119	204	52	151	204	114
22,600	132	19	723	84	120	205	53	152	205	115
22,700	132	19	728	85	121	206	53	153	206	116
22,800	133	19	734	85	121	207	54	143	207	117
22,900	133	19	739	86	122	208	54	154	208	118
23,000	134	19	745	87	122	210	55	155	210	119
23,100	135	19	750	87	123	211	55	156	211	120
23,200	135	19	756	88	124	212	56	156	212	121
23,300	136	19	761	89	124	213	56	157	213	122
23,400	136	19	767	89	125	215	57	158	215	123
23,500	137	18	772	90	125	216	57	158	216	124
23,600	137	18	778	91	126	217	58	159	217	125
23,700	138	18	783	91	127	219	58	160	219	126
23,800	138	18	789	92	127	220	59	160	220	127
23,900	139	18	794	93	128	221	59	161	221	128
24,000	140	18	800	94	128	223	60	162	223	129
24,100	140	18	806	94	129	224	60	163	224	130
24,200	141	18	812	95	129	225	61	163	225	131
24,300	142	18	818	96	130	227	61	164	227	132
24,400	142	18	824	96	130	228	62	165	228	133
24,500	143	18	830	97	131	230	62	166	230	134
24,600	143	18	836	98	131	231	63	166	231	136
24,700	144	18	843	99	132	233	63	167	233	137
24,800	144	18	848	99	132	234	64	168	234	138
24,900	145	18	854	100	133	236	64	169	236	139
25,000	146	18	860	101	133	237	65	170	237	140

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>°</i> <i>'</i>	<i>Minutes.</i>	<i>Minutes</i>	<i>°</i> <i>'</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
25,000	17 12.5	1,032.5	6.7	24 54	41.86	1,445	387.2	14	7,082
25,100	17 19.2	1,039.2	6.7	25 05	42.09	1,443	391.5	14	7,162
25,200	17 25.9	1,045.9	6.7	25 16	42.33	1,441	395.9	14	7,242
25,300	17 32.6	1,052.6	6.8	25 27	42.57	1,439	400.3	14	7,323
25,400	17 39.4	1,059.4	6.8	25 38	42.81	1,437	404.8	13	7,405
25,500	17 46.2	1,066.2	6.8	25 49	43.05	1,435	409.3	13	7,487
25,600	17 53.0	1,073.0	6.8	26 00	43.29	1,434	413.8	13	7,570
25,700	17 59.8	1,079.8	6.9	26 11	43.53	1,433	418.4	13	7,654
25,800	18 06.7	1,086.7	6.9	26 22	43.77	1,432	423.0	13	7,739
25,900	18 13.6	1,093.6	6.9	26 33	44.01	1,431	427.7	13	7,824
26,000	18 20.5	1,100.5	6.9	26 44	44.25	1,430	432.4	13	7,910
26,100	18 27.4	1,107.4	6.9	26 55	44.49	1,429	437.2	13	7,996
26,200	18 34.3	1,114.3	6.9	27 06	44.73	1,428	442.0	13	8,083
26,300	18 41.2	1,121.2	6.9	27 17	44.97	1,427	446.8	13	8,171
26,400	18 48.1	1,128.1	7.0	27 28	45.21	1,426	451.7	13	8,260
26,500	18 55.1	1,135.1	7.0	27 39	45.45	1,425	456.6	12	8,350
26,600	19 02.1	1,142.1	7.0	27 50	45.70	1,424	461.5	12	8,440
26,700	19 09.1	1,149.1	7.0	28 01	45.95	1,423	466.5	12	8,531
26,800	19 16.1	1,156.1	7.0	28 12	46.20	1,422	471.5	12	8,623
26,900	19 23.1	1,163.1	7.1	28 23	46.45	1,421	476.5	12	8,716
27,000	19 30.2	1,170.2	7.1	28 34	46.70	1,420	481.6	12	8,810
27,100	19 37.3	1,177.3	7.1	28 45	46.95	1,419	486.7	12	8,904
27,200	19 44.4	1,184.4	7.2	28 56	47.20	1,418	491.9	12	8,999
27,300	19 51.6	1,191.6	7.2	29 07	47.45	1,417	497.1	12	9,095
27,400	19 58.8	1,198.8	7.2	29 18	47.70	1,416	502.4	12	9,192
27,500	20 06.0	1,206.0	7.3	29 29	47.95	1,415	507.7	12	9,289
27,600	20 13.3	1,213.3	7.3	29 40	48.20	1,414	513.1	11	9,387
27,700	20 20.6	1,220.6	7.4	29 51	48.45	1,413	518.5	11	9,486
27,800	20 28.0	1,228.0	7.4	30 02	48.70	1,412	524.0	11	9,585
27,900	20 35.4	1,235.4	7.5	30 13	48.95	1,411	529.5	11	9,685
28,000	20 42.9	1,242.9	7.5	30 24	49.21	1,410	535.0	11	9,786

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Feet.
25,000	146	18	860	101	133	237	65	170	237	140
25,100	146	18	866	102	134	238	65	171	238	141
25,200	147	18	872	103	134	240	66	172	240	142
25,300	148	18	878	104	135	241	66	173	241	143
25,400	148	18	884	104	135	242	67	173	242	144
25,500	149	17	890	105	136	244	67	174	244	146
25,600	149	17	896	106	136	245	68	175	245	147
25,700	150	17	902	107	137	246	68	176	246	148
25,800	150	17	908	107	137	248	69	176	248	149
25,900	151	17	914	108	138	249	69	177	249	150
26,000	152	17	920	109	138	250	70	178	250	151
26,100	152	17	926	110	139	252	70	179	252	152
26,200	153	17	932	110	139	253	71	179	253	154
26,300	153	17	938	111	140	255	71	180	255	155
26,400	154	17	944	112	140	256	72	181	256	156
26,500	154	17	950	113	141	257	73	182	257	157
26,600	155	17	956	114	141	259	73	182	259	158
26,700	155	17	962	114	142	260	74	183	260	159
26,800	156	17	968	115	142	262	74	184	262	161
26,900	156	17	974	116	143	263	75	185	263	162
27,000	157	17	980	117	143	264	76	186	264	163
27,100	158	17	986	118	144	266	76	186	266	164
27,200	158	17	992	119	144	267	77	187	267	166
27,300	159	17	998	120	145	269	77	188	269	167
27,400	160	17	1,004	121	145	270	78	189	270	168
27,500	160	16	1,010	121	146	271	79	190	271	170
27,600	161	16	1,016	122	146	273	79	190	273	171
27,700	161	16	1,022	123	147	274	80	191	274	172
27,800	162	16	1,028	124	147	276	80	192	276	174
27,900	162	16	1,034	125	148	277	81	193	277	175
28,000	163	16	1,040	126	148	278	82	194	278	176

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.			Increase in angle of departure for 100 yards increase in range.	Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2		2a	2b	3		4	5	6	7	8
Yards.	°	'	Minutes.	Minutes.	°	'	Seconds.	Ft.-secs.	Yards.	Yards.	Feet
28,000	20	42.9	1,242.9	7.5	30	24	49.21	1,410	535.0	11	9,786
28,100	20	50.4	1,250.4	7.5	30	35	49.47	1,409	540.6	11	9,888
28,200	20	57.9	1,257.9	7.6	30	46	49.73	1,408	546.2	11	9,991
28,300	21	05.5	1,265.5	7.6	30	57	49.99	1,407	551.9	11	10,095
28,400	21	13.1	1,273.1	7.6	31	08	50.25	1,406	557.6	11	10,200
28,500	21	20.7	1,280.7	7.6	31	19	50.51	1,405	563.4	11	10,306
28,600	21	28.3	1,288.3	7.7	31	30	50.77	1,405	569.2	11	10,412
28,700	21	36.0	1,296.0	7.7	31	41	51.03	1,404	575.1	11	10,519
28,800	21	43.7	1,303.7	7.7	31	52	51.29	1,404	581.0	11	10,627
28,900	21	51.4	1,311.4	7.8	32	03	51.55	1,403	587.0	11	10,736
29,000	21	59.2	1,319.2	7.8	32	14	51.81	1,403	593.0	11	10,846
29,100	22	07.0	1,327.0	7.9	32	25	52.07	1,403	599.1	10	10,957
29,200	22	14.9	1,334.9	7.9	32	36	52.33	1,402	605.2	10	11,069
29,300	22	22.8	1,342.8	7.9	32	47	52.60	1,402	611.4	10	11,182
29,400	22	30.7	1,350.7	7.9	32	58	52.87	1,402	617.6	10	11,296
29,500	22	38.6	1,358.6	8.0	33	09	53.14	1,402	623.9	10	11,411
29,600	22	46.6	1,366.6	8.0	33	20	53.41	1,401	630.2	10	11,527
29,700	22	54.6	1,374.6	8.1	33	31	53.68	1,401	636.6	10	11,644
29,800	23	02.7	1,382.7	8.1	33	42	53.95	1,401	643.0	10	11,762
29,900	23	10.8	1,390.8	8.2	33	53	54.22	1,401	649.5	10	11,881
30,000	23	19.0	1,399.0	8.2	34	04	54.49	1,400	656.0	10	12,001
30,100	23	27.2	1,407.2	8.2	34	15	54.76	1,400	662.6	10	12,122
30,200	23	35.4	1,415.4	8.2	34	26	55.03	1,400	669.3	10	12,245
30,300	23	43.6	1,423.6	8.3	34	37	55.30	1,400	676.0	10	12,369
30,400	23	51.9	1,431.9	8.4	34	48	55.57	1,400	682.8	10	12,495
30,500	24	00.3	1,440.3	8.4	34	59	55.84	1,400	689.7	10	12,622
30,600	24	08.7	1,448.7	8.4	35	10	56.11	1,400	696.6	9	12,751
30,700	24	17.1	1,457.1	8.5	35	21	56.39	1,400	703.6	9	12,881
30,800	24	25.6	1,465.6	8.5	35	32	56.67	1,400	710.7	9	13,013
30,900	24	34.1	1,474.1	8.6	35	43	56.95	1,401	717.8	9	13,146
31,000	24	42.7	1,482.7	8.6	35	54	57.23	1,402	725.0	9	13,281

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
28,000	163	16	1,040	126	148	278	82	194	278	176
28,100	163	16	1,046	127	149	280	82	195	280	178
28,200	164	16	1,052	128	150	281	83	196	281	179
28,300	164	16	1,058	129	150	283	83	196	283	180
28,400	165	16	1,064	130	151	284	84	197	284	181
28,500	165	16	1,070	130	151	285	85	198	285	183
28,600	166	16	1,076	131	152	287	85	199	287	184
28,700	166	16	1,082	132	153	288	86	200	288	185
28,800	167	16	1,088	133	153	290	86	201	290	186
28,900	167	16	1,094	134	154	291	87	202	291	188
29,000	168	16	1,100	135	154	292	88	203	292	189
29,100	168	16	1,106	136	155	294	88	204	294	190
29,200	169	16	1,112	137	156	295	89	205	295	192
29,300	169	16	1,118	138	156	297	89	206	297	193
29,400	170	16	1,124	139	157	298	90	206	298	194
29,500	170	15	1,130	140	157	300	91	207	300	196
29,600	171	15	1,136	141	158	301	91	208	301	197
29,700	171	15	1,142	142	159	303	92	209	303	198
29,800	172	15	1,148	143	159	304	92	210	304	200
29,900	172	15	1,154	144	160	306	93	211	306	201
30,000	173	15	1,160	145	160	307	94	212	307	203
30,100	174	15	1,166	146	161	309	94	213	309	204
30,200	174	15	1,172	147	162	310	95	214	310	205
30,300	175	15	1,178	148	162	312	95	215	312	207
30,400	176	15	1,184	149	163	313	96	216	313	208
30,500	176	15	1,190	150	163	315	97	217	315	210
30,600	177	15	1,196	151	164	316	97	218	316	211
30,700	177	15	1,202	152	165	318	98	219	318	212
30,800	178	15	1,208	153	165	319	98	220	319	214
30,900	179	15	1,214	154	166	321	99	221	321	215
31,000	179	15	1,220	155	166	322	100	222	322	217

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds</i>	<i>Ft.-secs.</i>	<i>Yards</i>	<i>Yards.</i>	<i>Feet.</i>
31,000	24 42.7	1,482.7	8.6	35 54	57.23	1,402	725.0	9	13,281
31,100	24 51.3	1,491.3	8.7	36 05	57.51	1,402	732.3	9	13,417
31,200	25 00.0	1,500.0	8.7	36 16	57.79	1,402	739.7	9	13,555
31,300	25 08.7	1,508.7	8.7	36 27	58.07	1,403	747.1	9	13,694
31,400	25 17.4	1,517.4	8.8	36 38	58.35	1,403	754.6	9	13,835
31,500	25 26.2	1,526.2	8.9	36 49	58.64	1,403	762.2	9	13,977
31,600	25 35.1	1,535.1	8.9	37 00	58.93	1,404	769.9	9	14,121
31,700	25 44.0	1,544.0	8.9	37 11	59.22	1,404	777.6	9	14,266
31,800	25 52.9	1,552.9	9.0	37 22	59.51	1,404	785.4	9	14,413
31,900	26 01.9	1,561.9	9.1	37 33	59.80	1,405	793.3	9	14,561
32,000	26 11.0	1,571.0	9.1	37 44	60.09	1,405	801.3	9	14,711
32,100	26 20.1	1,580.1	9.2	37 55	60.39	1,405	809.4	9	14,862
32,200	26 29.3	1,589.3	9.2	38 06	60.69	1,406	817.6	9	15,015
32,300	26 38.5	1,598.5	9.3	38 18	60.99	1,406	825.8	9	15,169
32,400	26 47.8	1,607.8	9.4	38 30	61.29	1,406	834.1	9	15,325
32,500	26 57.2	1,617.2	9.4	38 42	61.59	1,407	842.5	8	15,482
32,600	27 06.6	1,626.6	9.4	38 54	61.90	1,407	850.9	8	15,641
32,700	27 16.0	1,636.0	9.6	39 06	62.21	1,408	859.4	8	15,801
32,800	27 25.6	1,645.6	9.6	39 18	62.52	1,408	868.0	8	15,963
32,900	27 35.2	1,655.2	9.6	39 30	62.83	1,409	876.6	8	16,126
33,000	27 44.8	1,664.8	9.7	39 42	63.14	1,409	885.3	8	16,291
33,100	27 54.5	1,674.5	9.8	39 54	63.46	1,410	894.1	8	16,457
33,200	28 04.3	1,684.3	9.9	40 06	63.78	1,411	903.0	8	16,625
33,300	28 14.2	1,694.2	9.9	40 18	64.10	1,412	912.0	8	16,794
33,400	28 24.1	1,704.1	10.0	40 30	64.42	1,413	921.1	8	16,965
33,500	28 34.1	1,714.1	10.1	40 42	64.75	1,414	930.3	8	17,137
33,600	28 44.2	1,724.2	10.1	40 54	65.08	1,415	939.6	8	17,311
33,700	28 54.3	1,734.3	10.2	41 06	65.41	1,416	949.0	8	17,486
33,800	29 04.5	1,744.5	10.3	41 18	65.74	1,417	958.5	8	17,663
33,900	29 14.8	1,754.8	10.4	41 30	66.07	1,418	968.1	8	17,841
34,000	29 25.2	1,765.2	10.5	41 42	66.40	1,419	977.8	8	18,021

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Feet.
31,000	179	15	1,220	155	166	322	100	222	322	217
31,100	180	15	1,226	156	167	324	100	223	324	218
31,200	180	15	1,232	157	168	325	101	224	325	220
31,300	181	15	1,238	158	168	327	101	225	327	221
31,400	182	15	1,244	159	169	328	102	226	328	223
31,500	182	14	1,250	160	169	330	103	227	330	224
31,600	183	14	1,256	161	170	331	103	228	331	226
31,700	183	14	1,262	162	171	333	104	229	333	227
31,800	184	14	1,268	163	171	335	104	230	335	229
31,900	184	14	1,274	164	172	336	105	231	336	230
32,000	185	14	1,280	165	172	338	106	232	338	232
32,100	186	14	1,286	166	173	340	106	233	340	233
32,200	186	14	1,292	167	174	341	107	234	341	235
32,300	187	14	1,298	168	174	343	107	235	343	237
32,400	188	14	1,304	169	175	345	108	236	345	238
32,500	188	14	1,310	170	175	347	109	238	347	240
32,600	189	14	1,316	171	176	348	109	239	348	242
32,700	189	14	1,322	172	177	350	110	240	350	243
32,800	190	14	1,328	173	177	352	110	241	352	245
32,900	190	14	1,334	174	178	354	111	242	354	247
33,000	191	14	1,340	175	179	355	112	243	355	249
33,100	192	14	1,346	176	179	357	113	244	357	250
33,200	192	14	1,353	177	180	359	113	245	359	252
33,300	193	14	1,359	178	181	361	114	246	361	254
33,400	194	14	1,366	179	181	362	115	247	362	256
33,500	194	13	1,372	180	182	364	115	249	364	257
33,600	195	13	1,379	181	183	366	116	250	366	259
33,700	196	13	1,385	182	183	368	117	251	368	261
33,800	196	13	1,392	183	184	369	117	252	369	263
33,900	197	13	1,398	184	185	371	118	253	371	265
34,000	198	13	1,405	185	186	373	119	254	373	267

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;
variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range	Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	
1	2	2a	2b	3		4	5	6	7	8	
<i>Yards.</i>	<i>°</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>°</i>	<i>'</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards</i>	<i>Feet.</i>	
34,000	29	25.2	1,765.2	10.5	41	42	66.40	1,419	977.8	8	18,021
34,100	29	35.7	1,775.7	10.6	41	54	66.74	1,420	987.6	8	18,202
34,200	29	46.3	1,786.3	10.6	42	06	67.08	1,421	997.5	8	18,385
34,300	29	56.9	1,796.9	10.7	42	18	67.42	1,422	1,007.5	8	18,569
34,400	30	07.6	1,807.6	10.8	42	30	67.76	1,423	1,017.6	8	18,755
34,500	30	18.4	1,818.4	11.0	42	42	68.11	1,424	1,027.8	7	18,942
34,600	30	29.4	1,829.4	11.0	42	54	68.46	1,425	1,038.1	7	19,131
34,700	30	40.4	1,840.4	11.1	43	06	68.81	1,426	1,048.5	7	19,321
34,800	30	51.5	1,851.5	11.2	43	18	69.16	1,427	1,059.0	7	19,513
34,900	31	02.7	1,862.7	11.3	43	30	69.52	1,428	1,069.6	7	19,706
35,000	31	14.0	1,874.0	11.4	43	42	69.88	1,430	1,080.3	7	19,901
35,100	31	25.4	1,885.4	11.5	43	54	70.24	1,432	1,091.1	7	20,098
35,200	31	36.9	1,896.9	11.6	44	06	70.60	1,434	1,102.0	7	20,297
35,300	31	48.5	1,908.5	11.8	44	18	70.97	1,436	1,113.0	7	20,498
35,400	32	00.3	1,920.3	11.9	44	30	71.34	1,438	1,124.2	7	20,702
35,500	32	12.2	1,932.2	12.0	44	42	71.71	1,440	1,135.5	7	20,909
35,600	32	24.2	1,944.2	12.1	44	54	72.08	1,442	1,146.9	7	21,119
35,700	32	36.3	1,956.3	12.2	45	06	72.46	1,444	1,158.5	7	21,333
35,800	32	48.5	1,968.5	12.4	45	18	72.84	1,446	1,170.2	7	21,551
35,900	33	00.9	1,980.9	12.5	45	30	73.22	1,448	1,182.0	7	21,773
36,000	33	13.4	1,993.4	12.7	45	42	73.60	1,450	1,194.0	7	22,000
36,100	33	26.1	2,006.1	12.9	45	54	73.99	1,452	1,206.1	7	22,232
36,200	33	39.0	2,019.0	13.0	46	06	74.38	1,454	1,218.4	7	22,469
36,300	33	52.0	2,032.0	13.2	46	18	74.78	1,456	1,230.8	7	22,710
36,400	34	05.2	2,045.2	13.3	46	30	75.18	1,458	1,243.4	7	22,955
36,500	34	18.5	2,058.5	13.5	46	42	75.59	1,460	1,256.1	6	23,204
36,600	34	32.0	2,072.0	13.6	46	55	76.00	1,462	1,269.0	6	23,456
36,700	34	45.6	2,085.6	13.8	47	08	76.42	1,464	1,282.0	6	23,711
36,800	34	59.4	2,099.4	14.0	47	21	76.84	1,466	1,295.2	6	23,969
36,900	35	13.4	2,113.4	14.3	47	34	77.27	1,468	1,308.5	6	24,299
37,000	35	27.7	2,127.7	14.5	47	47	77.70	1,470	1,322.0	6	24,491

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
34,000	198	13	1,405	185	186	373	119	254	373	267
34,100	198	13	1,411	186	186	375	120	255	375	269
34,200	199	13	1,418	187	187	377	121	256	377	270
34,300	200	13	1,424	188	188	379	121	258	379	272
34,400	200	13	1,431	189	188	381	122	259	381	274
34,500	201	13	1,437	190	189	383	123	260	383	276
34,600	202	13	1,444	191	190	385	123	261	385	278
34,700	202	13	1,450	192	191	387	124	262	387	280
34,800	203	13	1,457	193	192	389	125	263	389	282
34,900	204	13	1,463	194	193	391	125	265	391	284
35,000	205	13	1,470	195	194	393	126	266	393	286
35,100	205	13	1,476	196	194	395	127	267	395	288
35,200	206	13	1,483	197	195	397	128	268	397	290
35,300	207	13	1,489	198	196	399	128	270	399	292
35,400	208	13	1,496	199	197	401	129	271	401	294
35,500	208	12	1,502	200	198	404	130	272	404	296
35,600	209	12	1,509	202	199	406	131	273	406	299
35,700	210	12	1,515	203	200	408	131	275	408	301
35,800	211	12	1,522	204	201	410	132	276	410	303
35,900	211	12	1,528	205	202	412	133	277	412	305
36,000	212	12	1,535	206	203	414	134	279	414	307
36,100	213	12	1,541	207	204	417	134	280	417	310
36,200	214	12	1,548	208	205	419	135	282	419	312
36,300	214	12	1,554	209	206	421	136	283	421	314
36,400	215	12	1,561	211	207	424	137	285	424	317
36,500	216	12	1,567	212	208	426	138	286	426	319
36,600	217	12	1,574	213	209	428	138	288	428	321
36,700	217	12	1,580	214	210	430	139	289	430	324
36,800	218	12	1,587	216	211	433	140	291	433	326
36,900	219	12	1,593	217	212	435	141	293	435	328
37,000	220	12	1,600	218	213	437	142	295	437	331

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3		4	5	6	7	8
<i>Yards</i>	<i>°</i> <i>'</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>°</i> <i>'</i>		<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
37,000	35 27.7	2,127.7	14.5	47 47		77.70	1,470	1,322.0	6	24,491
37,100	35 42.2	2,142.2	14.6	48 00		78.14	1,473	1,335.7	6	24,756
37,200	35 56.8	2,156.8	14.9	48 14		78.58	1,476	1,349.6	6	25,024
37,300	36 11.7	2,171.7	15.2	48 28		79.03	1,479	1,363.7	6	25,295
37,400	36 26.9	2,186.9	15.5	48 42		79.48	1,482	1,378.0	6	25,570
37,500	36 42.4	2,202.4	15.7	48 56		79.94	1,485	1,392.5	6	25,849
37,600	36 58.1	2,218.1	16.0	49 10		80.40	1,488	1,407.2	6	26,133
37,700	37 14.1	2,234.1	16.3	49 24		80.87	1,491	1,422.1	6	26,422
37,800	37 30.4	2,250.4	16.6	49 39		81.34	1,494	1,437.2	6	26,716
37,900	37 47.0	2,267.0	17.0	49 54		81.81	1,497	1,452.5	6	27,016
38,000	38 04.0	2,284.0	17.4	50 09		82.28	1,500	1,468.0	6	27,325
38,100	38 21.4	2,301.4	17.8	50 24		82.75	1,503	1,483.8	6	27,652
38,200	38 39.2	2,319.2	18.2	50 39		83.22	1,506	1,499.9	6	27,997
38,300	38 57.4	2,337.4	18.6	50 55		83.70	1,509	1,516.3	6	28,360
38,400	39 16.0	2,356.0	19.0	51 11		84.19	1,512	1,533.0	6	28,741
38,500	39 35.0	2,375.0	19.4	51 27		84.69	1,515	1,550.0	5	29,140
38,600	39 54.4	2,394.4	19.9	51 43		85.20	1,519	1,567.3	5	29,559
38,700	40 14.3	2,414.3	20.6	52 00		85.72	1,523	1,584.9	5	30,003
38,800	40 34.9	2,434.9	21.7	52 17		86.28	1,527	1,602.8	5	30,472
38,900	40 56.6	2,456.6	23.4	52 34		86.90	1,531	1,621.0	5	30,966
39,000	41 20.0	2,480.0	25.9	52 53		87.60	1,535	1,639.5	5	31,485
39,100	41 45.9	2,505.9	29.4	53 13		88.40	1,539	1,658.3	5	32,039
39,200	42 15.3	2,535.3	34.1	53 36		89.32	1,543	1,677.4	5	32,639
39,300	42 49.4	2,569.4	40.2	54 03		90.38	1,547	1,696.8	5	33,295
39,400	43 29.6	2,609.6	47.9	54 35		91.60	1,551	1,716.5	5	34,017
39,500	44 17.5	2,657.5	57.4	55 12		93.00	1,555	1,736.5	5	34,815
39,600	45 14.9	2,714.9	.....	55 54		94.60	1,559	1,756.8	5	35,699

M

RANGE TABLE FOR 16-INCH GUN. (FULL CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2600 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of ± 10 feet per second initial velocity.	Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation in density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
37,000	220	12	1,600	218	213	437	142	295	437	331
37,100	221	12	1,606	219	214	440	143	296	440	334
37,200	222	12	1,612	220	215	442	144	298	442	337
37,300	223	12	1,618	222	217	445	144	300	445	339
37,400	224	12	1,624	223	218	447	145	302	447	342
37,500	225	11	1,630	225	220	450	146	304	450	345
37,600	226	11	1,636	226	221	452	147	306	452	348
37,700	227	11	1,642	228	223	455	148	308	455	350
37,800	228	11	1,648	229	224	457	148	310	457	353
37,900	229	11	1,654	231	226	460	149	312	460	356
38,000	230	11	1,660	232	227	463	150	314	463	359
38,100	231	11	1,666	233	229	466	151	316	466	362
38,200	232	11	1,672	235	231	469	152	318	469	365
38,300	233	11	1,678	237	233	472	152	320	472	368
38,400	234	11	1,684	238	235	475	153	322	475	371
38,500	235	11	1,690	240	237	478	154	324	478	374
38,600	236	11	1,696	242	239	481	155	326	481	378
38,700	237	11	1,702	243	241	484	156	328	484	382
38,800	238	11	1,708	245	243	487	157	331	487	386
38,900	239	11	1,714	247	245	490	158	334	490	391
39,000	240	10	1,720	249	247	493	159	337	493	396
39,100	241	10	1,726	251	249	498	160	341	498	402
39,200	242	10	1,732	253	252	503	161	345	503	408
39,300	243	10	1,738	255	255	509	162	349	509	415
39,400	244	10	1,744	257	258	516	163	354	516	423
39,500	245	10	1,750	259	261	524	164	359	524	432
39,600	246	10	1,756	261	264	532	165	365	532	443

N

RANGE TABLE FOR 16-INCH GUN. (REDUCED CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
1,000	42.2	42.2	4.3	43	1.55	1,939	0.4	1,000	9
1,100	46.5	46.5	4.4	47	1.70	1,933	.5	1,100	11
1,200	50.9	50.9	4.4	51	1.86	1,927	.6	1,200	13
1,300	55.3	55.3	4.4	55	2.02	1,921	.7	1,300	15
1,400	59.7	59.7	4.4	1 00	2.18	1,915	.8	1,400	18
1,500	1 04.1	64.1	4.4	1 05	2.34	1,909	.9	435	21
1,600	1 08.5	68.5	4.5	1 10	2.50	1,903	1.0	399	24
1,700	1 13.0	73.0	4.5	1 15	2.66	1,897	1.1	366	27
1,800	1 17.5	77.5	4.5	1 20	2.82	1,891	1.2	336	31
1,900	1 22.0	82.0	4.5	1 25	2.98	1,886	1.4	310	35
2,000	1 26.5	86.5	4.5	1 30	3.14	1,880	1.6	287	39
2,100	1 31.0	91.0	4.6	1 35	3.30	1,874	1.8	268	43
2,200	1 35.6	95.6	4.6	1 40	3.46	1,869	2.0	252	47
2,300	1 40.2	100.2	4.6	1 45	3.62	1,863	2.2	238	51
2,400	1 44.8	104.8	4.6	1 50	3.78	1,857	2.4	226	56
2,500	1 49.4	109.4	4.6	1 55	3.94	1,852	2.6	214	61
2,600	1 54.0	114.0	4.6	2 00	4.11	1,846	2.8	204	66
2,700	1 58.6	118.6	4.7	2 05	4.17	1,840	3.0	195	72
2,800	2 03.3	123.3	4.7	2 10	4.44	1,835	3.2	186	78
2,900	2 08.0	128.0	4.7	2 16	4.60	1,829	3.5	178	84
3,000	2 12.7	132.7	4.7	2 21	4.77	1,823	3.8	171	90
3,100	2 17.4	137.4	4.7	2 27	4.93	1,818	4.1	164	96
3,200	2 22.1	142.1	4.7	2 32	5.10	1,812	4.4	158	103
3,300	2 26.8	146.8	4.8	2 38	5.26	1,806	4.7	152	110
3,400	2 31.6	151.6	4.8	2 43	5.43	1,801	5.0	147	117
3,500	2 36.4	156.4	4.8	2 49	5.59	1,795	5.3	142	124
3,600	2 41.2	161.2	4.8	2 54	5.76	1,789	5.6	137	132
3,700	2 46.0	166.0	4.9	3 00	5.93	1,784	5.9	132	140
3,800	2 50.9	170.9	4.9	3 05	6.10	1,778	6.2	128	148
3,900	2 55.8	175.8	4.9	3 11	6.27	1,773	6.6	124	156
4,000	3 00.7	180.7	4.9	3 16	6.44	1,767	7.0	120	165

N

RANGE TABLE FOR 16-INCH GUN. (REDUCED CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Deviation for lateral wind component of 10 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
1,000	10	3	2	.....	9	9	.....	8	9	4
1,100	11	3	3	.....	10	10	.....	9	10	4
1,200	12	4	3	.....	11	11	.....	10	11	4
1,300	13	4	4	.....	12	12	.....	11	12	5
1,400	14	4	4	.....	13	13	.....	12	13	5
1,500	15	5	5	.....	14	14	.....	12	14	6
1,600	16	5	5	.....	15	14	.....	13	14	6
1,700	17	5	6	.....	15	15	.....	14	15	7
1,800	18	6	7	.....	16	16	.....	15	16	7
1,900	19	6	7	.....	17	17	.....	16	17	8
2,000	20	6	8	1	18	18	1	17	18	8
2,100	21	7	9	1	19	19	1	17	19	8
2,200	22	7	10	1	20	20	1	18	20	9
2,300	23	7	11	1	21	21	1	19	21	9
2,400	24	8	12	1	21	22	1	20	22	9
2,500	25	8	13	1	22	23	1	21	23	10
2,600	26	8	14	1	23	23	2	22	23	10
2,700	27	8	15	1	24	24	2	22	24	11
2,800	28	9	16	1	25	25	2	23	25	11
2,900	29	9	17	1	26	26	2	24	26	12
3,000	30	9	18	1	27	27	2	25	27	12
3,100	31	9	19	1	27	28	2	26	28	13
3,200	32	10	20	1	28	29	2	27	29	13
3,300	33	10	22	1	29	30	2	28	30	14
3,400	34	10	23	1	30	31	2	28	31	14
3,500	35	10	24	2	31	32	3	29	32	15
3,600	36	11	26	2	32	32	3	30	32	15
3,700	37	11	27	2	32	33	3	31	33	16
3,800	37	11	29	2	33	34	3	32	34	16
3,900	38	11	30	2	34	35	3	33	35	17
4,000	39	12	32	2	35	36	3	34	36	17

N

RANGE TABLE FOR 16-INCH GUN. (REDUCED CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Angle of departure=angle of elevation plus jump.		Increase in angle of departure for 100 yards increase in range.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high	Maximum ordinate.
1	2	2a	2b	3	4	5	6	7	8
<i>Yards.</i>	<i>° ' "</i>	<i>Minutes.</i>	<i>Minutes.</i>	<i>° ' "</i>	<i>Seconds.</i>	<i>Ft.-secs.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
23,500	33 20.4	2,000.4	19.5	42 58	58.25	1,250	593.8	7	13,871
23,600	33 39.9	2,019.9	19.7	43 19	58.74	1,252	603.8	7	14,106
23,700	33 59.6	2,039.6	19.9	43 40	59.24	1,254	614.0	7	14,346
23,800	34 19.5	2,059.5	20.1	44 01	59.75	1,256	624.4	7	14,591
23,900	34 39.6	2,079.6	20.3	44 22	60.27	1,258	635.1	7	14,841
24,000	34 59.9	2,099.9	20.7	44 43	60.80	1,260	646.1	7	15,096
24,100	35 20.6	2,120.6	21.5	45 05	61.34	1,263	657.5	7	15,357
24,200	35 42.1	2,142.1	22.5	45 27	61.89	1,265	669.3	7	15,625
24,300	36 04.6	2,164.6	23.7	45 49	62.45	1,268	681.6	7	15,901
24,400	36 28.3	2,188.3	25.1	46 12	63.02	1,270	694.4	7	16,186
24,500	36 53.4	2,213.4	26.7	46 35	63.60	1,273	707.8	7	16,481
24,600	37 20.1	2,240.1	28.5	46 58	64.19	1,276	721.9	7	16,788
24,700	37 48.6	2,268.6	30.5	47 22	64.79	1,279	736.8	6	17,109
24,800	38 19.1	2,299.1	32.7	47 46	65.40	1,282	752.6	6	17,446
24,900	38 51.8	2,331.8	35.1	48 10	66.02	1,285	769.4	6	17,801
25,000	39 26.9	2,366.9	37.7	48 35	66.65	1,288	787.2	6	18,176
25,100	40 04.6	2,404.6	.....	49 00	67.29	1,291	806.1	6	18,573

N

RANGE TABLE FOR 16-INCH GUN. (REDUCED CHARGE)

WEIGHT OF PROJECTILE, 2100 POUNDS.

INITIAL VELOCITY, 2000 F.S.

Standard powder temperature, 90°F.;

variation of $\pm 10^\circ\text{F.}$ changes the initial velocity ± 20 f.s.

Range.	Change of range for variation of +10 feet per second initial velocity.	Change of range for variation of -10 pounds in weight of projectile.	Change of range for variation in density of air of -10 per cent.	Change of range for wind component in plane of fire of 10 knots.	Change of range for motion of gun in plane of fire of 10 knots.	Change of range for motion of target in plane of fire of 10 knots.	Devia- tion for lateral wind com- ponent of 10 knots.	Devia- tion for lateral motion of gun perpen- dicular to line of fire speed of 10 knots.	Devia- tion for lateral motion of target perpen- dicular to line of fire speed of 10 knots.	Change in height of impact for variation of 100 yards in sight bar.
1	10	11	12	13	14	15	16	17	18	19
<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Feet.</i>
23,500	162	18	794	181	152	327	90	237	327	279
23,600	162	18	797	184	153	330	91	239	330	282
23,700	163	18	800	187	153	333	92	241	333	285
23,800	163	18	803	190	154	336	93	243	336	289
23,900	164	18	806	193	155	339	94	245	339	293
24,000	164	18	809	195	155	342	95	247	342	297
24,100	165	18	812	197	156	345	95	249	345	301
24,200	165	18	815	199	157	348	96	251	348	305
24,300	166	18	818	200	158	351	97	253	351	309
24,400	166	18	821	201	159	354	98	255	354	313
24,500	167	18	824	202	160	357	98	258	357	317
24,600	167	18	827	203	161	360	99	261	360	321
24,700	168	18	830	203	162	363	100	264	363	325
24,800	168	18	832	204	163	367	101	267	367	330
24,900	169	18	834	204	165	371	101	270	371	335
25,000	169	18	836	205	167	375	102	273	375	340
25,100	170	18	838	205	170	379	102	277	379	345

INTRODUCTION TO BALLISTIC TABLES

This section includes tables which are required for the solution of trajectories and for the computation of range tables. Table V is an auxiliary table for use in conjunction with Column 12 of the range table.

Complete explanations and illustrations of the derivation and use of these tables are given in *Exterior Ballistics, 1935*. Appropriate references are stated in introductory notes of the several tables.

TABLE I

The Gâvre Retardation Function G_v

This table is entered with the velocity v , in foot-seconds, and the value of G_v is found from the body of the table. The value of G_v thus found is the retardation, in foot-seconds per second, encountered by a projectile of unit ballistic coefficient in atmosphere of standard surface density, at the given velocity. The derivation and use of this table are explained in articles 410–411, 428–429, and 604–621, *Exterior Ballistics, 1935*.

v	00	10	20	30	40	50	60	70	80	90
0	0.00	0.00	0.02	0.05	0.09	0.14	0.20	0.26	0.33	0.41
100	0.50	0.60	0.71	0.83	0.96	1.10	1.25	1.41	1.58	1.76
200	1.95	2.14	2.33	2.53	2.74	2.96	3.19	3.43	3.67	3.91
300	4.16	4.42	4.68	4.95	5.23	5.51	5.80	6.10	6.40	6.71
400	7.03	7.36	7.69	8.02	8.36	8.70	9.05	9.42	9.80	10.19
500	10.58	10.97	11.37	11.78	12.19	12.62	13.05	13.49	13.95	14.43
600	14.92	15.42	15.93	16.44	16.97	17.52	18.09	18.69	19.31	19.95
700	20.60	21.28	21.98	22.71	23.48	24.28	25.11	25.97	26.87	27.82
800	28.82	29.87	31.02	32.20	33.43	34.73	36.11	37.58	39.13	40.77
900	42.61	44.47	46.46	48.58	50.85	53.28	55.87	58.63	61.57	64.70
1000	68.0	71.7	75.6	79.6	83.8	88.2	92.8	97.5	102.4	107.5
1100	112.7	118.0	123.4	128.8	134.2	139.6	145.0	150.4	155.8	161.1
1200	166.4	171.6	176.8	181.9	186.9	191.8	196.7	201.6	206.5	211.4
1300	216.2	220.9	225.5	230.1	234.7	239.3	243.8	248.3	252.8	257.2
1400	261.6	266.1	270.5	274.9	279.3	283.6	287.8	292.1	296.3	300.6
1500	304.9	309.2	313.5	317.7	321.8	326.0	330.2	334.5	338.8	343.0
1600	347.1	351.2	355.3	359.5	363.6	367.7	371.8	376.0	380.1	384.2
1700	388.3	392.4	396.4	400.5	404.7	408.8	412.8	416.8	420.9	425.0
1800	429.2	433.3	437.4	441.5	445.5	449.5	453.5	457.6	461.6	465.6
1900	469.7	473.7	477.8	481.8	485.9	490.1	494.2	498.3	502.4	506.5
2000	510.5	514.5	518.6	522.7	526.8	530.9	535.0	539.2	543.3	547.4
2100	551.6	555.7	559.9	564.1	568.2	572.4	576.5	580.6	584.7	588.8
2200	593.0	597.2	601.4	605.6	609.7	613.9	618.2	622.4	626.6	630.8
2300	635.1	639.5	643.8	648.1	652.5	656.9	661.2	665.5	669.8	674.1
2400	678.5	682.9	687.4	691.8	696.2	700.6	705.1	709.7	714.2	718.7
2500	723.2	727.7	732.2	736.8	741.5	746.1	750.6	755.2	759.9	764.6
2600	769.3	774.0	778.7	783.5	788.2	793.0	797.8	802.7	807.6	812.5
2700	817.4	822.2	827.1	832.0	836.9	841.8	846.8	851.9	857.0	862.0
2800	867.1	872.1	877.1	882.2	887.3	892.5	897.8	903.0	908.3	913.6
2900	918.9	924.2	929.5	934.8	940.2	945.6	951.0	956.5	962.0	967.5
3000	973.0	978.5	984.0	989.5	995.0	1000.6	1006.3	1012.1	1017.9	1023.7

TABLE I, Continued

v	00	10	20	30	40	50	60	70	80	90
3000	973.0	978.5	984.0	989.5	995.0	1000.6	1006.3	1012.1	1017.9	1023.7
3100	1029.5	1035.2	1041.0	1046.8	1052.5	1058.3	1064.1	1070.0	1075.8	1081.6
3200	1087.5	1093.5	1099.6	1105.8	1112.1	1118.4	1124.6	1130.7	1136.9	1143.1
3300	1149.3	1155.6	1162.0	1168.3	1174.5	1180.8	1187.2	1193.7	1200.1	1206.6
3400	1213.2	1219.8	1226.4	1233.0	1239.6	1246.2	1252.7	1259.3	1266.0	1272.8
3500	1279.6	1286.5	1293.5	1300.5	1307.5	1314.4	1321.3	1328.3	1335.2	1342.2
3600	1349.3	1356.4	1363.5	1370.6	1377.7	1384.8	1392.0	1399.2	1406.5	1413.8
3700	1421.2	1428.5	1435.8	1443.2	1450.7	1458.2	1465.7	1473.2	1480.6	1488.0
3800	1495.5	1503.0	1510.5	1518.0	1525.6	1533.2	1540.9	1548.7	1556.4	1564.0
3900	1571.6	1579.2	1586.8	1594.5	1602.2	1610.0	1617.8	1625.7	1633.7	1641.7
4000	1649.6	1657.6	1665.7	1673.7	1681.8	1689.8	1698.0	1706.1	1714.3	1722.4
4100	1730.6	1738.9	1747.2	1755.4	1763.7	1772.0	1780.4	1788.8	1797.1	1805.5
4200	1813.9	1822.4	1830.9	1839.3	1847.8	1856.3	1864.9	1873.4	1882.0	1890.6
4300	1899.2	1907.9	1916.6	1925.3	1934.0	1942.7	1951.5	1960.3	1969.2	1978.0
4400	1986.8	1995.7	2004.7	2013.6	2022.6	2031.5	2040.5	2049.5	2058.6	2067.6
4500	2076.6	2085.7	2094.8	2103.9	2113.0	2122.1	2131.3	2140.5	2149.7	2158.9
4600	2168.1	2177.4	2186.7	2196.1	2205.4	2214.7	2224.2	2233.6	2243.1	2252.5
4700	2262.0	2271.6	2281.2	2290.8	2300.4	2310.0	2319.7	2329.4	2339.2	2348.9
4800	2358.6	2368.4	2378.3	2388.1	2398.0	2407.8	2417.7	2427.6	2437.6	2447.5
4900	2457.4	2467.4	2477.4	2487.4	2497.4	2507.4	2517.5	2527.6	2537.7	2547.8
5000	2557.9	2568.1	2578.3	2588.4	2598.6	2608.8	2619.1	2629.4	2639.7	2650.0
5100	2660.3	2670.7	2681.2	2691.6	2702.1	2712.5	2723.1	2733.6	2744.2	2754.7
5200	2765.3	2776.0	2786.6	2797.3	2807.9	2818.6	2829.4	2840.1	2850.9	2861.6
5300	2872.4	2883.2	2894.0	2904.9	2915.7	2926.5	2937.4	2948.3	2959.2	2970.1
5400	2981.0	2992.0	3003.0	3014.1	3025.1	3036.1	3047.2	3058.3	3069.5	3080.6
5500	3091.7	3102.9	3114.2	3125.4	3136.7	3147.9	3159.3	3170.6	3182.0	3193.3
5600	3204.7	3216.2	3227.7	3239.1	3250.6	3262.1	3273.7	3285.3	3297.0	3308.6
5700	3320.2	3331.9	3343.6	3355.4	3367.1	3378.9	3390.6	3402.4	3414.2	3426.0
5800	3437.8	3449.7	3461.6	3473.5	3485.4	3497.3	3509.3	3521.4	3533.4	3545.5
5900	3557.5	3569.7	3581.9	3594.2	3606.4	3618.6	3631.0	3643.4	3655.7	3668.1
6000	3680.5									

The above table has been taken from *Eggert's Method*, as published in the *U. S. Naval Institute Proceedings*, Vol. 45, Nos. 191 and 200. It is based on tables originally published in France by the *Commission de Gâvre*. A table of the Gâvre function in metric units is given in *Exterior Ballistics Tables Based on Numerical Integration*, Vol. I, (Ordnance Department, U. S. Army, 1924). See also note on page 28, *Exterior Ballistics*, 1935.

TABLE II

The Altitude-Density Function H_y

This table is entered with the altitude y , in feet, and the value of $\log H_y$ is found from the body of the table. H_y expresses the ratio of air density at the altitude y feet to the density of air at the earth's surface at sea level, under the conditions of standard surface density (i.e., $\delta = 1$). The values of $\log H_y$ were computed by means of the formula

$$\log H_y = -.00001372 y.$$

Particular attention is invited to the fact that this table gives $\log H_y$, and that the characteristic 9-10 is to be understood for all of the values given in the table. Although the table extends only to 10,000 feet for the argument y , it may be used for greater altitudes than 10,000 feet as follows. Divide the value of y

y	0	10	20	30	40	50	60	70	80	90
000	.00000	.99986	.99973	.99959	.99945	.99931	.99918	.99904	.99890	.99877
100	.99863	.99850	.99835	.99822	.99808	.99794	.99780	.99767	.99753	.99739
200	.99726	.99712	.99698	.99684	.99671	.99657	.99643	.99630	.99616	.99602
300	.99588	.99575	.99561	.99547	.99533	.99520	.99506	.99492	.99479	.99465
400	.99451	.99437	.99424	.99410	.99396	.99383	.99369	.99355	.99341	.99328
500	.99314	.99300	.99287	.99273	.99259	.99245	.99232	.99218	.99204	.99190
600	.99177	.99163	.99149	.99136	.99122	.99108	.99094	.99081	.99067	.99053
700	.99040	.99026	.99012	.98998	.98985	.98971	.98957	.98944	.98930	.98916
800	.98902	.98889	.98875	.98861	.98848	.98834	.98820	.98806	.98793	.98779
900	.98765	.98751	.98738	.98724	.98710	.98697	.98683	.98669	.98655	.98642
1000	.98628	.98614	.98600	.98587	.98573	.98559	.98546	.98532	.98518	.98505
1100	.98491	.98477	.98463	.98450	.98436	.98422	.98408	.98395	.98381	.98367
1200	.98354	.98340	.98326	.98312	.98299	.98285	.98271	.98258	.98244	.98230
1300	.98216	.98203	.98189	.98175	.98162	.98148	.98134	.98120	.98107	.98093
1400	.98079	.98065	.98052	.98038	.98024	.98011	.97997	.97983	.97969	.97956
1500	.97942	.97928	.97915	.97901	.97887	.97873	.97860	.97846	.97832	.97819
1600	.97805	.97791	.97777	.97764	.97750	.97736	.97722	.97709	.97695	.97681
1700	.97668	.97654	.97640	.97626	.97613	.97599	.97585	.97572	.97558	.97544
1800	.97530	.97517	.97503	.97489	.97476	.97462	.97448	.97434	.97421	.97407
1900	.97393	.97379	.97366	.97352	.97338	.97325	.97311	.97297	.97283	.97270
2000	.97256	.97242	.97229	.97215	.97201	.97187	.97174	.97160	.97146	.97133
2100	.97119	.97105	.97091	.97078	.97064	.97050	.97036	.97023	.97009	.96995
2200	.96982	.96968	.96954	.96940	.96927	.96913	.96899	.96886	.96872	.96858
2300	.96844	.96831	.96817	.96803	.96790	.96776	.96762	.96748	.96735	.96721
2400	.96707	.96693	.96680	.96666	.96652	.96639	.96625	.96611	.96597	.96584
2500	.96570	.96556	.96543	.96529	.96515	.96501	.96488	.96474	.96460	.96447
2600	.96433	.96419	.96405	.96392	.96378	.96364	.96350	.96337	.96323	.96309
2700	.96296	.96282	.96268	.96254	.96241	.96227	.96213	.96200	.96186	.96172
2800	.96158	.96145	.96131	.96117	.96104	.96090	.96076	.96062	.96049	.96035
2900	.96021	.96007	.95994	.95980	.95966	.95953	.95939	.95925	.95911	.95898
3000	.95884	.95870	.95857	.95843	.95829	.95815	.95802	.95788	.95774	.95761
3100	.95747	.95733	.95719	.95706	.95692	.95678	.95664	.95651	.95637	.95623
3200	.95610	.95596	.95582	.95568	.95555	.95541	.95527	.95514	.95500	.95486
3300	.95472	.95459	.95445	.95431	.95418	.95404	.95390	.95376	.95363	.95349
3400	.95335	.95321	.95308	.95294	.95280	.95267	.95253	.95239	.95225	.95212
3500	.95198	.95184	.95171	.95157	.95143	.95129	.95116	.95102	.95088	.95075
3600	.95061	.95047	.95033	.95020	.95006	.94992	.94978	.94965	.94951	.94937
3700	.94924	.94910	.94896	.94882	.94869	.94855	.94841	.94828	.94814	.94800
3800	.94786	.94773	.94759	.94745	.94732	.94718	.94704	.94690	.94677	.94663
3900	.94649	.94635	.94622	.94608	.94594	.94581	.94567	.94553	.94539	.94526
4000	.94512	.94498	.94485	.94471	.94457	.94443	.94430	.94416	.94402	.94389
4100	.94375	.94361	.94347	.94334	.94320	.94306	.94292	.94279	.94265	.94251
4200	.94238	.94224	.94210	.94196	.94183	.94169	.94155	.94142	.94128	.94114
4300	.94100	.94087	.94073	.94059	.94046	.94032	.94018	.94004	.93991	.93977
4400	.93963	.93949	.93936	.93922	.93908	.93895	.93881	.93867	.93853	.93840
4500	.93826	.93812	.93799	.93785	.93771	.93757	.93744	.93730	.93716	.93703
4600	.93689	.93675	.93661	.93648	.93634	.93620	.93606	.93593	.93579	.93565
4700	.93552	.93538	.93524	.93510	.93497	.93483	.93469	.93456	.93442	.93428
4800	.93414	.93401	.93387	.93373	.93360	.93346	.93332	.93318	.93305	.93291
4900	.93277	.93263	.93250	.93236	.93222	.93209	.93195	.93181	.93167	.93154
5000	.93140	.93126	.93113	.93099	.93085	.93071	.93058	.93044	.93030	.93017

TABLE II, Continued

by 10. Entering the table with $y/10$, find the corresponding value of $\log H_y$ and move the decimal point of this value one place to the right. For example, to find $\log H_y$ for $y=10,100$ feet, we enter with $y=1010$ feet and find in the body of the table the value .98614. Moving the decimal point one place to the right we then have $\log H_y=9.8614-10$. It is to be noted that this operation gives also the characteristic of the logarithm. The function H_y , as defined above and as given by this table, is limited to altitudes within the troposphere (about 40,000 feet).

The derivation and use of this table are further explained in articles 420, 428-429, and 610-621, *Exterior Ballistics, 1935*.

y	0	10	20	30	40	50	60	70	80	90
5100	.93003	.92989	.92975	.92962	.92948	.92934	.92920	.92907	.92893	.92879
5200	.92866	.92852	.92838	.92824	.92811	.92797	.92783	.92770	.92756	.92742
5300	.92728	.92715	.92701	.92687	.92674	.92660	.92646	.92632	.92619	.92605
5400	.92591	.92577	.92564	.92550	.92536	.92523	.92509	.92495	.92481	.92468
5500	.92454	.92440	.92427	.92413	.92399	.92385	.92372	.92358	.92344	.92331
5600	.92317	.92303	.92289	.92276	.92262	.92248	.92234	.92221	.92207	.92193
5700	.92180	.92166	.92152	.92138	.92125	.92111	.92097	.92084	.92070	.92056
5800	.92042	.92029	.92015	.92001	.91988	.91974	.91960	.91946	.91933	.91919
5900	.91905	.91891	.91878	.91864	.91850	.91837	.91823	.91809	.91795	.91782
6000	.91768	.91754	.91741	.91727	.91713	.91699	.91686	.91672	.91658	.91645
6100	.91631	.91617	.91603	.91590	.91576	.91562	.91548	.91535	.91521	.91507
6200	.91494	.91480	.91466	.91452	.91439	.91425	.91411	.91398	.91384	.91370
6300	.91356	.91343	.91329	.91315	.91302	.91288	.91274	.91260	.91247	.91233
6400	.91219	.91205	.91192	.91178	.91164	.91151	.91137	.91123	.91109	.91096
6500	.91082	.91068	.91055	.91041	.91027	.91013	.91000	.90986	.90972	.90959
6600	.90945	.90931	.90917	.90904	.90890	.90876	.90862	.90849	.90835	.90821
6700	.90808	.90794	.90780	.90766	.90753	.90739	.90725	.90712	.90698	.90684
6800	.90670	.90657	.90643	.90629	.90616	.90602	.90588	.90574	.90561	.90547
6900	.90533	.90519	.90506	.90492	.90478	.90465	.90451	.90437	.90423	.90410
7000	.90396	.90382	.90369	.90355	.90341	.90327	.90314	.90300	.90286	.90273
7100	.90253	.90240	.90227	.90214	.90201	.90188	.90175	.90162	.90149	.90135
7200	.90121	.90108	.90094	.90080	.90067	.90054	.90049	.90026	.90012	.89998
7300	.89984	.89971	.89957	.89943	.89930	.89916	.89902	.89888	.89875	.89861
7400	.89847	.89833	.89820	.89806	.89792	.89779	.89765	.89751	.89737	.89724
7500	.89710	.89696	.89683	.89669	.89655	.89641	.89628	.89614	.89600	.89587
7600	.89573	.89559	.89545	.89532	.89518	.89504	.89490	.89477	.89463	.89449
7700	.89436	.89422	.89408	.89394	.89381	.89367	.89353	.89340	.89326	.89312
7800	.89298	.89285	.89271	.89257	.89244	.89230	.89216	.89202	.89189	.89175
7900	.89161	.89147	.89134	.89120	.89106	.89093	.89079	.89065	.89051	.89038
8000	.89024	.89010	.88997	.88983	.88969	.88955	.88942	.88928	.88914	.88901
8100	.88887	.88873	.88859	.88846	.88832	.88818	.88804	.88791	.88777	.88763
8200	.88750	.88736	.88722	.88708	.88695	.88681	.88667	.88654	.88640	.88626
8300	.88612	.88599	.88585	.88571	.88558	.88544	.88530	.88516	.88503	.88489
8400	.88475	.88461	.88448	.88434	.88420	.88407	.88393	.88379	.88365	.88352
8500	.88338	.88324	.88311	.88297	.88283	.88269	.88256	.88242	.88228	.88215
8600	.88201	.88187	.88173	.88160	.88146	.88132	.88118	.88105	.88091	.88077
8700	.88064	.88050	.88036	.88022	.88009	.87995	.87981	.87968	.87954	.87940
8800	.87926	.87913	.87899	.87885	.87872	.87858	.87844	.87830	.87817	.87803
8900	.87789	.87775	.87762	.87748	.87734	.87721	.87707	.87693	.87679	.87666
9000	.87652	.87638	.87625	.87611	.87597	.87583	.87570	.87556	.87542	.87529
9100	.87515	.87501	.87487	.87474	.87460	.87446	.87432	.87419	.87405	.87391
9200	.87378	.87364	.87350	.87336	.87323	.87309	.87295	.87282	.87268	.87254
9300	.87240	.87227	.87213	.87199	.87186	.87172	.87158	.87144	.87131	.87117
9400	.87103	.87089	.87076	.87062	.87049	.87035	.87021	.87007	.86993	.86980
9500	.86966	.86952	.86939	.86925	.86911	.86897	.86884	.86870	.86856	.86843
9600	.86829	.86815	.86801	.86788	.86774	.86760	.86746	.86733	.86719	.86705
9700	.86692	.86678	.86664	.86650	.86637	.86623	.86609	.86596	.86582	.86568
9800	.86554	.86541	.86527	.86513	.86500	.86486	.86472	.86458	.86445	.86431
9900	.86417	.86403	.86390	.86376	.86362	.86349	.86335	.86321	.86307	.86294
10000	.86280									

The above table has been taken from *Eggert's Method*, as published in the *U. S. Naval Institute Proceedings*, Vol. 45, Nos. 191 and 200. A table of the function H_y in metric units is given in *Exterior Ballistic Tables Based on Numerical Integration*, Vol. I, (Ordnance Department, U. S. Army, 1924).

TABLE III

The Surface Density Factor δ

In this table values of the surface density factor δ are tabulated against the arguments, surface air temperature (F°.) and surface barometric pressure (inches mercury). The factor δ is defined by the relation $\delta = \delta_a / \delta_s$; δ_s represents the density of air under the assumed standard conditions of 59°F., 29'' .53 mercury, saturation 78%; δ_a represents the density of air under any other conditions of temperature and pressure, the saturation remaining at 78%. The table is based on the standard density $\delta_s = 1.2034$ kilograms per cubic meter. The use of this table is explained in articles 418–419, *Exterior Ballistics, 1935*.

Barom- eter, inches.	Temperature F°.										
	20	24	28	32	36	40	44	48	52	56	60
28.50	1.049	1.040	1.031	1.022	1.014	1.005	.997	.988	.980	.971	.963
28.60	1.052	1.043	1.034	1.025	1.017	1.008	1.000	.992	.983	.975	.967
28.70	1.056	1.047	1.038	1.029	1.021	1.012	1.003	.995	.987	.978	.970
28.80	1.060	1.051	1.042	1.033	1.024	1.016	1.007	.999	.990	.982	.974
28.90	1.064	1.055	1.045	1.036	1.028	1.019	1.011	1.002	.994	.985	.977
29.00	1.067	1.058	1.049	1.040	1.032	1.023	1.014	1.006	.997	.989	.981
29.10	1.071	1.062	1.052	1.043	1.035	1.026	1.018	1.009	1.001	.992	.984
29.20	1.074	1.066	1.056	1.047	1.039	1.030	1.021	1.013	1.004	.995	.987
29.30	1.078	1.069	1.060	1.051	1.042	1.033	1.025	1.016	1.008	.999	.991
29.40	1.082	1.073	1.063	1.054	1.046	1.037	1.028	1.020	1.011	1.002	.994
29.50	1.085	1.076	1.067	1.058	1.049	1.040	1.032	1.023	1.014	1.006	.997
29.60	1.089	1.080	1.070	1.062	1.053	1.044	1.035	1.026	1.018	1.009	1.001
29.70	1.093	1.084	1.074	1.065	1.056	1.047	1.039	1.030	1.021	1.012	1.004
29.80	1.096	1.087	1.078	1.069	1.060	1.051	1.042	1.033	1.025	1.016	1.008
29.90	1.100	1.091	1.082	1.073	1.064	1.055	1.046	1.037	1.028	1.020	1.011
30.00	1.104	1.095	1.085	1.076	1.067	1.058	1.049	1.040	1.032	1.023	1.014
30.10	1.107	1.098	1.088	1.079	1.071	1.062	1.053	1.044	1.035	1.026	1.018
30.20	1.111	1.102	1.092	1.083	1.074	1.065	1.056	1.047	1.038	1.030	1.021
30.30	1.114	1.106	1.096	1.087	1.078	1.069	1.060	1.051	1.042	1.033	1.024
30.40	1.118	1.109	1.099	1.090	1.081	1.072	1.063	1.054	1.045	1.036	1.028
30.50	1.122	1.113	1.103	1.094	1.085	1.076	1.066	1.057	1.048	1.040	1.031
30.60	1.126	1.116	1.106	1.097	1.088	1.079	1.070	1.061	1.052	1.043	1.034
30.70	1.129	1.120	1.110	1.101	1.092	1.082	1.073	1.064	1.055	1.046	1.038
30.80	1.133	1.124	1.114	1.104	1.095	1.086	1.077	1.068	1.059	1.050	1.041
30.90	1.136	1.127	1.117	1.108	1.099	1.089	1.080	1.071	1.062	1.053	1.044
31.00	1.140	1.131	1.121	1.112	1.102	1.093	1.084	1.075	1.066	1.057	1.048

TABLE III, Continued

Barom- eter, inches.	Temperature F°.										
	60	64	68	72	76	80	84	88	92	96	100
28.50	.963	.955	.947	.939	.931	.922	.914	.906	.897	.889	.880
28.60	.967	.959	.950	.942	.934	.926	.918	.909	.901	.892	.883
28.70	.970	.962	.954	.946	.937	.929	.921	.912	.904	.895	.886
28.80	.974	.965	.957	.949	.941	.932	.924	.915	.907	.899	.890
28.90	.977	.969	.961	.952	.944	.935	.927	.919	.910	.902	.893
29.00	.981	.972	.964	.956	.947	.939	.931	.922	.914	.905	.896
29.10	.984	.976	.967	.959	.951	.942	.934	.925	.917	.908	.900
29.20	.987	.979	.970	.962	.954	.945	.937	.929	.920	.911	.903
29.30	.991	.982	.974	.966	.957	.948	.940	.932	.923	.915	.906
29.40	.994	.986	.977	.969	.961	.952	.944	.935	.926	.918	.909
29.50	.997	.989	.981	.972	.964	.955	.947	.938	.929	.921	.912
29.60	1.001	.992	.984	.976	.967	.958	.950	.941	.933	.924	.915
29.70	1.004	.996	.987	.979	.970	.962	.953	.945	.936	.927	.918
29.80	1.008	.999	.990	.982	.974	.965	.957	.948	.939	.930	.922
29.90	1.011	1.003	.994	.986	.977	.968	.960	.951	.943	.934	.925
30.00	1.014	1.006	.997	.989	.980	.971	.963	.955	.946	.937	.928
30.10	1.018	1.009	1.000	.992	.984	.975	.967	.958	.949	.940	.931
30.20	1.021	1.013	1.004	.996	.987	.978	.970	.961	.952	.943	.934
30.30	1.024	1.016	1.007	.999	.990	.981	.973	.964	.955	.946	.937
30.40	1.028	1.019	1.011	1.002	.993	.984	.976	.967	.958	.949	.940
30.50	1.031	1.023	1.014	1.005	.997	.988	.979	.970	.962	.953	.943
30.60	1.034	1.026	1.017	1.009	1.000	.991	.983	.974	.965	.956	.946
30.70	1.038	1.029	1.020	1.012	1.003	.994	.986	.977	.968	.959	.949
30.80	1.041	1.033	1.024	1.015	1.006	.997	.989	.980	.971	.962	.953
30.90	1.044	1.036	1.027	1.019	1.010	1.001	.992	.983	.974	.965	.956
31.00	1.048	1.039	1.030	1.022	1.013	1.004	.995	.986	.977	.968	.959

It is to be noted that the surface density factor δ as used in *Exterior Ballistics, 1935* and as tabulated above, is the reciprocal of the surface density factor δ as used in the 1926 and 1930 editions of *Exterior Ballistics* and as tabulated in Table III of the 1926 and 1930 editions of *Range and Ballistic Tables*. See also footnote on p. 34, *Exterior Ballistics, 1935*.

This table has been extracted from Table A of a pamphlet entitled *Method for Determining Ballistic Air Temperature and Ballistic Air Density*, published by the Signal Corps (Meteorological Service), U. S. Army, in 1922. The same table is given also in *Technical Regulations No. 1236-1* (U. S. War Department, June, 1934).

TABLE IV

The Ballistic Density Factor δ_b .

This table is designed to afford a means of determining an approximate ballistic density factor δ_b when actual aloft observations are not available. The values of the ballistic density factor given in this table are based upon assumed aloft densities, under various conditions of surface density, as derived from a study of observations taken in the past. The arguments for the table are the surface density factor δ (Table III) and the maximum ordinate, and the body of the table gives the ballistic density factor δ_b . The use of this table is explained in articles 423-424, *Exterior Ballistics*, 1935.

Maximum ordinate, feet.	Surface density factor (δ)													
	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01
0	0.880	0.890	0.900	0.910	0.920	0.930	0.940	0.950	0.960	0.970	0.980	0.990	1.000	1.010
1,000	0.885	0.896	0.904	0.914	0.924	0.933	0.943	0.952	0.963	0.972	0.982	0.991	1.001	1.010
2,000	0.891	0.900	0.910	0.919	0.928	0.937	0.947	0.955	0.965	0.974	0.984	0.993	1.002	1.010
3,000	0.897	0.904	0.915	0.924	0.932	0.941	0.950	0.958	0.967	0.976	0.985	0.994	1.003	1.010
4,000	0.903	0.911	0.920	0.929	0.936	0.945	0.953	0.961	0.970	0.979	0.988	0.995	1.004	1.010
5,000	0.909	0.918	0.926	0.933	0.940	0.949	0.957	0.964	0.973	0.981	0.990	0.996	1.004	1.011
6,000	0.914	0.923	0.931	0.937	0.944	0.952	0.960	0.967	0.975	0.982	0.990	0.997	1.005	1.012
7,000	0.919	0.927	0.935	0.940	0.948	0.955	0.963	0.970	0.977	0.984	0.991	0.998	1.006	1.012
8,000	0.923	0.932	0.938	0.944	0.951	0.958	0.966	0.972	0.978	0.986	0.992	1.000	1.006	1.012
9,000	0.928	0.936	0.942	0.948	0.955	0.961	0.969	0.975	0.980	0.988	0.994	1.001	1.007	1.012
10,000	0.932	0.940	0.946	0.951	0.958	0.964	0.971	0.977	0.982	0.989	0.995	1.002	1.008	1.013
11,000	0.937	0.944	0.949	0.955	0.961	0.966	0.974	0.979	0.984	0.991	0.997	1.003	1.008	1.013
12,000	0.941	0.948	0.953	0.958	0.964	0.969	0.976	0.981	0.986	0.992	0.998	1.004	1.009	1.014
13,000	0.944	0.951	0.955	0.960	0.966	0.971	0.977	0.982	0.987	0.993	0.999	1.004	1.009	1.014
14,000	0.947	0.953	0.958	0.963	0.968	0.973	0.979	0.984	0.989	0.994	0.999	1.005	1.010	1.015
15,000	0.950	0.956	0.961	0.966	0.970	0.975	0.980	0.985	0.990	0.995	1.000	1.005	1.010	1.015
16,000	0.953	0.958	0.963	0.968	0.972	0.977	0.982	0.987	0.991	0.996	1.001	1.005	1.010	1.015
17,000	0.955	0.960	0.965	0.969	0.974	0.979	0.983	0.988	0.992	0.996	1.001	1.006	1.011	1.016
18,000	0.958	0.962	0.967	0.971	0.976	0.981	0.985	0.990	0.993	0.997	1.002	1.006	1.011	1.016
19,000	0.960	0.964	0.968	0.972	0.977	0.982	0.986	0.990	0.993	0.997	1.003	1.006	1.011	1.016
20,000	0.962	0.966	0.970	0.974	0.978	0.983	0.987	0.991	0.994	0.998	1.003	1.007	1.011	1.016
21,000	0.964	0.967	0.971	0.975	0.979	0.984	0.988	0.992	0.994	0.998	1.004	1.007	1.011	1.016
22,000	0.966	0.969	0.973	0.977	0.981	0.985	0.988	0.992	0.995	0.999	1.005	1.007	1.011	1.016
23,000	0.968	0.971	0.974	0.978	0.982	0.986	0.989	0.992	0.996	0.999	1.005	1.008	1.011	1.016
24,000	0.970	0.974	0.976	0.980	0.983	0.987	0.990	0.993	0.996	1.000	1.006	1.008	1.011	1.016
25,000	0.971	0.975	0.977	0.981	0.984	0.987	0.990	0.993	0.996	1.000	1.006	1.008	1.011	1.015
26,000	0.972	0.975	0.978	0.982	0.985	0.988	0.991	0.994	0.997	1.000	1.005	1.007	1.010	1.015
27,000	0.973	0.976	0.979	0.982	0.986	0.988	0.991	0.994	0.997	1.000	1.004	1.007	1.010	1.014
28,000	0.974	0.977	0.980	0.983	0.986	0.989	0.991	0.994	0.997	1.000	1.004	1.007	1.010	1.013
29,000	0.975	0.978	0.981	0.984	0.987	0.989	0.992	0.995	0.998	1.000	1.003	1.006	1.009	1.013
30,000	0.976	0.979	0.982	0.985	0.988	0.990	0.992	0.995	0.998	1.000	1.003	1.006	1.009	1.012

TABLE IV, Continued

Maximum ordinate, feet.	Surface density factor (δ)													
	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14
0	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	1.140
1,000	1.010	1.020	1.030	1.039	1.050	1.059	1.068	1.078	1.087	1.098	1.107	1.116	1.126	1.136
2,000	1.010	1.020	1.030	1.038	1.048	1.057	1.066	1.076	1.084	1.094	1.103	1.112	1.121	1.131
3,000	1.010	1.020	1.029	1.037	1.047	1.055	1.064	1.073	1.081	1.090	1.099	1.108	1.117	1.126
4,000	1.010	1.020	1.028	1.036	1.045	1.053	1.061	1.070	1.078	1.087	1.095	1.102	1.111	1.121
5,000	1.011	1.020	1.028	1.036	1.043	1.051	1.059	1.068	1.074	1.083	1.091	1.098	1.107	1.116
6,000	1.012	1.020	1.027	1.035	1.042	1.049	1.057	1.065	1.071	1.079	1.087	1.094	1.102	1.110
7,000	1.012	1.020	1.027	1.034	1.041	1.048	1.055	1.063	1.069	1.076	1.084	1.091	1.098	1.106
8,000	1.012	1.020	1.026	1.034	1.040	1.046	1.054	1.061	1.066	1.074	1.080	1.087	1.095	1.101
9,000	1.012	1.020	1.026	1.033	1.039	1.045	1.052	1.059	1.064	1.071	1.077	1.084	1.091	1.097
10,000	1.013	1.020	1.026	1.032	1.038	1.044	1.051	1.057	1.062	1.068	1.075	1.081	1.088	1.094
11,000	1.013	1.020	1.026	1.032	1.037	1.043	1.049	1.056	1.061	1.066	1.072	1.078	1.084	1.090
12,000	1.014	1.020	1.026	1.031	1.036	1.042	1.048	1.054	1.059	1.064	1.070	1.075	1.081	1.087
13,000	1.014	1.020	1.026	1.031	1.035	1.041	1.047	1.053	1.057	1.063	1.068	1.073	1.079	1.085
14,000	1.015	1.020	1.025	1.030	1.035	1.041	1.045	1.051	1.056	1.061	1.066	1.071	1.076	1.082
15,000	1.015	1.020	1.025	1.030	1.034	1.040	1.044	1.050	1.054	1.060	1.064	1.069	1.074	1.080
16,000	1.015	1.020	1.025	1.029	1.033	1.039	1.043	1.049	1.053	1.058	1.062	1.067	1.072	1.078
17,000	1.016	1.020	1.024	1.029	1.033	1.038	1.042	1.047	1.051	1.056	1.060	1.065	1.070	1.075
18,000	1.016	1.020	1.024	1.028	1.032	1.037	1.041	1.046	1.050	1.054	1.058	1.063	1.068	1.073
19,000	1.016	1.020	1.024	1.028	1.031	1.036	1.040	1.045	1.049	1.053	1.056	1.061	1.066	1.071
20,000	1.016	1.019	1.023	1.027	1.031	1.036	1.040	1.044	1.048	1.051	1.055	1.060	1.064	1.069
21,000	1.016	1.019	1.023	1.026	1.030	1.035	1.039	1.043	1.046	1.050	1.054	1.058	1.062	1.067
22,000	1.016	1.019	1.023	1.026	1.030	1.034	1.038	1.042	1.045	1.049	1.052	1.057	1.061	1.066
23,000	1.016	1.018	1.022	1.026	1.030	1.033	1.038	1.041	1.044	1.047	1.050	1.056	1.059	1.064
24,000	1.016	1.018	1.022	1.025	1.029	1.033	1.037	1.040	1.043	1.046	1.049	1.054	1.057	1.062
25,000	1.015	1.017	1.021	1.024	1.028	1.032	1.036	1.039	1.041	1.044	1.047	1.052	1.055	1.060
26,000	1.015	1.017	1.020	1.023	1.027	1.030	1.034	1.037	1.040	1.043	1.045	1.050	1.053	1.057
27,000	1.014	1.016	1.020	1.022	1.026	1.029	1.032	1.036	1.038	1.041	1.044	1.048	1.050	1.054
28,000	1.013	1.015	1.019	1.021	1.024	1.028	1.031	1.034	1.036	1.039	1.042	1.045	1.048	1.052
29,000	1.013	1.015	1.018	1.020	1.023	1.026	1.029	1.032	1.035	1.038	1.041	1.043	1.046	1.050
30,000	1.012	1.014	1.017	1.019	1.022	1.025	1.028	1.031	1.033	1.036	1.039	1.041	1.044	1.047

This table has been extracted from Table C of a pamphlet entitled *Method for Determining Ballistic Air Temperature and Ballistic Air Density*, published by the Signal Corps (Meteorological Service), U. S. Army, in 1922. Table C (with small changes), and an additional table for antiaircraft and other high-angle fire, have recently been published in *Technical Regulations No. 1236-1* (U. S. War Department, June, 1934).

TABLE V

Multipliers for Column 12

The multipliers given in this table are the ratios between any given variation from standard atmospheric density and the tabular variation of 10% upon which Column 12 of the range table is based. The sign of the multiplier indicates the direction of the range *error* that corresponds to the density variation to which the multiplier applies (when no sign is given, the plus sign is to be understood). The arguments for this table are the surface density factor δ (Table III) and the maximum ordinate. When both of these arguments are used, the multiplier found represents the operations both of reducing the surface density factor (Table III) to the ballistic density factor (Table IV), and of deriving from the latter the corresponding multiplier. If the density factor with which the table is to be entered is already a ballistic density factor, the corresponding multiplier is to be found by entering the table with the ballistic density factor and zero maximum ordinate. The derivation and use of this table are further explained in articles 1014-1015, and 1212-1213, *Exterior Ballistics, 1935*.

Maximum ordinate, feet.	Surface density factor (δ)													
	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01
0	1.20	1.10	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.00	-0.10
1,000	1.15	1.04	.96	.86	.76	.67	.57	.48	.37	.28	.18	.09	-.01	-.10
2,000	1.09	1.00	.90	.81	.72	.63	.53	.45	.35	.26	.16	.07	-.02	-.10
3,000	1.03	.96	.85	.76	.68	.59	.50	.42	.33	.24	.15	.06	-.03	-.10
4,000	.97	.89	.80	.71	.64	.55	.47	.39	.30	.21	.12	.05	-.04	-.10
5,000	.91	.82	.74	.67	.60	.51	.43	.36	.27	.19	.10	.04	-.04	-.11
6,000	.86	.77	.69	.63	.56	.48	.40	.33	.25	.18	.10	.03	-.05	-.12
7,000	.81	.73	.65	.60	.52	.45	.37	.30	.23	.16	.09	.02	-.06	-.12
8,000	.77	.68	.62	.56	.49	.42	.34	.28	.22	.14	.08	.00	-.06	-.12
9,000	.72	.64	.58	.52	.45	.39	.31	.25	.20	.12	.06	-.01	-.07	-.12
10,000	.68	.60	.54	.49	.42	.36	.29	.23	.18	.11	.05	-.02	-.08	-.13
11,000	.63	.56	.51	.45	.39	.34	.26	.21	.16	.09	.03	-.03	-.08	-.13
12,000	.59	.52	.47	.42	.36	.31	.24	.19	.14	.08	.02	-.04	-.09	-.14
13,000	.56	.49	.45	.40	.34	.29	.23	.18	.13	.07	.01	-.04	-.09	-.14
14,000	.53	.47	.42	.37	.32	.27	.21	.16	.11	.06	.01	-.05	-.10	-.15
15,000	.50	.44	.39	.34	.30	.25	.20	.15	.10	.05	.00	-.05	-.10	-.15
16,000	.47	.42	.37	.32	.28	.23	.18	.13	.09	.04	-.01	-.05	-.10	-.15
17,000	.45	.40	.35	.31	.26	.21	.17	.12	.08	.04	-.01	-.06	-.11	-.16
18,000	.42	.38	.33	.29	.24	.19	.15	.10	.07	.03	-.02	-.06	-.11	-.16
19,000	.40	.36	.32	.28	.23	.18	.14	.10	.07	.03	-.03	-.06	-.11	-.16
20,000	.38	.34	.30	.26	.22	.17	.13	.09	.06	.02	-.03	-.07	-.11	-.16
21,000	.36	.33	.29	.25	.21	.16	.12	.08	.06	.02	-.04	-.07	-.11	-.16
22,000	.34	.31	.27	.23	.19	.15	.12	.08	.05	.01	-.05	-.07	-.11	-.16
23,000	.32	.29	.26	.22	.18	.14	.11	.08	.04	.01	-.05	-.08	-.11	-.16
24,000	.30	.26	.24	.20	.17	.13	.10	.07	.04	.00	-.06	-.08	-.11	-.16
25,000	.29	.25	.23	.19	.16	.13	.10	.07	.04	.00	-.06	-.08	-.11	-.15
26,000	.28	.25	.22	.18	.15	.12	.09	.06	.03	.00	-.05	-.07	-.10	-.15
27,000	.27	.24	.21	.18	.14	.12	.09	.06	.03	.00	-.04	-.07	-.10	-.14
28,000	.26	.23	.20	.17	.14	.11	.09	.06	.03	.00	-.04	-.07	-.10	-.13
29,000	.25	.22	.19	.16	.13	.11	.08	.05	.02	.00	-.03	-.06	-.09	-.13
30,000	.24	.21	.18	.15	.12	.10	.08	.05	.02	.00	-.03	-.06	-.09	-.12

TABLE V, Continued

Maximum ordinate, feet.	Surface density factor (δ)													
	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14
0	-0.10	-0.20	-0.30	-0.40	-0.50	-0.60	-0.70	-0.80	-0.90	-1.00	-1.10	-1.20	-1.30	-1.40
1,000	-.10	-.20	-.30	-.39	-.50	-.59	-.68	-.78	-.87	-.98	-1.07	-1.16	-1.26	-1.36
2,000	-.10	-.20	-.30	-.38	-.48	-.57	-.66	-.76	-.84	-.94	-1.03	-1.12	-1.21	-1.31
3,000	-.10	-.20	-.29	-.37	-.47	-.55	-.64	-.73	-.81	-.90	-.99	-1.08	-1.17	-1.26
4,000	-.10	-.20	-.28	-.36	-.45	-.53	-.61	-.70	-.78	-.87	-.95	-1.02	-1.11	-1.21
5,000	-.11	-.20	-.28	-.36	-.43	-.51	-.59	-.68	-.74	-.83	-.91	-.98	-1.07	-1.16
6,000	-.12	-.20	-.27	-.35	-.42	-.49	-.57	-.65	-.71	-.79	-.87	-.94	-1.02	-1.10
7,000	-.12	-.20	-.27	-.34	-.41	-.48	-.55	-.63	-.69	-.76	-.84	-.91	-.98	-1.06
8,000	-.12	-.20	-.26	-.34	-.40	-.46	-.54	-.61	-.66	-.74	-.80	-.87	-.95	-1.01
9,000	-.12	-.20	-.26	-.33	-.39	-.45	-.52	-.59	-.64	-.71	-.77	-.84	-.91	-.97
10,000	-.13	-.20	-.26	-.32	-.38	-.44	-.51	-.57	-.62	-.68	-.75	-.81	-.88	-.94
11,000	-.13	-.20	-.26	-.32	-.37	-.43	-.49	-.56	-.61	-.66	-.72	-.78	-.84	-.90
12,000	-.14	-.20	-.26	-.31	-.36	-.42	-.48	-.54	-.59	-.64	-.70	-.75	-.81	-.87
13,000	-.14	-.20	-.26	-.31	-.35	-.41	-.47	-.53	-.57	-.63	-.68	-.73	-.79	-.85
14,000	-.15	-.20	-.25	-.30	-.35	-.41	-.45	-.51	-.56	-.61	-.66	-.71	-.76	-.82
15,000	-.15	-.20	-.25	-.30	-.34	-.40	-.44	-.50	-.54	-.60	-.64	-.69	-.74	-.80
16,000	-.15	-.20	-.25	-.29	-.33	-.39	-.43	-.49	-.53	-.58	-.62	-.67	-.72	-.78
17,000	-.16	-.20	-.24	-.29	-.33	-.38	-.42	-.47	-.51	-.56	-.60	-.65	-.70	-.75
18,000	-.16	-.20	-.24	-.28	-.32	-.37	-.41	-.46	-.50	-.54	-.58	-.63	-.68	-.73
19,000	-.16	-.20	-.24	-.28	-.31	-.36	-.40	-.45	-.49	-.53	-.56	-.61	-.66	-.71
20,000	-.16	-.19	-.23	-.27	-.31	-.36	-.40	-.44	-.48	-.51	-.55	-.60	-.64	-.69
21,000	-.16	-.19	-.23	-.26	-.30	-.35	-.39	-.43	-.46	-.50	-.54	-.58	-.62	-.67
22,000	-.16	-.19	-.23	-.26	-.30	-.34	-.38	-.42	-.45	-.49	-.52	-.57	-.61	-.66
23,000	-.16	-.18	-.22	-.26	-.30	-.33	-.38	-.41	-.44	-.47	-.50	-.56	-.59	-.64
24,000	-.16	-.18	-.22	-.25	-.29	-.33	-.37	-.40	-.43	-.46	-.49	-.54	-.57	-.62
25,000	-.15	-.17	-.21	-.24	-.28	-.32	-.36	-.39	-.41	-.44	-.47	-.52	-.55	-.60
26,000	-.15	-.17	-.20	-.23	-.27	-.30	-.34	-.37	-.40	-.43	-.45	-.50	-.53	-.57
27,000	-.14	-.16	-.20	-.22	-.26	-.29	-.32	-.36	-.38	-.41	-.44	-.48	-.50	-.54
28,000	-.13	-.15	-.19	-.21	-.24	-.28	-.31	-.34	-.36	-.39	-.42	-.45	-.48	-.52
29,000	-.13	-.15	-.18	-.20	-.23	-.26	-.29	-.32	-.35	-.38	-.41	-.43	-.46	-.50
30,000	-.12	-.14	-.17	-.19	-.22	-.25	-.28	-.31	-.33	-.36	-.39	-.41	-.44	-.47

INTRODUCTION TO TABLE VI

Table VI consists of extracts from the American translation of the *A.L.V.F. Tables*, made by the Ordnance Department, U. S. Army, from the French edition of 1918. The complete *A.L.V.F. Tables* of 1918 (translated 1919) consist of tables for each 5° of angle of departure from 15° to 40° inclusive. For each of these angles of departure there are separate tables for range, time of flight, angle of fall, and striking velocity. For each of the four elements just mentioned there are two series of tables, one for initial velocities from 300 to 600 meters per second and one for initial velocities from 600 to 900 meters per second. Each of these last two series of tables consists of four separate tables, for values of *Log C* from .475 to .635, from .655 to .815, from .835 to .995, and from 1.015 to 1.175. Thus there are eight separate tables for each of the four elements and for each of the six angles of departure, or 192 separate tables in all; each separate table forms one page.

The extracts given in this volume comprise tables for each of the four elements for each of the six angles of departure (15° – 40°), but for velocities only from 600 m.s. to 900 m.s., and for values of *Log C* only from 1.015 to 1.175. These extracts are adequate for computation of range-table data only for the latest types of 14" gun (not those illustrated in this volume) and for 16" guns.

Particular attention is invited to the fact that the *A.L.V.F. Tables* are made up in *metric units*; this applies to the elements initial velocity, range, and striking velocity. The value of *Log C* is found in the usual manner, employing English units. Further details of the units of these tables are given in article 704, *Exterior Ballistics*, 1935.

The derivation and use of the *A.L.V.F. Tables* are explained in Chapters 7 and 8, *Exterior Ballistics*, 1935. The tables were originally computed by the *Commission Artillerie Lourde (sur) V (oie) F (errée)*, and published, September 15, 1918, by the French *Ministère de l'Armement*, as the *Tables de Balistique Extérieure*. A later edition was published in 1921, but it has not been translated. The later edition includes initial velocities up to 1200 m.s., and tables for the angle of departure 45° , for maximum ordinate, for range to vertex, and for the effect of wind on the range.

TABLE VI.

 $\phi = 15^\circ$.

RANGE.

Log. C (C)	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C (C)
V.	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	V.
600	12650 165 313	12815 163 321	12978 160 329	13138 160 337	13298 160 345	13458 158 353	13616 157 360	13773 157 367	13930 374	600
610	12963 173 317	13136 171 325	13307 168 333	13475 168 341	13643 168 349	13811 165 357	13976 164 365	14140 164 372	14304 379	610
620	13280 181 320	13461 179 328	13640 176 336	13816 176 345	13992 176 353	14168 173 361	14341 171 369	14512 171 376	14683 383	620
630	13600 189 323	13789 187 331	13976 185 340	14161 184 349	14345 184 357	14529 181 365	14710 178 373	14888 178 380	15066 387	630
640	13923 197 326	14120 196 335	14316 194 344	14510 192 353	14702 192 361	14894 189 369	15083 185 377	15268 185 384	15453 391	640
650	14249 206 329	14455 205 338	14660 203 347	14863 200 356	15063 200 364	15263 197 372	15460 192 380	15652 192 388	15844 395	650
660	14578 215 332	14793 214 341	15007 212 350	15219 208 359	15427 208 368	15635 205 376	15840 200 384	16040 199 392	16239 399	660
670	14910 224 334	15134 223 344	15357 221 353	15578 217 363	15795 216 372	16011 213 380	16224 208 388	16432 206 396	16638 403	670
680	15244 234 334	15478 232 344	15710 231 354	15941 226 363	16167 224 374	16391 221 383	16612 216 392	16828 213 400	17041 407	680
690	15578 244 336	15822 242 345	16064 240 355	16304 237 365	16541 233 375	16774 230 385	17004 224 393	17228 220 402	17448 410	690
700	15914 253 337	16167 252 346	16419 250 356	16669 247 365	16916 243 375	17159 238 384	17397 233 393	17630 228 402	17858 412	700
710	16251 262 339	16513 262 348	16775 259 357	17034 257 366	17291 252 376	17543 247 385	17790 242 394	18032 238 403	18270 413	710
720	16590 271 341	16861 271 350	17132 268 359	17400 267 368	17667 261 377	17928 256 386	18184 251 396	18435 248 406	18683 416	720
730	16931 280 342	17211 280 351	17491 277 360	17768 276 369	18044 270 378	18314 266 387	18580 261 397	18841 258 407	19099 417	730
740	17273 289 343	17562 289 352	17851 286 362	18137 285 371	18422 279 380	18701 276 389	18977 271 398	19248 268 408	19516 417	740
750	17616 298 344	17914 299 354	18213 295 363	18508 294 373	18802 288 382	19090 285 392	19375 281 401	19656 277 410	19933 419	750
760	17960 308 345	18268 308 355	18576 305 364	18881 303 374	19184 298 383	19482 294 393	19776 290 403	20066 286 412	20352 422	760
770	18305 318 345	18623 317 355	18940 315 365	19255 312 375	19567 308 385	19875 304 395	20179 299 405	20478 296 415	20774 425	770
780	18650 328 346	18978 327 356	19305 325 367	19630 322 377	19952 318 387	20270 314 397	20584 309 407	20893 306 417	21199 427	780
790	18996 338 347	19334 338 358	19672 335 368	20007 332 380	20339 328 390	20667 324 400	20991 319 410	21310 316 420	21626 430	790
800	19343 349 350	19692 348 361	20040 347 372	20387 342 383	20729 338 395	21067 334 405	21401 329 415	21730 326 424	22056 432	800
810	19693 360 350	20053 359 361	20412 358 372	20770 354 383	21124 348 393	21472 344 404	21816 338 414	22154 334 424	22488 433	810
820	20043 371 352	20414 370 363	20784 369 374	21153 364 383	21517 359 393	21876 354 403	22230 348 413	22578 343 424	22921 435	820
830	20395 382 351	20777 381 362	21158 378 372	21536 374 382	21910 369 393	22279 364 403	22643 359 414	23002 354 425	23356 437	830
840	20746 393 353	21139 391 363	21530 388 374	21918 385 383	22303 379 392	22682 375 403	23057 370 414	23427 366 426	23793 439	840
850	21099 403 351	21502 402 361	21904 397 373	22301 394 383	22695 390 393	23085 386 404	23471 382 416	23853 379 429	24232 441	850
860	21450 413 350	21863 414 361	22277 407 370	22684 404 382	23088 401 394	23489 398 406	23887 395 418	24282 391 430	24673 443	860
870	21800 424 349	22224 423 360	22647 419 370	23066 416 383	23482 413 396	23895 410 408	24305 407 420	24712 404 432	25116 445	870
880	22149 435 351	22584 433 360	23017 432 372	23449 429 382	23878 425 393	24303 422 405	24725 419 419	25144 417 433	25561 447	880
890	22500 444 350	22944 445 360	23389 442 371	23831 440 382	24271 437 393	24708 436 406	25144 433 419	25577 431 433	26008 448	890
900	22850 454	23304 456	23760 453	24213 451	24664 450	25114 449	25563 447	26010 446	26456	900
Log. C (C)	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C (C)

$\phi = 15^\circ$. TIME OF FLIGHT.

Log C (°)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log.C (°)
V.										V.
600	2844 13 40	2857 13 41	2870 12 41	2882 11 42	2893 11 43	2904 10 43	2914 9 43	2923 9 44	2932 44	600
610	2884 14 41	2898 13 41	2911 13 42	2924 12 42	2936 11 42	2947 10 42	2957 10 43	2967 9 43	2976 44	610
620	2925 14 40	2939 14 41	2953 13 41	2966 12 41	2978 11 41	2989 11 42	3000 10 42	3010 10 43	3020 43	620
630	2965 15 40	2980 14 40	2994 13 40	3007 12 41	3019 12 42	3031 11 42	3042 11 42	3053 10 42	3063 43	630
640	3005 15 39	3020 14 40	3034 14 41	3048 13 41	3061 12 41	3073 11 42	3084 11 43	3095 11 43	3106 43	640
650	3044 16 40	3060 15 40	3075 14 40	3089 13 41	3102 13 42	3115 12 42	3127 11 42	3138 11 42	3149 43	650
660	3084 16 40	3100 15 40	3115 15 41	3130 14 41	3144 13 41	3157 12 41	3169 11 42	3180 12 43	3192 43	660
670	3124 16 39	3140 16 40	3156 15 40	3171 14 41	3185 13 42	3198 13 42	3211 12 42	3223 12 42	3235 43	670
680	3163 17 40	3180 16 40	3196 16 40	3212 15 40	3227 13 41	3240 13 42	3253 12 42	3265 13 43	3278 43	680
690	3203 17 39	3220 16 39	3236 16 40	3252 16 40	3268 14 40	3282 13 41	3295 13 42	3308 13 43	3321 43	690
700	3242 17 39	3259 17 40	3276 16 40	3292 16 41	3308 15 41	3323 14 41	3337 14 42	3351 13 42	3364 42	700
710	3281 18 39	3299 17 39	3316 17 40	3333 16 40	3349 15 40	3364 15 41	3379 14 41	3393 13 41	3406 42	710
720	3320 18 38	3338 18 39	3356 17 39	3373 16 40	3389 16 41	3405 15 41	3420 14 41	3434 14 42	3448 42	720
730	3358 19 39	3377 18 39	3395 18 40	3413 17 40	3430 16 40	3446 15 40	3461 15 41	3476 14 41	3490 42	730
740	3397 19 39	3416 19 40	3435 18 40	3453 17 40	3470 16 40	3486 16 40	3502 15 41	3517 15 42	3532 42	740
750	3436 20 39	3456 19 39	3475 18 39	3493 17 40	3510 16 40	3526 17 41	3543 16 41	3559 15 41	3574 42	750
760	3475 20 38	3495 19 39	3514 19 40	3533 17 40	3550 17 41	3567 17 41	3584 16 41	3600 16 42	3616 42	760
770	3513 21 39	3534 20 39	3554 19 39	3573 18 40	3591 17 40	3608 17 40	3625 17 41	3642 16 41	3658 42	770
780	3552 21 39	3573 20 39	3593 20 40	3613 18 40	3631 17 40	3648 18 41	3666 17 41	3683 17 42	3700 42	780
790	3591 21 38	3612 21 39	3633 20 39	3653 18 39	3671 18 40	3689 18 41	3707 18 41	3725 17 41	3742 41	790
800	3629 22 38	3651 21 38	3672 20 39	3692 19 39	3711 19 40	3730 18 40	3748 18 41	3766 17 41	3783 42	800
810	3667 22 37	3689 22 38	3711 20 38	3731 20 39	3751 19 40	3770 19 41	3789 18 41	3807 18 42	3825 42	810
820	3704 23 37	3727 22 38	3749 21 38	3770 21 38	3791 20 39	3811 19 40	3830 19 41	3849 18 41	3867 41	820
830	3741 24 37	3765 22 37	3787 21 38	3808 22 39	3830 21 39	3851 20 40	3871 19 40	3890 18 41	3908 42	830
840	3778 24 36	3802 23 36	3825 22 37	3847 22 38	3869 22 39	3891 20 39	3911 20 40	3931 19 40	3950 41	840
850	3814 24 36	3838 24 37	3862 23 37	3885 23 38	3908 22 38	3930 21 38	3951 20 39	3971 20 40	3991 41	850
860	3850 25 36	3875 24 36	3899 24 37	3923 23 37	3946 22 37	3968 22 38	3990 21 39	4011 21 40	4032 41	860
870	3886 25 36	3911 25 37	3936 24 37	3960 23 37	3983 23 38	4006 23 38	4029 22 39	4051 22 40	4073 41	870
880	3922 26 36	3948 25 36	3973 24 36	3997 24 37	4021 23 37	4044 24 38	4068 23 39	4091 23 40	4114 41	880
890	3958 26 36	3984 25 36	4009 25 36	4034 24 36	4058 24 37	4082 25 38	4107 24 39	4131 24 40	4155 41	890
900	3994 26	4020 25	4045 25	4070 25	4095 25	4120 26	4146 25	4171 25	4196	900
V.										V.
(C)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(C)
Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log C

TABLE VI.

 $\phi = 15^\circ$.

ANGLE OF FALL.

Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.
600	2448 19 18	2429 20 17	2409 20 17	2389 21 16	2368 21 15	2347 21 15	2326 21 14	2305 21 14	2284 13	600
610	2466 20 18	2446 20 17	2426 21 16	2405 22 16	2383 21 16	2362 22 15	2340 21 14	2319 22 13	2297 13	610
620	2484 21 17	2463 21 16	2442 21 15	2421 22 15	2399 22 15	2377 23 14	2354 22 14	2332 22 13	2310 12	620
630	2501 22 17	2479 22 16	2457 21 16	2436 22 15	2414 23 14	2391 23 13	2368 23 13	2345 23 12	2322 12	630
640	2518 23 17	2495 22 16	2473 22 16	2451 23 15	2428 24 14	2404 23 14	2381 24 13	2357 23 13	2334 12	640
650	2535 24 16	2511 22 16	2489 23 15	2466 24 15	2442 24 15	2418 24 14	2394 24 14	2370 24 13	2346 13	650
660	2551 24 16	2527 23 16	2504 23 15	2481 24 14	2457 25 14	2432 24 13	2408 25 13	2383 24 13	2359 12	660
670	2567 24 17	2543 24 16	2519 24 16	2495 24 15	2471 26 14	2445 24 14	2421 25 13	2396 25 12	2371 12	670
680	2584 25 18	2559 24 17	2535 25 16	2510 25 15	2485 26 14	2459 25 14	2434 26 13	2408 25 13	2383 12	680
690	2602 26 17	2576 25 16	2551 26 15	2525 26 14	2499 26 14	2473 26 13	2447 26 13	2421 26 12	2395 12	690
700	2619 27 16	2592 26 16	2566 27 15	2539 26 15	2513 27 14	2486 26 14	2460 27 13	2433 26 13	2407 12	700
710	2635 27 17	2608 27 16	2581 27 15	2554 27 14	2527 27 13	2500 27 13	2473 27 12	2446 27 12	2419 12	710
720	2652 28 17	2624 28 16	2596 28 15	2568 28 14	2540 27 14	2513 28 13	2485 27 13	2458 27 12	2431 11	720
730	2669 29 17	2640 29 16	2611 29 15	2582 28 14	2554 28 13	2526 28 13	2498 28 12	2470 28 12	2442 12	730
740	2686 30 16	2656 30 15	2626 30 14	2596 29 14	2567 28 14	2539 29 13	2510 28 13	2482 28 12	2454 12	740
750	2702 31 16	2671 31 15	2640 30 15	2610 29 14	2581 29 13	2552 29 13	2523 29 12	2494 28 12	2466 11	750
760	2718 32 16	2686 31 16	2655 31 15	2624 30 14	2594 29 14	2565 30 13	2535 29 13	2506 29 12	2477 11	760
770	2734 32 16	2702 32 15	2670 32 14	2638 30 14	2608 30 14	2578 30 13	2548 30 12	2518 30 12	2488 12	770
780	2750 33 15	2717 33 14	2684 32 14	2652 30 14	2622 31 13	2591 31 13	2560 30 12	2530 30 12	2500 11	780
790	2765 34 15	2731 33 15	2698 32 14	2666 31 13	2635 31 12	2604 32 12	2572 30 12	2542 31 11	2511 11	790
800	2780 34 16	2746 34 15	2712 33 14	2679 32 13	2647 31 13	2616 32 12	2584 31 12	2553 31 11	2522 11	800
810	2796 35 15	2761 35 15	2726 34 14	2692 32 14	2660 32 13	2628 32 12	2596 32 12	2564 31 12	2533 11	810
820	2811 35 15	2776 36 14	2740 34 14	2706 33 13	2673 33 13	2640 32 13	2608 32 12	2576 32 11	2544 11	820
830	2826 36 15	2790 36 14	2754 35 14	2719 33 13	2686 33 12	2653 33 12	2620 33 12	2587 32 12	2555 11	830
840	2841 37 14	2804 36 14	2768 36 13	2732 34 13	2698 33 13	2665 33 12	2632 33 11	2599 33 11	2566 11	840
850	2855 37 15	2818 37 13	2781 36 12	2745 34 12	2711 34 12	2677 34 12	2643 33 12	2610 33 11	2577 10	850
860	2870 39 15	2831 38 14	2793 36 13	2757 34 13	2723 34 12	2689 34 11	2655 34 11	2621 34 11	2587 11	860
870	2885 40 14	2845 39 14	2806 36 14	2770 35 13	2735 35 12	2700 34 12	2666 34 11	2632 34 10	2598 11	870
880	2899 40 15	2859 39 15	2820 37 14	2783 36 13	2747 35 12	2712 35 11	2677 35 11	2642 33 11	2600 10	880
890	2914 40 14	2874 40 13	2834 38 13	2796 37 12	2759 36 11	2723 35 11	2688 35 11	2653 34 11	2619 11	890
900	2928 41	2887 40	2847 39	2808 38	2770 36	2734 35	2699 35	2664 34	2630	900
Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.

$\phi = 15^\circ$.

TERMINAL VELOCITY.

TABLE VI.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	3747 51 21	3798 51 22	3849 52 24	3901 52 25	3953 53 26	4006 52 28	4058 53 30	4111 53 32	4164 33	600
610	3768 52 19	3820 53 21	3873 53 22	3926 53 24	3979 55 26	4034 54 28	4088 55 29	4143 54 30	4197 32	610
620	3787 54 19	3841 54 21	3895 55 23	3950 55 24	4005 57 26	4062 55 28	4117 56 29	4173 56 39	4229 32	620
630	3806 56 20	3862 56 21	3918 56 22	3974 57 24	4031 59 26	4090 56 27	4146 57 29	4203 58 30	4261 32	630
640	3826 57 18	3883 57 20	3940 58 22	3998 59 23	4057 60 25	4117 58 27	4175 58 29	4233 60 30	4293 31	640
650	3844 59 17	3903 59 19	3962 59 20	4021 61 22	4082 62 24	4144 60 26	4204 59 28	4263 61 30	4324 31	650
660	3861 61 18	3922 60 19	3982 61 21	4043 63 22	4106 64 24	4170 62 25	4232 61 27	4293 62 29	4355 30	660
670	3879 62 18	3941 62 19	4003 62 20	4065 65 22	4130 65 23	4195 64 24	4259 63 26	4322 63 28	4385 30	670
680	3897 63 17	3960 63 18	4023 64 20	4087 66 21	4153 66 22	4219 66 23	4285 65 25	4350 65 27	4415 29	680
690	3914 64 17	3978 65 18	4043 65 19	4108 67 21	4175 67 22	4242 68 23	4310 67 24	4377 67 27	4444 29	690
700	3931 65 16	3996 66 17	4062 67 19	4129 68 21	4197 68 22	4265 69 24	4334 70 26	4404 69 27	4473 29	700
710	3947 66 16	4013 68 17	4081 69 19	4150 69 21	4219 70 22	4289 71 24	4360 71 26	4431 71 27	4502 28	710
720	3963 67 16	4030 70 17	4100 71 19	4171 70 21	4241 72 22	4313 73 24	4386 72 26	4458 72 27	4530 28	720
730	3979 68 16	4047 72 17	4119 73 19	4192 71 20	4263 74 22	4337 75 24	4412 73 26	4485 73 27	4558 28	730
740	3995 69 16	4064 74 17	4138 74 18	4212 73 20	4285 76 22	4361 77 23	4438 74 25	4512 74 26	4586 27	740
750	4011 70 16	4081 75 17	4156 76 18	4232 75 19	4307 77 21	4384 79 23	4463 75 24	4538 75 25	4613 27	750
760	4027 71 16	4098 76 17	4174 77 18	4251 77 19	4328 79 21	4407 80 22	4487 76 23	4563 77 25	4640 27	760
770	4043 72 15	4115 77 17	4192 78 18	4270 79 19	4349 80 20	4429 81 21	4510 78 22	4588 79 24	4667 26	770
780	4058 74 15	4132 78 17	4210 79 18	4289 80 18	4369 81 20	4450 82 21	4532 80 22	4612 81 24	4693 26	780
790	4073 76 14	4149 79 16	4228 79 17	4307 82 19	4389 82 19	4471 83 20	4554 82 21	4636 83 23	4719 25	790
800	4087 78 14	4165 80 15	4245 81 16	4326 82 18	4408 83 19	4491 84 20	4575 84 22	4659 85 24	4744 25	800
810	4101 79 14	4180 81 15	4261 83 15	4344 83 17	4427 84 19	4511 86 20	4597 86 22	4683 86 24	4769 25	810
820	4115 80 14	4195 82 15	4277 84 16	4361 85 18	4446 85 19	4531 88 20	4619 88 22	4707 87 23	4794 24	820
830	4129 81 13	4210 83 15	4293 86 16	4379 86 17	4465 86 19	4551 90 20	4641 89 22	4730 88 23	4818 24	830
840	4142 83 13	4225 84 14	4309 87 15	4396 88 16	4484 87 18	4571 92 20	4663 90 21	4753 89 23	4842 24	840
850	4155 84 13	4239 85 14	4324 88 15	4412 90 17	4502 89 18	4591 93 20	4684 92 21	4776 90 22	4866 24	850
860	4168 85 13	4253 86 14	4339 90 15	4429 91 16	4520 91 17	4611 94 19	4705 93 20	4798 92 21	4890 23	860
870	4181 86 13	4267 87 14	4354 91 15	4445 92 16	4537 93 17	4630 95 19	4725 94 20	4819 94 22	4913 24	870
880	4194 87 12	4281 88 13	4369 92 15	4461 93 16	4554 95 17	4649 96 18	4745 96 19	4841 96 21	4937 23	880
890	4206 88 12	4294 90 13	4384 93 15	4477 94 16	4571 96 17	4667 97 18	4764 98 19	4862 98 21	4960 23	890
900	4218 89	4307 92	4399 94	4493 95	4588 97	4685 98	4783 100	4883 100	4983	900
V.										V.
(c)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c)
Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C

TABLE VI.

 $\phi = 20^\circ$.

RANGE.

Log. C V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C V.
600	15216 223 363	15439 222 373	15661 221 384	15882 218 393	16100 217 403	16317 215 414	16532 215 424	16747 214 434	16961 445	600
610	15579 233 365	15812 233 375	16045 230 385	16275 228 396	16503 228 406	16731 225 416	16956 225 418	17181 225 438	17406 449	610
620	15944 243 367	16187 243 377	16430 241 388	16671 238 399	16909 238 410	17147 237 420	17384 235 431	17619 236 442	17855 453	620
630	16311 253 369	16564 254 380	16818 252 390	17070 249 401	17319 248 412	17567 248 423	17815 246 434	18061 247 445	18308 456	630
640	16680 264 371	16944 264 382	17208 263 393	17471 260 404	17731 259 415	17990 259 426	18249 257 437	18506 258 449	18764 460	640
650	17051 275 373	17326 275 384	17601 274 395	17875 271 406	18146 270 418	18416 270 429	18686 269 440	18955 269 452	19224 464	650
660	17424 286 375	17710 186 386	17996 285 397	18281 283 408	18564 281 420	18845 281 432	19126 281 443	19407 281 455	19688 467	660
670	17799 297 377	18096 297 388	18393 296 400	18689 295 411	18984 293 423	19277 292 435	19569 293 447	19862 293 459	20155 470	670
680	18176 308 379	18484 309 391	18793 307 402	19100 307 414	19407 305 425	19712 304 438	20016 305 451	20321 304 462	20625 474	680
690	18555 320 381	18875 320 393	19195 319 405	19514 318 417	19832 318 429	20150 317 441	20467 316 453	20783 316 466	21099 478	690
700	18936 332 383	19268 332 395	19600 331 408	19931 330 420	20261 330 432	20591 329 443	20920 329 455	21249 328 467	21577 480	700
710	19319 344 384	19663 345 397	20008 343 410	20351 342 422	20693 341 434	21034 341 446	21375 341 458	21716 341 470	22057 482	710
720	19703 357 386	20060 358 400	20418 355 412	20773 354 425	21127 353 437	21480 353 449	21833 353 461	22186 353 473	22539 485	720
730	20089 371 389	20460 370 402	20830 368 415	21198 366 427	21564 365 440	21929 365 453	22294 365 465	22659 365 477	23024 489	730
740	20478 384 391	20862 383 404	21245 380 417	21625 379 430	22004 378 443	22382 377 456	22759 377 469	23136 377 481	23513 493	740
750	20869 397 393	21266 396 406	21662 393 420	22055 392 434	22447 391 446	22838 390 459	23228 389 472	23617 389 484	24006 496	750
760	21262 410 395	21672 410 408	22082 407 422	22489 404 436	22893 404 449	23297 403 461	23700 401 474	24101 401 489	24502 499	760
770	21657 423 397	22080 424 411	22504 421 424	22925 417 437	23342 416 450	23758 416 464	24174 416 477	24590 411 488	25001 504	770
780	22054 437 399	22491 437 412	22928 434 426	23362 430 439	23792 430 453	24222 429 466	24651 427 479	25078 427 492	25505 505	780
790	22453 450 401	22903 451 415	23354 447 428	23801 444 442	24245 443 456	24688 442 469	25130 440 482	25570 440 496	26010 509	790
800	22854 464 403	23318 464 418	23782 461 431	24243 458 445	24701 456 459	25157 455 472	25612 454 485	26066 453 499	26519 513	800
810	23257 479 405	23736 477 420	24313 475 433	24688 472 447	25160 469 461	25629 468 475	26097 468 488	26565 467 502	27032 516	810
820	23662 494 407	24156 490 421	24646 489 435	25135 486 449	25621 483 463	26104 481 477	26585 482 491	27067 481 505	27548 519	820
830	24069 508 409	24577 504 422	25081 503 437	25584 500 451	26084 497 465	26581 495 478	27076 496 493	27572 495 507	28067 520	830
840	24478 521 411	24999 519 424	25518 517 438	26035 514 452	26549 510 466	27059 510 480	27569 510 494	28079 508 508	28587 523	840
850	24889 534 411	25423 533 425	25956 531 439	26487 528 453	27015 524 467	27539 524 482	28063 524 496	28587 523 510	29110 524	850
860	25300 548 412	25848 547 425	26395 545 440	26940 542 454	27482 539 468	28021 538 483	28559 538 497	29097 537 511	29634 526	860
870	25712 561 412	26273 562 426	26835 559 441	27394 556 455	27950 554 469	28504 552 484	29056 552 498	29608 552 512	30160 527	870
880	26124 575 413	26699 577 427	27276 573 441	27849 570 456	28419 569 470	28988 566 484	29554 566 499	30120 567 514	30687 528	880
890	26537 589 412	27126 591 427	27717 588 442	28305 584 456	28889 583 471	29472 581 485	30053 581 500	30634 581 515	31215 529	890
900	26949 604	27553 606	28159 602	28761 599	29360 597	29957 596	30553 596	31149 595	31744	900
Log. C V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C V.

$\phi = 20^\circ$.

TIME OF FLIGHT.

TABLE VI.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	3665 20 51	3685 18 51	3703 18 52	3721 17 53	3738 17 54	3755 17 54	3772 16 54	3788 16 55	3804 56	600
610	3716 20 51	3736 19 51	3755 19 53	3774 18 53	3792 17 53	3809 17 54	3826 17 55	3843 17 55	3860 55	610
620	3767 20 50	3787 21 52	3808 19 52	3827 18 53	3845 18 54	3863 18 54	3881 17 54	3898 17 55	3915 56	620
630	3817 22 51	3839 21 51	3860 20 52	3880 19 53	3899 18 53	3917 18 54	3935 18 55	3953 18 55	3971 55	630
640	3868 22 50	3890 22 51	3912 21 52	3933 19 52	3952 19 53	3971 19 53	3990 18 54	4008 18 55	4026 55	640
650	3918 23 50	3941 23 51	3964 21 51	3985 20 52	4005 19 53	4024 20 54	4044 19 54	4063 18 54	4081 55	650
660	3968 24 50	3992 23 50	4015 22 51	4037 21 52	4058 20 53	4078 20 54	4098 19 54	4117 19 54	4136 54	660
670	4018 24 50	4042 24 51	4066 23 51	4089 22 52	4111 21 53	4132 20 54	4152 19 55	4171 19 55	4190 55	670
680	4068 25 49	4093 24 50	4117 24 51	4141 23 51	4164 22 52	4186 21 53	4207 19 54	4226 19 54	4245 54	680
690	4117 26 49	4143 25 50	4168 24 51	4192 24 51	4216 23 52	4239 22 53	4261 19 53	4280 19 54	4299 54	690
700	4166 27 48	4193 26 49	4219 24 50	4243 25 51	4268 24 51	4292 22 51	4314 20 52	4334 19 53	4353 54	700
710	4214 28 49	4242 27 50	4269 25 50	4294 25 51	4319 24 51	4343 23 51	4366 21 51	4387 20 52	4407 53	710
720	4263 29 49	4292 27 49	4319 26 50	4345 25 51	4370 24 51	4394 23 51	4417 22 52	4439 21 53	4460 54	720
730	4312 29 48	4341 28 49	4369 27 50	4396 25 50	4421 24 51	4445 24 52	4469 23 52	4492 22 52	4514 53	730
740	4360 30 48	4390 29 48	4419 27 49	4446 26 49	4472 25 50	4497 24 51	4521 23 52	4544 23 53	4567 53	740
750	4408 30 47	4438 30 48	4468 27 48	4495 27 50	4522 26 50	4548 25 51	4573 24 51	4597 23 52	4620 53	750
760	4455 31 48	4486 30 48	4516 29 49	4545 27 49	4572 27 50	4599 25 50	4624 25 51	4649 24 52	4673 53	760
770	4503 31 47	4534 31 48	4565 29 48	4594 28 49	4622 27 50	4649 26 51	4675 26 52	4701 25 52	4726 52	770
780	4550 32 48	4582 31 48	4613 30 49	4643 29 49	4672 28 49	4700 27 50	4727 26 51	4753 25 52	4778 53	780
790	4598 32 47	4630 32 48	4662 30 48	4692 29 49	4721 29 50	4750 28 50	4778 27 50	4805 26 51	4831 52	790
800	4645 33 47	4678 32 47	4710 31 47	4741 30 48	4771 29 49	4800 28 50	4828 28 51	4856 27 51	4883 52	800
810	4692 33 47	4725 32 48	4757 32 49	4789 31 49	4820 30 49	4850 29 50	4879 28 50	4907 28 51	4935 52	810
820	4739 34 47	4773 33 48	4806 32 48	4838 31 48	4869 31 49	4900 29 49	4929 29 50	4958 29 51	4987 51	820
830	4786 35 46	4821 33 47	4854 32 48	4886 32 48	4918 31 48	4949 30 49	4979 30 50	5009 29 51	5038 52	830
840	4832 36 46	4868 34 46	4902 32 47	4934 32 48	4966 32 49	4998 31 49	5029 31 50	5060 30 50	5090 51	840
850	4878 36 46	4914 35 46	4949 33 47	4982 33 48	5015 32 49	5047 32 50	5079 31 50	5110 31 51	5141 51	850
860	4924 36 46	4960 36 47	4996 34 47	5030 34 48	5064 33 49	5097 32 50	5129 32 50	5161 32 50	5192 51	860
870	4970 37 46	5007 36 47	5043 35 47	5078 35 48	5113 34 48	5147 32 49	5179 32 50	5211 32 51	5243 51	870
880	5016 38 45	5054 36 46	5090 36 47	5126 35 48	5161 35 49	5196 33 49	5229 33 50	5262 32 51	5294 51	880
890	5061 39 46	5100 37 46	5137 37 47	5174 36 47	5210 35 48	5245 34 49	5279 34 50	5313 32 50	5345 51	890
900	5107 39	5146 38	5184 37	5221 37	5258 36	5294 35	5329 34	5363 33	5396	900
V.										V.
Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)

TABLE VI.

 $\phi = 20^\circ$. ANGLE OF FALL.

Log C (C)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (C)
V.										V.
600	3321 25 25	3296 26 24	3270 27 23	3243 26 23	3217 27 22	3190 27 21	3163 25 21	3138 25 20	3113 19	600
610	3346 26 25	3320 27 24	3293 27 24	3266 27 23	3239 28 22	3211 27 22	3184 26 21	3158 26 20	3132 19	610
620	3371 27 25	3344 27 24	3317 28 23	3289 28 22	3261 28 21	3233 28 20	3205 27 20	3178 27 19	3151 18	620
630	3396 28 24	3368 28 23	3340 29 22	3311 29 22	3282 29 21	3253 28 20	3225 28 19	3197 28 19	3169 19	630
640	3420 29 24	3391 29 23	3362 29 22	3333 30 21	3303 30 20	3273 29 19	3244 28 18	3216 28 17	3188 16	640
650	3444 30 23	3414 30 23	3384 30 22	3354 31 21	3323 31 20	3292 30 19	3262 29 18	3233 29 17	3204 17	650
660	3467 30 23	3437 31 22	3406 31 22	3375 32 21	3343 32 20	3311 31 19	3280 30 18	3250 29 17	3221 17	660
670	3490 31 23	3459 31 23	3428 32 22	3396 33 21	3363 33 20	3330 32 19	3298 31 18	3267 29 18	3238 17	670
680	3513 31 23	3482 32 22	3450 33 21	3417 34 20	3383 34 20	3349 33 20	3316 31 19	3285 30 18	3255 17	680
690	3536 32 23	3504 33 22	3471 34 21	3437 34 20	3403 34 19	3369 34 18	3335 32 17	3303 31 16	3272 16	690
700	3559 33 22	3526 34 21	3492 35 21	3457 35 20	3422 35 19	3387 35 18	3352 33 18	3319 31 17	3288 16	700
710	3581 34 22	3547 34 21	3513 36 20	3477 36 19	3441 36 18	3405 35 18	3370 34 18	3336 32 17	3304 16	710
720	3603 35 21	3568 35 21	3533 37 20	3496 37 20	3459 36 19	3423 35 18	3388 35 17	3353 33 17	3320 16	720
730	3624 35 21	3589 36 20	3553 37 19	3516 38 19	3478 37 19	3441 36 18	3405 35 17	3370 34 16	3336 15	730
740	3645 36 21	3609 37 20	3572 37 19	3535 38 18	3497 38 17	3459 37 17	3422 36 15	3386 35 15	3351 15	740
750	3666 37 22	3629 38 21	3591 38 20	3553 39 19	3514 38 18	3476 39 16	3437 36 16	3401 35 15	3366 15	750
760	3688 38 20	3650 39 20	3611 39 20	3572 40 19	3532 40 18	3492 39 17	3453 37 17	3416 35 16	3381 15	760
770	3708 38 21	3670 39 20	3631 40 19	3591 41 18	3550 41 17	3509 39 16	3470 38 15	3432 36 15	3396 14	770
780	3729 39 19	3690 40 18	3650 41 17	3609 42 16	3567 42 15	3525 40 14	3485 38 14	3447 37 13	3410 13	780
790	3748 40 19	3708 41 18	3667 42 17	3625 43 16	3582 43 16	3539 40 16	3499 39 15	3460 37 14	3423 13	790
800	3767 41 19	3726 42 18	3684 43 17	3641 43 16	3598 43 15	3555 41 15	3514 40 14	3474 38 14	3436 13	800
810	3786 42 19	3744 43 18	3701 44 17	3657 44 16	3613 43 15	3570 42 14	3528 40 14	3488 39 13	3449 13	810
820	3805 43 18	3762 44 18	3718 45 17	3673 45 16	3628 44 15	3584 42 14	3542 41 13	3501 39 13	3462 12	820
830	3823 43 18	3780 45 17	3735 46 17	3689 46 17	3643 45 16	3598 43 15	3555 41 14	3514 40 13	3474 12	830
840	3841 44 18	3797 45 17	3752 46 16	3706 47 16	3659 46 16	3613 44 15	3569 42 14	3527 41 13	3486 12	840
850	3859 45 18	3814 46 17	3768 46 17	3722 47 16	3675 47 15	3628 45 14	3583 43 13	3540 42 12	3498 12	850
860	3877 46 17	3831 46 17	3785 47 16	3738 48 16	3690 48 16	3642 46 16	3596 44 15	3552 42 14	3510 13	860
870	3894 46 18	3848 47 17	3801 47 17	3754 48 16	3706 48 15	3658 47 15	3611 45 15	3566 43 14	3523 13	870
880	3912 47 18	3865 47 18	3818 48 17	3770 49 16	3721 48 16	3673 47 15	3626 46 15	3580 44 15	3536 14	880
890	3930 47 20	3883 48 19	3835 49 18	3786 49 17	3737 49 16	3688 47 16	3641 46 15	3595 45 14	3550 14	890
900	3950 48	3902 49	3853 50	3803 50	3753 49	3704 48	3656 47	3609 45	3564	900
V.	(c) (10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c) Log. C
	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	

$\phi = 20^\circ$.

TERMINAL VELOCITY.

TABLE VI.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	3602 45 17	3647 47 18	3694 48 19	3742 49 21	3791 49 22	3840 50 24	3890 51 26	3941 51 28	3992 29	600
610	3619 46 17	3665 48 19	3713 50 20	3763 50 21	3813 51 23	3864 52 24	3916 53 26	3969 52 27	4021 29	610
620	3636 48 17	3684 49 18	3733 51 20	3784 52 21	3836 52 22	3888 54 24	3942 54 25	3996 54 26	4050 28	620
630	3653 49 17	3702 51 19	3753 52 20	3805 53 21	3858 54 22	3912 55 23	3967 55 24	4022 56 26	4078 28	630
640	3670 51 17	3721 52 18	3773 53 19	3826 54 20	3880 55 22	3935 56 23	3991 57 24	4048 58 26	4106 27	640
650	3687 52 17	3739 53 18	3792 54 19	3846 56 20	3902 56 21	3958 57 23	4015 59 24	4074 59 26	4133 27	650
660	3704 53 16	3757 54 17	3811 55 18	3866 57 20	3923 58 22	3981 58 23	4039 61 25	4100 60 25	4160 27	660
670	3720 54 15	3774 55 16	3829 57 18	3886 59 20	3945 59 21	4004 60 23	4064 61 24	4125 62 25	4187 27	670
680	3735 55 15	3790 57 16	3847 59 18	3906 60 20	3966 61 21	4027 61 22	4088 62 24	4150 64 25	4214 26	680
690	3750 56 14	3806 59 15	3865 61 17	3926 61 19	3987 62 21	4049 63 23	4112 63 24	4175 65 26	4240 26	690
700	3764 57 15	3821 61 16	3882 63 17	3945 63 19	4008 64 21	4072 64 22	4136 65 24	4201 65 25	4266 26	700
710	3779 58 15	3837 62 17	3899 65 18	3964 65 19	4029 65 20	4096 66 22	4160 66 23	4226 66 24	4292 26	710
720	3794 60 15	3854 63 16	3917 66 17	3983 66 19	4049 67 21	4116 67 22	4183 67 23	4250 68 25	4318 26	720
730	3809 61 15	3870 64 16	3934 68 18	4002 68 19	4070 68 20	4138 68 21	4206 69 23	4275 69 24	4344 26	730
740	3824 62 15	3886 66 16	3952 69 17	4021 69 18	4090 69 19	4159 70 20	4229 70 22	4299 71 24	4370 26	740
750	3839 63 15	3902 67 16	3969 70 17	4039 70 18	4109 70 19	4179 72 21	4251 72 22	4323 73 24	4396 25	750
760	3854 64 16	3918 68 17	3986 71 18	4057 71 18	4128 72 19	4200 73 20	4273 74 21	4347 74 23	4421 25	760
770	3870 65 15	3935 69 16	4004 71 17	4075 72 18	4147 73 19	4220 74 20	4294 76 22	4370 76 23	4446 25	770
780	3885 66 16	3951 70 17	4021 72 17	4093 73 18	4166 74 18	4240 76 19	4316 77 21	4393 78 23	4471 25	780
790	3901 67 16	3968 70 17	4038 73 18	4111 73 18	4184 75 19	4259 78 20	4337 79 21	4416 80 22	4496 24	790
800	3917 68 15	3985 71 17	4056 73 17	4129 74 17	4203 76 18	4279 79 20	4358 80 21	4438 82 23	4520 24	800
810	3932 70 15	4002 71 16	4073 73 17	4146 75 17	4221 78 18	4299 80 19	4379 82 20	4461 83 22	4544 24	810
820	3947 71 13	4018 72 15	4090 73 16	4163 76 17	4239 79 18	4318 81 19	4399 84 21	4483 85 22	4568 24	820
830	3960 73 13	4033 73 14	4106 74 15	4180 77 17	4257 80 18	4337 83 19	4420 85 20	4505 87 22	4592 24	830
840	3973 74 13	4047 74 14	4121 76 16	4197 78 17	4275 81 18	4356 84 19	4440 87 20	4527 89 22	4616 24	840
850	3986 75 13	4061 76 14	4137 77 16	4214 79 17	4293 82 18	4375 85 19	4460 89 21	4549 91 22	4640 24	850
860	3999 76 13	4075 78 14	4153 78 15	4231 80 17	4311 83 18	4394 87 19	4481 90 20	4571 93 22	4664 24	860
870	4012 77 13	4089 79 15	4168 80 16	4248 81 17	4329 84 18	4413 88 20	4501 92 21	4593 95 22	4688 23	870
880	4025 79 13	4104 80 14	4184 81 15	4265 82 16	4347 86 18	4433 89 19	4522 93 20	4615 96 21	4711 23	880
890	4038 80 13	4118 81 14	4199 82 15	4281 84 16	4365 87 17	4452 90 19	4542 94 20	4636 98 21	4734 23	890
900	4051 81	4132 82	4214 83	4297 85	4382 89	4471 91	4562 95	4657 100	4757	900
Log. C (c)	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C (c)

TABLE VI.

 $\phi = 25^\circ$. RANGE.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	17305 270 396	17575 270 408	17845 270 421	18115 269 434	18384 267 446	18651 266 459	18917 265 472	19182 264 485	19446 498	600
610	17701 282 399	17983 283 412	18266 283 425	18549 281 438	18830 280 451	19110 279 464	19389 278 477	19667 277 490	19944 503	610
620	18100 295 403	18395 296 416	18691 296 429	18987 294 442	19281 293 455	19574 292 468	19866 291 481	20157 290 494	20447 507	620
630	18503 308 408	18811 309 421	19120 309 433	19429 307 446	19736 306 460	20042 305 473	20347 304 486	20651 303 499	20954 512	630
640	18911 321 411	19232 321 424	19553 322 437	19875 321 450	20196 319 463	20515 318 476	20833 317 489	21150 316 503	21466 517	640
650	19322 334 415	19656 334 428	19990 335 441	20325 334 454	20659 332 467	20991 331 480	21322 331 494	21653 330 508	21983 522	650
660	19737 347 417	20084 347 430	20431 348 444	20779 347 458	21126 345 472	21471 345 486	21816 345 500	22161 344 513	22505 526	660
670	20154 360 420	20514 361 434	20875 362 448	21237 361 462	21598 359 475	21957 359 490	22316 358 503	22674 357 517	23031 531	670
680	20574 374 423	20948 375 437	21323 376 452	21699 374 466	22073 374 480	22447 372 493	22819 372 507	23191 371 521	23562 535	680
690	20997 388 426	21385 390 441	21775 390 455	22165 388 469	22553 387 484	22940 386 498	23326 386 512	23712 385 526	24097 540	690
700	21423 403 427	21826 404 441	22230 404 456	22634 403 471	23037 401 486	23438 400 501	23838 400 516	24238 399 530	24637 544	700
710	21850 417 431	22267 419 446	22686 419 460	23105 418 474	23523 416 488	23939 415 503	24354 414 518	24768 413 533	25181 548	710
720	22281 432 434	22713 433 448	23146 433 463	23579 432 478	24011 431 493	24442 430 508	24872 429 523	25301 428 538	25729 552	720
730	22715 446 435	23161 448 451	23609 448 466	24057 447 481	24504 446 496	24950 445 511	25395 444 526	25839 442 541	26281 556	730
740	23150 462 436	23612 463 452	24075 463 468	24538 462 484	25000 461 499	25461 460 514	25921 459 529	26380 457 544	26837 560	740
750	23586 478 438	24064 479 455	24543 479 471	25022 477 487	25499 476 503	25975 475 519	26450 474 534	26924 473 549	27397 564	750
760	24024 495 441	24519 495 458	25014 495 474	25509 493 490	26002 492 506	26494 490 522	26984 489 538	27473 488 553	27961 568	760
770	24465 512 444	24977 511 461	25488 511 477	25999 509 493	26508 508 509	27016 506 525	27522 504 541	28026 503 557	28529 573	770
780	24909 529 446	25438 527 463	25965 527 480	26492 525 496	27017 524 512	27541 522 528	28063 520 544	28583 519 560	29102 577	780
790	25355 546 448	25901 544 466	26445 543 483	26988 541 499	27529 540 516	28069 538 532	28607 536 548	29143 536 565	29679 581	790
800	25803 564 451	26367 561 467	26928 559 485	27487 558 502	28045 556 519	28601 554 536	29155 553 552	29708 552 569	30260 585	800
810	26254 580 453	26834 579 469	27413 567 487	27989 575 504	28564 573 521	29137 570 538	29707 570 555	30277 568 572	30845 589	810
820	26707 596 454	27303 597 471	27900 593 488	28493 592 506	29085 590 523	29675 587 540	30262 587 558	30849 585 576	31434 594	820
830	27161 613 458	27774 614 475	28388 611 492	28999 609 509	29608 607 526	30215 605 544	30820 605 562	31425 603 580	32028 598	830
840	27619 630 459	28249 631 475	28880 628 493	29508 626 512	30134 625 530	30759 623 548	31382 623 566	32005 621 584	32626 603	840
850	28078 646 462	28724 649 479	29373 647 496	30020 644 514	30664 643 533	31307 641 551	31948 641 569	32589 640 588	33229 607	850
860	28540 663 463	29203 666 481	29869 665 499	30534 663 517	31197 661 536	31858 659 554	32517 660 573	33177 659 592	33836 611	860
870	29003 681 465	29684 684 483	30368 683 501	31051 682 520	31733 679 539	32412 678 558	33090 679 578	33769 678 597	34447 616	870
880	29468 699 469	30167 702 487	30869 702 505	31571 701 523	32272 698 542	32970 698 562	33668 698 582	34366 697 601	35063 620	880
890	29937 717 471	30654 720 489	31374 720 507	32094 720 526	32814 718 545	33532 718 565	34250 717 585	34967 716 605	35683 625	890
900	30408 735	31143 738	31881 739	32620 739	33359 738	34097 738	34835 737	35572 736	36308	900
V.										V.
Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)

$\phi = 25^\circ$. TIME OF FLIGHT.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	4440 26 60	4466 26 61	4492 25 62	4517 24 62	4541 23 63	4564 23 64	4587 22 65	4609 22 66	4631 67	600
610	4500 27 60	4527 27 61	4554 25 61	4579 25 62	4604 24 63	4628 24 64	4652 23 65	4675 23 66	4698 67	610
620	4560 28 59	4588 27 60	4615 26 61	4641 26 62	4667 25 63	4692 25 64	4717 24 65	4741 24 66	4765 66	620
630	4619 29 59	4648 28 60	4676 27 61	4703 27 62	4730 26 63	4756 26 64	4782 25 65	4807 24 65	4831 65	630
640	4678 30 59	4708 29 60	4737 28 61	4765 28 62	4793 27 63	4820 27 64	4847 25 64	4872 24 65	4896 66	640
650	4737 31 59	4768 30 60	4798 29 61	4827 29 62	4856 28 63	4884 27 64	4911 26 65	4937 25 65	4962 65	650
660	4796 32 59	4828 31 60	4859 30 61	4889 30 62	4919 29 63	4948 28 64	4976 26 64	5002 25 65	5027 66	660
670	4855 33 59	4888 32 60	4920 31 61	4951 31 62	4982 30 63	5012 28 63	5040 27 64	5067 26 65	5093 66	670
680	4914 34 59	4948 33 60	4981 32 61	5013 32 62	5045 30 62	5075 29 63	5104 28 64	5132 27 65	5159 66	680
690	4973 35 59	5008 34 59	5042 33 60	5075 32 61	5107 31 62	5138 30 63	5168 29 64	5197 28 65	5225 65	690
700	5032 35 59	5067 35 60	5102 34 60	5136 33 61	5169 32 62	5201 31 62	5232 30 63	5262 28 64	5290 65	700
710	5091 36 59	5127 35 60	5162 35 61	5197 34 61	5231 32 62	5263 32 63	5295 31 63	5326 29 64	5355 65	710
720	5150 37 59	5187 36 59	5223 35 60	5258 35 61	5293 33 61	5326 32 62	5358 32 63	5390 30 64	5420 65	720
730	5209 37 58	5246 37 59	5283 36 60	5319 35 61	5354 34 62	5388 33 62	5421 33 63	5454 31 63	5485 64	730
740	5267 38 58	5305 38 59	5343 37 60	5380 36 61	5416 34 61	5450 34 62	5484 33 63	5517 32 64	5549 64	740
750	5325 39 57	5364 39 58	5403 38 59	5441 36 60	5477 35 61	5512 35 62	5547 34 62	5581 32 63	5613 64	750
760	5382 40 57	5422 40 58	5462 39 59	5501 37 60	5538 36 61	5574 35 62	5609 35 63	5644 33 63	5677 64	760
770	5439 41 57	5480 41 58	5521 40 59	5561 38 60	5599 37 61	5636 36 61	5672 35 62	5707 34 62	5741 63	770
780	5496 42 57	5538 42 58	5580 41 59	5631 39 59	5660 37 60	5697 37 61	5734 35 62	5769 35 63	5804 63	780
790	5553 43 57	5596 43 58	5639 41 58	5680 40 59	5720 38 60	5758 38 61	5796 36 61	5832 35 62	5867 63	790
800	5610 44 56	5654 43 57	5697 42 57	5739 41 58	5780 39 59	5819 38 60	5857 37 60	5894 36 61	5930 62	800
810	5666 45 55	5711 43 56	5754 43 57	5797 42 57	5839 40 58	5879 38 59	5917 38 60	5955 37 60	5992 61	810
820	5721 46 54	5767 44 55	5811 43 56	5854 43 57	5897 41 57	5938 39 58	5977 38 59	6015 38 60	6053 61	820
830	5775 47 54	5822 45 55	5867 44 56	5911 43 56	5954 42 57	5996 40 57	6036 39 58	6075 39 59	6114 60	830
840	5829 48 54	5877 46 55	5923 44 56	5967 44 57	6011 42 57	6053 41 58	6094 40 59	6134 40 60	6174 61	840
850	5883 49 55	5932 47 56	5979 45 57	6024 44 58	6068 43 58	6111 42 59	6153 41 60	6194 41 61	6235 62	850
860	5938 50 55	5988 48 56	6036 46 57	6082 44 58	6126 44 59	6170 43 60	6213 42 61	6255 42 62	6297 63	860
870	5993 51 56	6044 49 57	6093 47 58	6140 45 59	6185 45 60	6230 44 61	6274 43 62	6317 43 63	6360 63	870
880	6049 52 57	6101 50 58	6151 48 59	6199 46 60	6245 46 61	6291 45 61	6336 44 62	6380 43 63	6423 64	880
890	6106 53 58	6159 51 58	6210 49 59	6259 47 60	6306 46 61	6352 46 62	6398 45 63	6443 44 64	6487 65	890
900	6164 53	6217 52	6269 50	6319 48	6367 47	6414 47	6461 46	6507 45	6552	900
V.										V.
Log. C (c)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	Log. C (c)
	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	

TABLE VI.

 $\phi = 25^\circ$. ANGLE OF FALL.

Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.
600	4109 25 31	4084 26 30	4058 27 29	4031 27 27	4004 27 25	3977 28 24	3949 29 23	3920 30 23	3890 22	600
610	4140 26 30	4114 27 29	4087 29 28	4058 29 27	4029 28 26	4001 29 24	3972 29 23	3943 31 22	3912 22	610
620	4170 27 29	4143 28 28	4115 30 27	4085 30 26	4055 30 25	4025 30 24	3995 30 23	3965 31 22	3934 22	620
630	4199 28 29	4171 29 28	4142 31 26	4111 31 26	4080 31 25	4049 31 24	4018 31 23	3987 31 22	3956 21	630
640	4228 29 28	4199 31 27	4168 31 26	4137 32 25	4105 32 24	4073 32 24	4041 32 23	4009 32 22	3977 21	640
650	4256 30 27	4226 32 26	4194 32 25	4162 33 24	4129 32 24	4097 33 23	4064 33 22	4031 33 21	3998 20	650
660	4283 31 27	4252 33 26	4219 33 25	4186 33 24	4153 33 23	4120 34 22	4086 34 22	4052 34 21	4018 20	660
670	4310 32 26	4278 34 25	4244 34 24	4210 34 24	4176 34 23	4142 34 22	4108 35 21	4073 35 21	4038 20	670
680	4336 33 26	4303 35 25	4268 34 24	4234 35 23	4199 35 23	4164 35 22	4129 35 21	4094 36 20	4058 19	680
690	4362 34 25	4328 36 24	4292 35 24	4257 35 23	4222 36 22	4186 36 22	4150 36 21	4114 37 20	4077 19	690
700	4387 35 26	4352 36 25	4316 36 24	4280 36 23	4244 36 22	4208 37 21	4171 37 20	4134 38 20	4096 19	700
710	4413 36 25	4377 37 24	4340 37 23	4303 37 22	4266 37 21	4229 38 20	4191 37 19	4154 39 19	4115 18	710
720	4438 37 25	4401 38 24	4363 38 23	4325 38 22	4287 38 21	4249 39 20	4210 37 19	4173 40 18	4133 17	720
730	4463 38 24	4425 39 23	4386 39 22	4347 39 21	4308 39 20	4269 40 19	4229 38 18	4191 41 17	4150 16	730
740	4487 39 23	4448 40 22	4408 40 21	4368 40 20	4328 40 20	4288 41 19	4247 39 18	4208 42 17	4166 16	740
750	4510 40 22	4470 41 22	4429 41 21	4388 40 20	4348 41 19	4307 42 19	4265 40 18	4225 43 17	4182 16	750
760	4532 40 22	4492 42 21	4450 42 21	4408 41 20	4367 41 19	4326 43 18	4283 41 18	4242 44 17	4198 16	760
770	4554 41 22	4513 42 21	4471 43 20	4428 42 20	4386 42 19	4344 43 18	4301 42 17	4259 45 16	4214 16	770
780	4576 42 21	4534 43 20	4491 43 20	4448 43 19	4405 43 18	4362 44 17	4318 43 17	4275 45 16	4230 15	780
790	4597 43 21	4554 43 20	4511 44 19	4467 44 19	4423 44 18	4379 44 17	4335 44 16	4291 46 15	4245 15	790
800	4618 44 21	4574 44 21	4530 44 20	4486 45 19	4441 45 19	4396 45 18	4351 45 17	4306 46 16	4260 15	800
810	4639 44 21	4595 45 21	4550 45 20	4505 45 19	4460 46 18	4414 46 17	4368 46 16	4322 47 15	4275 15	810
820	4660 44 21	4616 46 20	4570 46 19	4524 46 18	4478 47 17	4431 47 17	4384 47 16	4337 47 15	4290 14	820
830	4681 45 21	4636 47 19	4589 47 19	4542 47 18	4495 47 17	4448 48 17	4400 48 16	4352 48 15	4304 14	830
840	4702 47 19	4655 47 19	4608 48 18	4560 48 17	4512 47 17	4465 49 16	4416 49 15	4367 49 14	4318 13	840
850	4721 47 19	4674 48 18	4626 49 17	4577 48 16	4529 48 15	4481 50 14	4431 50 14	4381 50 13	4331 12	850
860	4740 48 18	4692 49 18	4643 50 17	4593 49 16	4544 49 15	4495 50 14	4445 51 14	4394 51 13	4343 12	860
870	4758 48 18	4710 50 17	4660 51 16	4609 50 16	4559 50 15	4509 50 14	4459 52 13	4407 52 12	4355 12	870
880	4776 49 17	4727 51 16	4676 51 15	4625 51 15	4574 51 14	4523 51 13	4472 53 12	4419 52 12	4367 11	880
890	4793 50 17	4743 52 15	4691 51 15	4640 52 14	4588 52 13	4536 52 12	4484 53 11	4431 53 11	4378 10	890
900	4810 52	4758 52	4706 52	4654 53	4601 53	4548 53	4495 53	4442 54	4388	900
Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.

$\phi = 25^\circ$. TERMINAL VELOCITY.

TABLE VI.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	3577 40 17	3617 42 18	3659 44 19	3703 44 21	3747 46 23	3793 47 24	3840 48 25	3888 49 27	3937 28	600
610	3594 41 17	3635 43 18	3678 46 19	3724 46 20	3770 47 21	3817 48 23	3865 50 25	3915 50 26	3965 28	610
620	3611 42 16	3653 44 18	3697 47 20	3744 47 21	3791 49 22	3840 50 23	3890 51 24	3941 52 25	3993 27	620
630	3627 44 17	3671 46 18	3717 48 19	3765 48 20	3813 50 22	3863 51 23	3914 52 24	3966 54 26	4020 27	630
640	3644 45 17	3689 47 19	3736 49 20	3785 50 21	3835 51 22	3886 52 24	3938 54 25	3992 55 26	4047 28	640
650	3661 47 16	3708 48 17	3756 50 19	3806 51 21	3857 53 23	3910 53 24	3963 55 25	4018 57 26	4075 27	650
660	3677 48 16	3725 50 17	3775 52 19	3827 53 20	3880 54 21	3934 54 22	3988 56 24	4044 58 26	4102 27	660
670	3693 49 16	3742 52 17	3794 53 19	3847 54 21	3901 55 23	3956 56 24	4012 58 25	4070 59 26	4129 27	670
680	3709 50 16	3759 54 18	3813 55 18	3868 56 20	3924 56 22	3980 57 24	4037 59 25	4096 60 26	4156 27	680
690	3725 52 16	3777 54 17	3831 57 19	3888 58 20	3946 58 21	4004 58 23	4062 60 25	4122 61 26	4183 27	690
700	3741 53 16	3794 56 17	3850 58 18	3908 59 19	3967 60 20	4027 60 21	4087 61 23	4148 62 24	4210 26	700
710	3757 54 16	3811 57 17	3868 59 18	3927 60 20	3987 61 21	4048 62 22	4110 62 23	4172 64 25	4236 26	710
720	3773 55 15	3828 58 17	3886 61 18	3947 61 19	4008 62 21	4070 63 22	4133 64 23	4197 65 25	4262 26	720
730	3788 57 16	3845 59 17	3904 62 19	3966 63 20	4029 63 21	4092 64 22	4156 66 24	4222 66 25	4288 27	730
740	3804 58 16	3862 61 17	3923 63 18	3986 64 19	4050 64 20	4114 66 22	4180 67 23	4247 68 25	4315 26	740
750	3820 59 16	3879 62 17	3941 64 18	4005 65 19	4070 66 20	4136 67 21	4203 69 23	4272 69 24	4341 26	750
760	3836 60 16	3896 63 17	3959 65 18	4024 66 19	4090 67 21	4157 69 22	4226 70 23	4296 71 25	4367 27	760
770	3852 61 16	3913 64 17	3977 66 18	4043 68 19	4111 68 20	4179 70 22	4249 72 24	4321 73 25	4394 26	770
780	3868 62 16	3930 65 17	3995 67 18	4062 69 19	4131 70 20	4201 72 22	4273 73 23	4346 74 25	4420 26	780
790	3884 63 16	3947 66 17	4013 68 18	4081 70 19	4151 72 20	4223 73 21	4296 75 23	4371 75 25	4446 27	790
800	3900 64 15	3964 67 16	4031 69 17	4100 71 19	4171 73 20	4244 75 21	4319 77 23	4396 77 24	4473 26	800
810	3915 65 16	3980 68 17	4048 71 18	4119 72 19	4191 74 21	4265 77 22	4342 78 23	4420 79 24	4499 26	810
820	3931 66 16	3997 69 17	4066 72 18	4138 74 19	4212 75 20	4287 78 22	4365 79 23	4444 81 24	4525 26	820
830	3947 67 15	4014 70 16	4084 73 18	4157 75 19	4232 77 20	4309 79 21	4388 80 23	4468 83 25	4551 26	830
840	3962 68 16	4030 72 17	4102 74 18	4176 76 19	4252 78 20	4330 81 22	4411 82 23	4493 84 25	4577 26	840
850	3978 69 15	4047 73 17	4120 75 18	4195 77 19	4272 80 20	4352 82 21	4434 84 23	4518 85 25	4603 27	850
860	3993 71 15	4064 74 16	4138 76 17	4214 78 18	4292 81 20	4373 84 22	4457 86 23	4543 87 24	4630 26	860
870	4008 72 15	4080 75 16	4155 77 17	4232 80 19	4312 83 21	4395 85 22	4480 87 23	4567 89 25	4656 26	870
880	4023 73 15	4096 76 16	4172 79 17	4251 82 19	4333 84 20	4417 86 22	4503 89 24	4592 90 25	4682 26	880
890	4038 74 15	4112 77 16	4189 81 18	4270 83 19	4353 86 21	4439 88 22	4527 90 23	4617 91 25	4708 27	890
900	4053 75	4128 79	4207 82	4289 85	4374 87	4461 89	4550 92	4642 93	4735	900
V.										V.
(c)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c)
Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C

TABLE VI.

 $\phi = 30^\circ$.

RANGE.

Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.
600	19029 301 424	19330 303 439	19633 305 454	19938 306 468	20244 304 482	20548 303 496	20851 300 511	21151 297 526	21448 541	600
610	19453 316 428	19769 318 443	20037 319 458	20406 320 472	20726 318 487	21044 318 502	21362 315 517	21677 312 532	21989 547	610
620	19881 331 432	20212 333 447	20545 333 462	20878 335 477	21213 333 492	21546 333 507	21879 330 522	22209 327 537	22536 553	620
630	20313 346 436	20659 348 452	21007 348 467	21355 350 482	21705 348 497	22053 348 512	22401 345 527	22746 343 543	23089 559	630
640	20749 362 440	21111 363 455	21474 363 471	21837 365 487	22202 363 502	22565 363 517	22928 361 532	23289 359 548	23648 564	640
650	21189 377 445	21566 379 460	21945 379 475	22324 380 491	22704 378 506	23082 378 522	23460 377 538	23837 375 554	24212 570	650
660	21634 392 448	22026 394 464	22420 395 480	22815 395 496	23210 394 512	23604 394 528	23998 393 544	24391 391 560	24782 576	660
670	22082 408 452	22490 410 468	22900 411 484	23311 411 500	23722 410 516	24132 410 532	24542 409 548	24951 407 565	25358 582	670
680	22534 424 456	22958 426 472	23384 427 488	23811 427 504	24238 426 520	24664 426 536	25090 426 553	25516 424 570	25940 588	680
690	22990 440 460	23430 442 477	23872 443 493	24315 443 509	24758 412 525	25200 443 542	25643 443 559	26086 442 576	26528 594	690
700	23450 457 463	23907 458 480	24365 459 497	24824 459 514	25283 459 531	25742 460 548	26202 460 565	26662 460 582	27122 600	700
710	23913 474 468	24387 475 485	24862 476 502	25338 476 519	25814 476 536	26290 477 553	26767 477 570	27244 478 587	27722 605	710
720	24381 491 471	24872 492 488	25364 493 505	25857 493 523	26350 493 540	26843 494 558	27337 494 576	27831 496 593	28327 611	720
730	24852 508 473	25360 509 491	25869 511 509	26380 510 527	26890 511 545	27401 512 563	27913 511 581	28424 514 599	28938 617	730
740	25325 526 478	25851 527 496	26378 529 514	26907 528 532	27435 529 550	27964 530 568	28494 529 586	29023 532 605	29555 623	740
750	25803 544 482	26347 545 500	26892 547 518	27439 546 536	27985 547 555	28532 548 574	29080 548 593	29628 550 611	30178 629	750
760	26285 562 484	26847 563 503	27410 565 522	27975 565 541	28540 566 559	29106 567 578	29673 566 597	30239 568 616	30807 635	760
770	26769 581 488	27350 582 507	27932 584 526	28516 583 545	29099 585 565	29684 586 584	30270 585 603	30855 587 622	31442 641	770
780	27257 600 492	27857 601 511	28458 603 531	29061 603 550	29664 604 570	30268 605 589	30873 604 608	31477 606 628	32083 647	780
790	27749 619 495	28368 621 514	28989 622 534	29611 623 554	30234 623 573	30857 624 593	31481 624 613	32105 625 633	32730 653	790
800	28244 638 498	28882 641 518	29523 642 538	30165 642 558	30807 643 578	31450 644 598	32094 644 618	32738 645 638	33383 658	800
810	28742 658 502	29400 661 522	30061 662 542	30723 662 562	31385 663 582	32048 664 602	32712 664 622	33376 665 643	34041 664	810
820	29244 678 507	29922 681 527	30603 682 547	31285 682 567	31967 683 587	32650 684 607	33334 685 627	34019 686 648	34705 669	820
830	29751 698 510	30449 701 530	31150 702 550	31852 702 571	32554 703 591	33257 704 611	33961 706 632	34667 707 653	35374 674	830
840	30261 718 514	30979 721 534	31700 723 554	32423 722 575	33145 723 596	33868 725 617	34593 727 638	35320 728 659	36048 680	840
850	30775 738 517	31513 741 537	32254 744 558	32998 743 579	33741 744 600	34485 746 622	35231 748 643	35979 749 664	36728 686	850
860	31292 758 521	32050 762 542	32812 765 563	33577 764 584	34341 766 606	35107 767 628	35874 769 650	36643 771 671	37414 692	860
870	31813 779 526	32592 783 546	33375 786 567	34161 786 588	34947 788 610	35735 789 632	36524 790 654	37314 792 676	38106 698	870
880	32339 799 530	33138 804 551	33942 807 571	34749 808 592	35557 810 614	36367 811 636	37178 812 658	37990 814 681	38804 704	880
890	32869 820 534	33689 824 555	34513 828 576	35341 830 597	36171 832 619	37003 833 641	37836 835 664	38671 837 687	39508 710	890
900	33403 841	34244 845	35089 849	35938 852	36790 854	37644 856	38500 858	39358 860	40218	900
Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.

$\phi = 30^\circ$.

TIME OF FLIGHT.

TABLE VI.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	5174 33 69	5207 32 70	5239 32 71	5271 31 72	5302 30 73	5332 29 74	5361 28 75	5389 27 76	5416 77	600
610	5243 34 69	5277 33 70	5310 33 71	5343 32 72	5375 31 73	5406 30 74	5436 29 75	5465 28 76	5493 77	610
620	5312 35 69	5347 34 70	5381 34 71	5415 33 72	5448 32 73	5480 31 74	5511 30 75	5541 29 76	5570 77	620
630	5381 36 69	5417 35 70	5452 35 71	5487 34 72	5521 33 73	5554 32 74	5586 31 75	5617 30 76	5647 77	630
640	5450 37 69	5487 36 70	5523 36 71	5559 35 72	5594 34 73	5628 33 74	5661 32 75	5693 31 76	5724 77	640
650	5519 38 68	5557 37 69	5594 37 71	5631 36 72	5667 35 73	5702 34 74	5736 33 75	5769 32 76	5801 77	650
660	5587 39 68	5626 39 70	5665 38 71	5703 37 72	5740 36 73	5776 35 74	5811 34 75	5845 33 76	5878 76	660
670	5655 41 68	5696 40 69	5736 39 70	5775 38 71	5813 37 72	5850 36 73	5886 35 74	5921 33 75	5954 76	670
680	5723 42 68	5765 41 69	5806 40 70	5846 39 71	5885 38 72	5923 37 73	5960 36 74	5996 34 75	6030 76	680
690	5791 43 67	5834 42 68	5876 41 69	5917 40 71	5957 39 72	5996 38 73	6034 37 74	6071 35 75	6106 76	690
700	5858 44 67	5902 43 68	5945 43 70	5988 41 71	6029 40 72	6069 39 73	6108 38 74	6146 36 75	6182 76	700
710	5925 45 67	5970 45 69	6015 44 70	6059 42 71	6101 41 72	6142 40 73	6182 39 74	6221 37 75	6258 76	710
720	5992 47 67	6039 46 68	6085 45 69	6130 43 70	6173 42 71	6215 41 72	6256 40 73	6296 38 74	6334 75	720
730	6059 48 67	6107 47 68	6154 46 69	6200 44 70	6244 43 71	6287 42 72	6329 41 73	6370 39 74	6409 75	730
740	6126 49 67	6175 48 68	6223 47 69	6270 45 70	6315 44 71	6359 43 72	6402 42 73	6444 40 74	6484 75	740
750	6193 50 67	6243 49 68	6292 48 69	6340 46 70	6386 45 71	6431 44 72	6475 43 73	6518 41 74	6559 75	750
760	6260 51 66	6311 50 68	6361 49 69	6410 47 70	6457 46 71	6503 45 72	6548 44 73	6592 42 74	6634 75	760
770	6326 53 66	6379 51 67	6430 50 69	6480 48 70	6528 47 71	6575 46 72	6621 45 73	6666 43 74	6709 75	770
780	6392 54 66	6446 53 67	6499 51 68	6550 49 69	6599 48 70	6647 47 71	6694 46 72	6740 44 73	6784 74	780
790	6458 55 66	6513 54 67	6567 52 68	6619 50 69	6669 49 70	6718 48 71	6766 47 72	6813 45 73	6858 74	790
800	6524 56 66	6580 55 67	6635 53 68	6688 51 69	6739 50 70	6789 49 71	6838 48 72	6886 46 73	6932 74	800
810	6590 57 66	6647 56 67	6703 54 68	6757 52 69	6809 51 70	6860 50 71	6910 49 72	6959 47 73	7006 74	810
820	6656 58 65	6714 57 67	6771 55 68	6826 53 69	6879 52 70	6931 51 71	6982 50 72	7032 48 73	7080 74	820
830	6721 60 65	6781 58 66	6839 56 67	6895 54 68	6949 53 69	7002 52 70	7054 51 71	7105 49 72	7154 73	830
840	6786 61 65	6847 59 66	6906 57 67	6963 55 68	7018 54 69	7072 53 70	7125 52 71	7177 50 72	7227 73	840
850	6851 62 65	6913 60 66	6973 58 67	7031 56 68	7087 55 69	7142 54 70	7196 53 71	7249 51 72	7300 73	850
860	6916 63 65	6979 61 66	7040 59 67	7099 57 68	7156 56 69	7212 55 70	7267 54 71	7321 52 71	7373 72	860
870	6981 64 65	7045 62 66	7107 60 67	7167 58 68	7225 57 69	7282 56 70	7338 54 71	7392 53 71	7445 72	870
880	7046 65 65	7111 63 66	7174 61 67	7235 59 68	7294 58 69	7352 56 70	7408 55 71	7463 54 72	7517 72	880
890	7111 66 65	7177 64 66	7241 62 67	7303 60 68	7363 59 69	7422 57 69	7479 56 70	7535 54 71	7589 72	890
900	7176 67	7243 65	7308 63	7371 61	7432 59	7491 58	7549 57	7606 55	7661	900
V.										V.
Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)

TABLE VI.

 $\phi = 30^\circ$. ANGLE OF FALL.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	4803 21 33	4782 22 32	4760 23 31	4737 25 30	4712 26 29	4686 28 28	4658 30 27	4628 33 26	4595 25	600
610	4836 22 32	4814 23 31	4791 24 30	4767 26 29	4741 27 28	4714 29 27	4685 31 26	4654 34 25	4620 24	610
620	4868 23 32	4845 24 31	4821 25 29	4796 27 28	4769 28 27	4741 30 26	4711 32 25	4679 35 24	4644 23	620
630	4900 24 31	4876 26 30	4850 26 29	4824 28 27	4796 29 26	4767 31 25	4736 33 24	4703 36 23	4667 23	630
640	4931 25 30	4906 27 29	4879 28 28	4851 29 27	4822 30 26	4792 32 25	4760 34 24	4726 36 23	4690 22	640
650	4961 26 30	4935 28 28	4907 29 27	4878 30 26	4848 31 25	4817 33 24	4784 35 23	4749 37 22	4712 22	650
660	4991 28 29	4963 29 28	4934 30 27	4904 31 26	4873 32 25	4841 34 24	4807 36 23	4771 37 22	4734 21	660
670	5020 29 28	4991 30 27	4961 31 26	4930 32 25	4898 33 24	4865 35 23	4830 37 22	4793 38 21	4755 20	670
680	5048 30 28	5018 31 27	4987 32 25	4955 33 24	4922 34 23	4888 36 22	4852 38 21	4814 39 21	4775 20	680
690	5076 31 27	5045 33 25	5012 33 24	4979 34 23	4945 35 22	4910 37 21	4873 38 21	4835 40 20	4795 19	690
700	5103 33 26	5070 34 25	5036 34 24	5002 35 23	4967 36 22	4931 37 21	4894 39 20	4855 41 19	4814 18	700
710	5129 34 26	5095 35 25	5060 35 24	5025 36 23	4989 37 22	4952 38 21	4914 40 20	4874 42 19	4832 18	710
720	5155 35 26	5120 36 25	5084 36 24	5048 37 23	5011 38 21	4973 39 20	4934 41 19	4893 43 18	4850 18	720
730	5181 36 25	5145 37 24	5108 37 23	5071 39 22	5032 39 21	4993 40 20	4953 42 19	4911 43 18	4868 17	730
740	5206 37 24	5169 38 23	5131 38 22	5093 40 21	5053 40 20	5013 41 19	4972 43 18	4929 44 17	4885 16	740
750	5230 38 23	5192 39 22	5153 39 21	5114 41 20	5073 41 19	5032 42 18	4990 44 17	4946 45 17	4901 16	750
760	5253 39 22	5214 40 21	5174 40 20	5134 42 19	5092 42 19	5050 43 18	5007 44 17	4963 46 16	4917 15	760
770	5275 40 22	5235 41 21	5194 41 20	5153 42 19	5111 43 18	5068 44 17	5024 45 17	4979 47 16	4932 15	770
780	5297 41 21	5256 42 20	5214 42 19	5172 43 18	5129 44 17	5085 44 17	5041 46 16	4995 48 15	4947 14	780
790	5318 42 20	5276 43 19	5233 43 18	5190 44 17	5146 44 17	5102 45 16	5057 47 15	5010 49 14	4961 13	790
800	5338 43 19	5295 44 19	5251 44 18	5207 44 17	5163 45 16	5118 46 15	5072 48 14	5024 50 13	4974 13	800
810	5357 43 19	5314 45 18	5269 45 17	5224 45 16	5179 46 15	5133 47 14	5086 49 13	5037 50 13	4987 12	810
820	5376 44 19	5332 46 18	5286 46 17	5240 46 16	5194 47 15	5147 48 14	5099 49 13	5050 51 12	4999 11	820
830	5395 45 19	5350 47 18	5303 47 17	5256 47 16	5209 48 15	5161 49 14	5112 50 13	5062 52 12	5010 11	830
840	5414 46 18	5368 48 17	5320 48 16	5272 48 15	5224 49 15	5175 50 14	5125 51 13	5074 53 12	5021 11	840
850	5432 47 18	5385 49 17	5336 49 16	5287 49 15	5239 50 14	5189 51 13	5138 52 12	5086 54 11	5032 10	850
860	5450 48 17	5402 50 16	5352 50 16	5302 49 15	5253 51 14	5202 52 13	5150 53 12	5097 55 11	5042 10	860
870	5467 49 17	5418 50 16	5368 51 15	5317 50 15	5267 52 14	5215 53 13	5162 54 12	5108 56 11	5052 10	870
880	5484 50 17	5434 51 16	5383 51 15	5332 51 14	5281 53 13	5228 54 12	5174 55 12	5119 57 11	5062 10	880
890	5501 51 16	5450 52 15	5398 52 15	5346 52 14	5294 54 13	5240 54 13	5186 56 12	5130 58 11	5072 10	890
900	5517 52	5465 52	5413 53	5360 53	5307 54	5253 55	5198 57	5141 59	5082	900
V.										V.
Log. C (c)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	Log. C (c)
1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175		

$\phi = 30^\circ$.

TERMINAL VELOCITY.

TABLE VI.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	3618 38 17	3656 39 18	3695 40 20	3735 42 22	3777 43 23	3820 45 25	3865 45 26	3910 45 27	3955 29	600
610	3635 39 17	3674 41 18	3715 42 19	3757 43 21	3800 45 24	3845 46 25	3891 46 26	3937 47 28	3984 29	610
620	3652 40 17	3692 42 18	3734 44 20	3778 46 22	3824 46 23	3870 47 25	3917 48 26	3965 48 27	4013 29	620
630	3669 41 17	3710 44 19	3754 46 20	3800 47 21	3847 48 23	3895 48 25	3943 49 27	3992 50 28	4042 28	630
640	3686 43 18	3729 45 19	3774 47 20	3821 49 22	3870 50 23	3920 50 24	3970 50 25	4020 50 27	4070 29	640
650	3704 44 17	3748 46 18	3794 49 20	3843 50 21	3893 51 23	3944 51 24	3995 52 26	4047 52 27	4099 28	650
660	3721 45 18	3766 48 19	3814 50 20	3864 52 22	3916 52 23	3968 53 25	4021 53 26	4074 53 27	4127 29	660
670	3739 46 17	3785 49 19	3834 52 20	3886 53 21	3939 54 23	3993 54 24	4047 54 25	4101 55 27	4156 28	670
680	3756 48 18	3804 50 19	3854 53 21	3907 55 22	3962 55 23	4017 55 25	4072 56 27	4128 56 28	4184 29	680
690	3774 49 18	3823 52 19	3875 54 20	3929 56 22	3985 57 24	4042 57 25	4099 57 26	4156 57 27	4213 29	690
700	3792 50 19	3842 53 20	3895 56 21	3951 58 22	4009 58 23	4067 58 24	4125 58 26	4183 59 18	4242 29	700
710	3811 51 18	3862 54 20	3916 57 21	3973 59 21	4032 59 22	4091 60 24	4151 60 25	4211 60 27	4271 29	710
720	3829 53 18	3882 55 19	3937 57 20	3994 60 22	4054 61 23	4115 61 24	4176 62 26	4238 62 27	4300 29	720
730	3847 54 17	3901 56 18	3957 59 20	4016 61 21	4077 62 22	4139 63 24	4202 63 26	4265 64 28	4329 29	730
740	3864 55 17	3919 58 19	3977 60 20	4037 62 22	4099 64 24	4163 65 26	4228 65 27	4293 65 28	4358 29	740
750	3881 57 17	3938 59 18	3997 62 20	4059 64 22	4123 66 24	4189 66 25	4255 66 26	4321 66 27	4387 29	750
760	3898 58 18	3956 61 19	4017 64 20	4081 66 22	4147 67 23	4214 67 24	4281 67 26	4348 68 28	4416 29	760
770	3916 59 19	3975 62 20	4037 66 21	4103 67 21	4170 68 22	4238 69 24	4307 69 25	4376 69 27	4445 29	770
780	3935 60 18	3995 63 20	4058 66 21	4124 68 22	4192 70 23	4262 70 24	4332 71 26	4403 71 27	4474 29	780
790	3953 62 19	4015 64 20	4079 67 21	4146 69 21	4215 71 22	4286 72 23	4358 72 24	4430 73 27	4503 29	790
800	3972 63 17	4035 65 18	4100 67 20	4167 70 22	4237 72 23	4309 73 24	4382 75 26	4457 75 27	4532 29	800
810	3989 64 18	4053 67 19	4120 69 20	4189 71 21	4260 73 22	4333 75 23	4408 76 24	4484 77 26	4561 29	810
820	4007 65 19	4072 68 21	4140 70 22	4210 72 22	4282 74 23	4356 76 24	4432 78 25	4510 80 27	4590 29	820
830	4026 67 18	4093 69 19	4162 70 20	4232 73 22	4305 75 23	4380 77 24	4457 80 26	4537 82 27	4619 29	830
840	4044 68 17	4112 70 18	4182 72 20	4254 74 22	4328 76 24	4404 79 26	4483 81 27	4564 84 28	4648 29	840
850	4061 69 18	4130 72 19	4202 74 20	4276 76 21	4352 78 23	4430 80 25	4510 82 27	4592 85 29	4677 30	850
860	4079 70 18	4149 73 20	4222 75 21	4297 78 22	4375 80 23	4455 82 24	4537 84 26	4621 86 28	4707 30	860
870	4097 72 18	4169 74 19	4243 76 20	4319 79 22	4398 81 23	4479 84 25	4563 86 26	4649 88 28	4737 30	870
880	4115 73 18	4188 75 19	4263 78 20	4341 80 21	4421 83 23	4504 85 24	4589 88 26	4677 90 28	4767 30	880
890	4133 74 18	4207 76 19	4283 79 21	4362 82 22	4444 84 23	4528 87 25	4615 90 27	4705 92 28	4797 30	890
900	4151 75	4226 78	4304 80	4384 83	4467 86	4553 89	4642 91	4733 94	4827	900
V.										V.
(c)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c)
Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C

TABLE VI.

 $\phi = 35^\circ$. RANGE.

Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.
600	20376 323 448	20699 324 463	21023 325 478	21348 325 493	21673 326 509	21999 326 525	22325 326 541	22651 326 557	22977 573	600
610	20824 338 451	21162 339 467	21501 340 483	21841 341 499	22182 342 515	22524 342 531	22866 342 547	23208 342 563	23550 580	610
620	21275 354 456	21629 355 472	21984 356 489	22340 357 505	22697 358 521	23055 358 537	23413 358 554	23771 359 571	24130 588	620
630	21731 370 460	22101 372 476	22473 372 493	22845 373 511	23218 374 528	23592 375 545	23967 375 561	24342 376 578	24718 595	630
640	22191 386 465	22577 389 482	22966 390 499	23356 390 516	23746 391 533	24137 391 550	24528 392 568	24920 393 586	25313 603	640
650	22656 403 470	23059 406 487	23465 407 504	23872 407 522	24279 408 540	24687 409 558	25096 410 576	25506 410 594	25916 611	650
660	23126 420 474	23546 423 491	23969 425 509	24394 425 527	24819 426 546	25245 427 564	25672 428 582	26100 427 600	26527 618	660
670	23600 437 478	24037 441 496	24478 443 515	24921 444 534	25365 444 553	25809 445 572	26254 446 590	26700 445 607	27145 625	670
680	24078 455 483	24533 460 502	24993 462 521	25455 463 540	25918 463 559	26381 463 578	26844 463 597	27307 463 615	27770 633	680
690	24561 474 487	25035 479 507	25514 481 526	25995 482 546	26477 482 565	26959 482 584	27441 481 602	27922 481 621	28403 640	690
700	25048 494 494	25542 498 513	26040 501 533	26541 501 552	27042 501 571	27543 500 590	28043 500 609	28543 500 628	29043 647	700
710	25542 513 500	26055 518 520	26573 520 539	27093 520 559	27613 520 579	28133 519 598	28652 519 617	29171 519 636	29690 655	710
720	26042 533 506	26575 537 526	27112 540 545	27652 540 563	28192 539 583	28731 538 603	29269 538 623	29807 538 643	30345 663	720
730	26548 553 509	27101 556 529	27657 558 549	28215 560 569	28775 559 589	29334 558 609	29892 558 630	30450 558 651	31008 671	730
740	27057 573 513	27630 576 534	28206 578 554	28784 580 574	29364 579 594	29943 579 615	30522 579 636	31101 578 657	31679 678	740
750	27570 594 517	28164 596 538	28760 598 559	29358 600 580	29958 600 601	30558 600 622	31158 600 643	31758 599 664	32357 686	750
760	28087 615 522	28702 617 543	29319 619 564	29938 621 586	30559 621 608	31180 621 629	31801 621 651	32422 621 672	33043 694	760
770	28609 636 528	29245 638 549	29883 641 570	30524 643 592	31167 642 614	31809 643 636	32452 642 658	33094 643 680	33737 702	770
780	29137 657 533	29794 659 554	30453 663 576	31116 665 598	31781 664 620	32445 665 643	33110 664 665	33774 665 688	34439 710	780
790	29670 678 538	30348 681 559	31029 685 582	31714 687 604	32401 687 626	33088 687 648	33775 687 671	34462 687 694	35149 717	790
800	30208 699 542	30907 704 564	31611 707 586	32318 709 609	33027 709 632	33736 710 655	34446 710 678	35156 710 701	35866 725	800
810	30750 721 546	31471 726 569	32197 730 592	32927 732 615	33659 732 638	34391 733 661	35124 733 685	35857 734 709	36591 733	810
820	31296 744 552	32040 749 575	32789 753 598	33542 755 621	34297 755 645	35052 757 669	35809 757 693	36566 758 717	37324 741	820
830	31848 767 557	32615 772 581	33387 776 604	34163 779 628	34942 779 652	35721 781 676	36502 781 700	37283 782 725	38065 749	830
840	32405 791 563	33196 795 586	33991 800 611	34791 803 634	35594 803 657	36397 805 682	37202 806 707	38008 806 732	38814 757	840
850	32968 814 569	33782 820 593	34602 823 617	35425 826 641	36251 828 665	37079 830 690	37909 831 715	38740 831 740	39571 765	850
860	33537 838 574	34375 844 598	35219 847 622	36066 850 647	36916 853 672	37769 855 697	38624 856 722	39480 856 747	40336 773	860
870	34111 862 579	34973 868 604	35841 872 629	36713 875 654	37588 878 679	38466 880 704	39346 881 729	40227 882 755	41109 781	870
880	34690 887 585	35577 893 610	36470 897 636	37367 900 661	38267 903 686	39170 905 712	40075 907 738	40982 908 764	41890 790	880
890	35275 912 591	36187 919 616	37106 922 641	38028 925 667	38953 929 694	39882 931 720	40813 933 746	41746 934 772	42680 798	890
900	35866 937	36803 944	37747 948	38695 952	39647 955	40602 957	41559 959	42518 960	43478	900
Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.

$\phi = 35^\circ$.

TIME OF FLIGHT.

TABLE VI.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	5874 39 77	5913 38 78	5951 37 80	5988 36 81	6024 36 82	6060 35 83	6095 34 84	6129 33 86	6162 87	600
610	5951 40 78	5991 40 79	6031 38 80	6069 37 81	6106 37 83	6143 36 84	6179 36 85	6215 34 86	6249 87	610
620	6029 41 77	6070 41 78	6111 39 79	6150 39 81	6189 38 82	6227 37 83	6264 37 84	6301 35 85	6336 87	620
630	6106 42 78	6148 42 79	6190 41 80	6231 40 81	6271 39 83	6310 38 84	6348 38 85	6386 37 86	6423 87	630
640	6184 43 77	6227 43 79	6270 42 80	6312 42 81	6354 40 82	6394 39 84	6433 39 85	6472 38 86	6510 87	640
650	6261 45 77	6306 44 78	6350 43 79	6393 43 81	6436 42 82	6478 40 83	6518 40 85	6558 39 86	6597 87	650
660	6338 46 77	6384 45 78	6429 45 80	6474 44 81	6518 43 82	6561 42 84	6603 41 85	6644 40 86	6684 87	660
670	6415 47 77	6462 47 79	6509 46 80	6555 45 81	6600 45 82	6645 43 83	6688 42 84	6730 41 85	6771 86	670
680	6492 49 76	6541 48 78	6589 47 79	6636 46 81	6682 46 82	6728 44 83	6772 43 84	6815 42 85	6857 86	680
690	6568 51 76	6619 49 77	6668 49 79	6717 47 80	6764 47 82	6811 45 83	6856 44 84	6900 43 85	6943 86	690
700	6644 52 76	6696 51 77	6747 50 78	6797 49 80	6846 48 82	6894 46 83	6940 45 84	6985 44 85	7029 86	700
710	6720 53 77	6773 52 78	6825 52 79	6877 51 80	6928 49 81	6977 47 83	7024 46 84	7070 45 85	7115 86	710
720	6797 54 76	6851 53 78	6904 53 79	6957 52 80	7009 51 81	7060 48 82	7108 47 84	7155 46 85	7201 86	720
730	6873 56 76	6929 54 77	6983 54 79	7037 53 80	7090 52 81	7142 50 82	7192 48 83	7240 47 85	7287 86	730
740	6949 57 76	7006 56 78	7062 55 79	7117 54 80	7171 53 81	7224 51 82	7275 50 84	7325 48 85	7373 86	740
750	7025 59 76	7084 57 77	7141 56 78	7197 55 80	7252 54 81	7306 53 83	7359 51 84	7410 49 85	7459 86	750
760	7101 60 76	7161 58 77	7219 58 79	7277 56 80	7333 56 81	7389 54 82	7443 52 83	7495 50 84	7545 85	760
770	7177 61 76	7238 60 77	7298 59 78	7357 57 80	7414 57 81	7471 55 82	7526 53 83	7579 51 84	7630 85	770
780	7253 62 75	7315 61 77	7376 61 79	7437 58 80	7495 58 81	7553 56 82	7609 54 83	7663 52 84	7715 85	780
790	7328 64 75	7392 63 77	7455 62 78	7517 59 79	7576 59 81	7635 57 82	7692 55 83	7747 53 84	7800 85	790
800	7403 66 76	7469 64 77	7533 63 78	7596 61 79	7657 60 81	7717 58 82	7775 56 83	7831 54 84	7885 85	800
810	7479 67 75	7546 65 77	7611 64 78	7675 63 79	7738 61 80	7799 59 81	7858 57 82	7915 55 84	7970 85	810
820	7554 69 75	7623 66 76	7689 65 78	7754 64 79	7818 62 80	7880 60 81	7940 59 82	7999 56 83	8055 85	820
830	7629 70 75	7699 68 76	7767 66 77	7833 65 79	7898 63 80	7961 61 81	8022 60 82	8082 58 83	8140 84	830
840	7704 71 75	7775 69 76	7844 68 78	7912 66 79	7978 64 80	8042 62 81	8104 61 82	8165 59 83	8224 84	840
850	7779 72 75	7851 71 76	7922 69 77	7991 67 78	8058 65 80	8123 63 81	8186 62 82	8248 60 83	8308 84	850
860	7854 73 75	7927 72 76	7999 70 77	8069 69 78	8138 66 79	8204 64 81	8268 63 82	8331 61 83	8392 84	860
870	7929 74 74	8003 73 76	8076 71 77	8147 70 78	8217 68 79	8285 65 80	8350 64 82	8414 62 83	8476 84	870
880	8003 76 74	8079 74 75	8153 72 77	8225 71 78	8296 69 79	8365 67 80	8432 65 81	8497 63 83	8560 84	880
890	8077 77 74	8154 76 75	8230 73 76	8303 72 78	8375 70 79	8445 68 80	8513 67 81	8580 64 82	8644 84	890
900	8151 78	8229 77	8306 75	8381 73	8454 71	8525 69	8594 68	8662 66	8728	900
V.										V.
Log. C (c)	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C (c)

TABLE VI.

 $\phi = 35^\circ$.

ANGLE OF FALL.

Log. C V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C V.
600	5408 19 34	5389 20 33	5369 21 32	5348 22 31	5326 24 30	5302 25 29	5277 26 28	5251 27 27	5224 26	600
610	5442 20 33	5422 21 32	5401 22 31	5379 23 30	5356 25 29	5331 26 28	5305 27 27	5278 28 26	5250 25	610
620	5475 21 32	5454 22 31	5432 23 30	5409 24 29	5385 26 28	5359 27 27	5332 28 26	5304 29 25	5275 24	620
630	5507 22 32	5485 23 31	5462 24 30	5438 25 28	5413 27 27	5386 28 26	5358 29 25	5329 30 24	5299 23	630
640	5539 23 31	5516 24 30	5492 26 29	5466 26 28	5440 28 26	5412 29 25	5383 30 24	5353 31 23	5322 22	640
650	5570 24 30	5546 25 29	5521 27 28	5494 28 27	5466 29 25	5437 30 24	5407 31 23	5376 32 22	5344 21	650
660	5600 25 29	5575 26 28	5549 28 27	5521 30 26	5491 30 25	5461 31 23	5430 32 22	5398 33 21	5365 20	660
670	5629 26 29	5603 27 28	5576 29 26	5547 31 25	5516 32 24	5484 32 23	5452 33 21	5419 34 20	5385 19	670
680	5658 27 29	5631 29 27	5602 30 26	5572 32 24	5540 33 23	5507 34 22	5473 34 21	5439 35 20	5404 19	680
690	5687 29 28	5658 30 27	5628 32 25	5596 33 24	5563 34 23	5529 35 22	5494 35 21	5459 36 19	5423 18	690
700	5715 30 27	5685 32 26	5653 33 24	5620 34 23	5586 35 22	5551 36 21	5515 37 20	5478 37 19	5441 17	700
710	5742 31 26	5711 34 24	5677 34 23	5643 35 22	5608 36 21	5572 37 20	5535 38 19	5497 39 18	5458 17	710
720	5768 33 25	5735 35 23	5700 35 22	5665 36 21	5629 37 20	5592 38 19	5554 39 18	5515 40 17	5475 16	720
730	5793 35 24	5758 36 23	5722 36 22	5686 37 21	5649 38 20	5611 39 19	5572 40 18	5532 41 17	5491 16	730
740	5817 36 23	5781 37 22	5744 37 21	5707 38 20	5669 39 19	5630 40 18	5590 41 17	5549 42 16	5507 15	740
750	5840 37 23	5803 38 22	5765 38 21	5727 39 20	5688 40 19	5648 41 18	5607 42 17	5565 43 16	5522 15	750
760	5863 38 22	5825 39 21	5786 39 20	5747 40 19	5707 41 18	5666 42 17	5624 43 16	5581 44 15	5537 14	760
770	5885 39 21	5846 40 20	5806 40 19	5766 41 18	5725 42 17	5683 43 16	5640 44 15	5596 45 14	5551 13	770
780	5906 40 20	5866 41 19	5825 41 18	5784 42 17	5742 43 16	5699 44 15	5655 45 14	5610 46 13	5564 12	780
790	5926 41 19	5885 42 18	5843 42 17	5801 43 16	5758 44 15	5714 45 14	5669 46 13	5623 47 12	5576 11	790
800	5945 42 19	5903 43 18	5860 43 17	5817 44 15	5773 45 14	5728 46 13	5682 47 12	5635 48 11	5587 10	800
810	5964 43 18	5921 44 17	5877 45 16	5832 45 15	5787 46 14	5741 47 13	5694 48 12	5646 49 11	5597 10	810
820	5982 44 17	5938 45 17	5893 46 16	5847 46 15	5801 47 14	5754 48 13	5706 49 12	5657 50 11	5607 10	820
830	5999 44 17	5955 46 16	5909 47 15	5862 47 14	5815 48 13	5767 49 12	5718 50 11	5668 51 10	5617 9	830
840	6016 45 16	5971 47 15	5924 48 14	5876 48 13	5828 49 12	5779 50 11	5729 51 10	5678 52 9	5626 9	840
850	6032 46 16	5986 48 15	5938 49 14	5889 49 13	5840 50 12	5790 51 11	5739 52 10	5687 52 10	5635 9	850
860	6048 47 15	6001 49 14	5952 50 13	5902 50 12	5852 51 11	5801 52 10	5749 52 9	5697 53 9	5644 8	860
870	6063 48 14	6015 50 13	5965 51 12	5914 51 11	5863 52 10	5811 53 9	5758 52 9	5706 54 8	5652 7	870
880	6077 49 14	6028 51 12	5977 52 11	5925 52 10	5873 53 9	5820 53 9	5767 53 8	5714 55 7	5659 7	880
890	6091 51 13	6040 52 12	5988 53 11	5935 53 10	5882 53 9	5829 54 8	5775 54 7	5721 55 6	5666 6	890
900	6104 52	6052 53	5999 54	5945 54	5891 54	5837 55	5782 55	5727 55	5672	900
Log. C V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C V.

$\phi = 35^\circ$.

TERMINAL VELOCITY.

TABLE VI.

Log. C (c) V.	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c) V.
600	3691 37 20	3728 38 21	3766 39 22	3805 41 23	3846 42 24	3888 42 25	3930 43 27	3973 44 28	4017 30	600
610	3711 38 20	3749 39 21	3788 40 22	3828 42 23	3870 43 24	3913 44 26	3957 44 27	4001 46 29	4047 31	610
620	3731 39 19	3770 40 20	3810 41 22	3851 43 23	3894 45 24	3939 45 25	3984 46 27	4030 48 29	4078 31	620
630	3750 40 19	3790 42 21	3832 42 22	3874 44 23	3918 46 25	3964 47 26	4011 48 28	4059 50 29	4109 31	630
640	3769 42 20	3811 43 21	3854 43 22	3897 46 24	3943 47 25	3990 49 26	4039 49 27	4088 52 29	4140 31	640
650	3789 43 19	3832 44 21	3876 45 22	3921 47 24	3968 48 25	4016 50 27	4066 51 28	4117 54 30	4171 31	650
660	3808 45 19	3853 45 21	3898 47 23	3945 48 24	3993 50 25	4043 51 26	4094 53 28	4147 55 30	4202 31	660
670	3827 47 20	3874 47 21	3921 48 22	3969 49 24	4018 51 26	4069 53 27	4122 55 28	4177 56 29	4233 31	670
680	3847 48 19	3895 48 20	3943 50 22	3993 51 24	4044 52 26	4096 54 28	4150 56 29	4206 58 30	4264 31	680
690	3866 49 19	3915 50 20	3965 52 22	4017 53 24	4070 54 26	4124 55 28	4179 57 30	4236 59 31	4295 31	690
700	3885 50 19	3935 52 21	3987 54 22	4041 55 24	4096 56 25	4152 57 27	4209 58 28	4267 59 30	4326 32	700
710	3904 52 19	3956 53 21	4009 56 22	4065 56 24	4121 58 26	4179 58 27	4237 60 28	4297 61 30	4358 32	710
720	3923 54 19	3977 54 21	4031 58 23	4089 58 24	4147 59 25	4206 59 27	4265 62 29	4327 63 30	4390 32	720
730	3942 56 19	3998 56 20	4054 59 22	4113 59 24	4172 61 26	4233 61 27	4294 63 28	4357 65 30	4422 32	730
740	3961 57 20	4018 58 21	4076 61 22	4137 61 24	4198 62 25	4260 62 27	4322 65 29	4387 67 30	4454 32	740
750	3981 58 20	4039 59 21	4098 63 23	4161 62 24	4123 64 25	4287 64 27	4351 66 29	4417 69 31	4486 32	750
760	4001 59 20	4060 61 22	4121 64 23	4185 63 24	4248 66 26	4314 66 27	4380 68 29	4448 70 30	4518 32	760
770	4021 61 20	4082 62 21	4144 65 23	4209 65 24	4274 67 25	4341 68 27	4409 69 29	4478 72 31	4550 32	770
780	4041 62 20	4103 64 21	4167 66 23	4233 66 24	4299 69 26	4368 70 27	4438 71 29	4509 73 30	4582 32	780
790	4061 63 20	4124 66 22	4190 67 23	4257 68 24	4325 70 26	4395 72 28	4467 72 29	4539 75 31	4614 32	790
800	4081 65 20	4146 67 21	4213 68 23	4281 70 24	4351 72 26	4423 73 28	4496 74 29	4570 76 31	4646 33	800
810	4101 66 20	4167 69 22	4236 69 23	4305 72 25	4377 74 26	4451 74 28	4525 76 30	4601 78 31	4679 33	810
820	4121 68 20	4189 70 22	4259 71 23	4330 73 25	4403 76 26	4479 76 28	4555 77 30	4632 80 32	4712 33	820
830	4141 70 21	4211 71 22	4282 73 23	4355 74 25	4429 78 27	4507 78 28	4585 79 30	4664 81 32	4745 34	830
840	4162 71 21	4233 72 22	4305 75 24	4380 76 25	4456 79 27	4535 80 28	4615 81 30	4696 83 32	4779 34	840
850	4183 72 20	4255 74 22	4329 76 23	4405 78 25	4483 80 26	4563 82 28	4645 83 30	4728 85 32	4813 34	850
860	4203 74 20	4277 75 22	4352 78 23	4430 79 25	4509 82 26	4591 84 28	4675 85 30	4760 87 32	4847 34	860
870	4223 76 21	4299 76 22	4375 80 23	4455 80 25	4535 84 27	4619 86 28	4705 87 30	4792 89 32	4881 34	870
880	4244 77 21	4321 77 22	4398 82 24	4480 82 25	4562 85 27	4647 88 29	4735 89 30	4824 91 32	4915 34	880
890	4265 78 21	4343 79 22	4422 83 24	4505 84 25	4589 87 27	4676 89 29	4765 91 31	4856 93 33	4949 35	890
900 V.	4286 79	4365 81	4446 84	4530 86	4616 89	4705 91	4796 93	4889 95	4984	900 V.
(c) Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	(c) Log. C

TABLE VI.

 $\phi = 40.^\circ$ RANGE.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	21339 338 463	21677 337 478	22014 337 494	22351 337 510	22688 337 526	23025 336 543	23361 334 563	23695 334 578	24029 595	600
610	21802 353 468	22155 353 484	22508 353 500	22861 353 517	23214 354 534	23568 353 551	23921 352 568	24273 351 585	24624 603	610
620	22270 369 473	22639 369 489	23008 370 506	23378 370 523	23748 371 540	24119 370 557	24489 369 575	24858 369 593	25227 612	620
630	22743 385 477	23128 386 494	23514 387 511	23901 387 529	24288 388 547	24676 388 565	25064 387 583	25451 388 602	25839 621	630
640	23220 402 482	23622 403 500	24025 405 518	24430 405 536	24835 406 554	25241 406 572	25647 406 591	26053 407 611	26460 630	640
650	23702 420 489	24122 421 507	24543 423 525	24966 423 543	25389 424 562	25813 425 581	26238 426 600	26664 426 619	27090 639	650
660	24191 438 494	24629 439 512	25068 441 531	25509 442 550	25951 443 569	26394 444 589	26838 445 609	27283 446 629	27729 649	660
670	24685 456 500	25141 458 519	25599 460 538	26059 461 557	26520 463 577	26983 464 597	27447 465 617	27912 466 637	28378 658	670
680	25185 475 505	25660 477 524	26137 479 544	26616 481 564	27097 483 584	27580 484 604	28064 485 625	28549 487 646	29036 667	680
690	25690 494 510	26184 497 530	26681 499 550	27180 501 571	27681 503 592	28184 505 613	28689 506 634	29195 508 655	29703 676	690
700	26200 514 516	26714 517 536	27231 520 558	27751 522 579	28273 524 600	28797 526 621	29323 527 642	29850 529 663	30379 694	700
710	26716 534 524	27250 539 545	27789 541 566	28330 543 587	28873 545 609	29418 547 630	29965 548 651	30513 550 672	31063 693	710
720	27240 555 529	27795 560 550	28355 562 572	28917 565 594	29482 568 616	30048 568 638	30616 569 660	31185 571 681	31756 702	720
730	27769 576 536	28345 582 558	28927 584 580	29511 587 602	30098 588 624	30686 590 646	31276 590 668	31866 592 690	32458 712	730
740	28305 598 541	28903 604 564	29507 606 586	30113 609 609	30722 610 631	31332 612 653	31944 612 675	32556 614 698	33170 721	740
750	28846 621 548	29467 626 570	30093 629 593	30722 631 616	31353 632 639	31985 634 662	32619 635 685	33254 637 708	33891 731	750
760	29394 643 554	30037 649 577	30686 652 600	31338 654 623	31992 655 647	32647 657 671	33304 658 695	33962 660 718	34622 741	760
770	29948 666 561	30614 672 585	31286 675 608	31961 678 631	32639 679 655	33318 681 679	33999 681 703	34680 683 727	35363 750	770
780	30509 690 566	31199 695 590	31894 698 614	32592 702 638	33294 703 662	33997 705 687	34702 705 711	35407 706 736	36113 760	780
790	31075 714 572	31789 719 596	32508 722 621	33230 726 645	33956 728 670	34684 729 695	35413 730 720	36143 730 745	36873 770	790
800	31647 738 579	32385 744 604	33129 746 628	33875 751 654	34626 753 679	35379 754 704	36133 755 729	36888 755 754	37643 780	800
810	32226 763 586	32989 768 611	33757 772 636	34529 776 662	35305 778 687	36083 779 712	36862 780 738	37642 781 764	38423 790	810
820	32812 788 592	33600 793 618	34393 798 644	35191 801 671	35992 803 697	36795 805 723	37600 806 749	38406 807 775	39213 801	820
830	33404 814 600	34218 819 626	35037 825 653	35862 827 679	36689 829 705	37518 831 732	38349 832 758	39181 833 785	40014 811	830
840	34004 840 607	34844 846 633	35690 851 660	36541 853 688	37394 856 715	38250 857 741	39107 859 768	39966 859 794	40825 821	840
850	34611 866 616	35477 873 643	36350 879 669	37229 880 695	38109 882 722	38991 884 749	39875 885 776	40760 886 803	41646 831	850
860	35227 893 625	36120 899 652	37019 905 678	37924 907 704	38831 909 731	39740 911 758	40651 912 785	41563 914 813	42477 841	860
870	35852 920 631	36772 925 659	37697 931 686	38628 934 713	39562 936 740	40498 938 768	41436 940 796	42376 942 824	43318 852	870
880	36483 948 638	37431 952 666	38383 958 694	39341 961 722	40302 964 750	41266 966 778	42232 968 806	43200 970 834	44170 863	880
890	37121 976 645	38097 980 673	39077 986 702	40063 989 730	41052 992 758	42044 994 786	43038 996 815	44034 999 845	45033 875	890
900	37766 1004	38770 1009	39779 1014	40793 1017	41810 1020	42830 1023	43853 1026	44879 1029	45908	900
V.										V.
Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)

$\phi = 40^\circ$.

TIME OF FLIGHT.

TABLE VI.

Log. C (c)	1.015 (10.351) dif.	1.035 (10.839) dif.	1.055 (11.350) dif.	1.075 (11.885) dif.	1.095 (12.445) dif.	1.115 (13.032) dif.	1.135 (13.646) dif.	1.155 (14.289) dif.	1.175 (14.962) dif.	Log. C (c)
V.										V.
600	6543 44 85	6587 43 87	6630 42 89	6672 41 90	6713 40 92	6753 39 93	6792 39 94	6831 38 95	6869 96	600
610	6628 46 85	6674 45 86	6719 43 88	6762 43 90	6805 41 91	6846 40 93	6886 40 95	6926 39 96	6965 97	610
620	6713 47 86	6760 47 87	6807 45 88	6852 44 90	6896 43 91	6939 52 93	6981 41 94	7022 40 95	7062 96	620
630	6799 48 85	6847 48 87	6895 47 88	6942 45 89	6987 45 91	7032 43 92	7075 42 94	7117 41 96	7158 97	630
640	6884 50 85	6934 49 86	6983 48 87	7031 47 89	7078 46 91	7124 45 93	7169 44 94	7213 42 95	7255 97	640
650	6969 51 86	7020 50 88	7070 50 89	7120 49 90	7169 48 92	7217 46 93	7263 45 95	7308 44 96	7352 97	650
660	7055 53 85	7108 51 87	7159 51 89	7210 51 90	7261 49 91	7310 48 93	7358 46 94	7404 45 95	7449 96	660
670	7140 55 86	7195 53 87	7248 52 88	7300 52 90	7352 51 92	7403 49 93	7452 47 94	7499 46 96	7545 97	670
680	7226 56 85	7282 54 87	7336 54 89	7390 54 90	7444 52 91	7496 50 92	7546 49 94	7595 47 95	7642 97	680
690	7311 58 85	7369 56 87	7425 55 89	7480 55 91	7535 53 92	7588 52 93	7640 50 94	7690 49 95	7739 96	690
700	7396 60 85	7456 58 87	7514 57 89	7571 56 90	7627 54 91	7681 53 93	7734 51 94	7785 50 95	7835 96	700
710	7481 62 85	7543 60 86	7603 58 88	7661 57 90	7718 56 91	7774 54 92	7828 52 93	7880 51 95	7931 97	710
720	7566 63 85	7629 62 87	7691 60 88	7751 58 89	7809 57 91	7866 55 93	7921 54 94	7975 53 95	8028 96	720
730	7651 65 85	7716 63 86	7779 61 88	7840 60 90	7900 59 91	7959 56 92	8015 55 94	8070 54 95	8124 96	730
740	7736 66 85	7802 65 87	7867 63 88	7930 61 89	7991 60 91	8051 58 92	8109 56 93	8165 55 95	8220 96	740
750	7821 68 85	7889 66 86	7955 64 87	8019 63 89	8082 61 90	8143 59 92	8202 58 94	8260 56 95	8316 96	750
760	7906 69 84	7975 67 86	8042 66 88	8108 64 89	8172 63 91	8235 61 92	8296 59 94	8355 57 95	8412 96	760
770	7990 71 85	8061 69 86	8130 67 87	8197 66 89	8263 64 91	8327 63 93	8390 60 94	8450 58 95	8508 96	770
780	8075 72 84	8147 70 86	8217 69 88	8286 68 90	8354 66 91	8420 64 92	8484 61 93	8545 59 94	8604 96	780
790	8159 74 84	8233 72 85	8305 71 87	8376 69 89	8445 67 91	8512 65 92	8577 62 93	8639 61 95	8700 96	790
800	8243 75 85	8318 74 86	8392 73 87	8465 71 88	8536 68 89	8604 66 91	8670 64 93	8734 62 94	8796 96	800
810	8328 76 85	8404 75 87	8479 74 88	8553 72 89	8625 70 90	8695 68 91	8763 65 92	8828 64 94	8892 95	810
820	8413 78 85	8491 76 86	8567 75 87	8642 73 88	8715 71 89	8786 69 91	8855 67 93	8922 65 94	8987 95	820
830	8498 79 85	8577 77 86	8654 76 88	8730 74 89	8804 73 90	8877 71 91	8948 68 92	9016 66 94	9082 95	830
840	8583 80 84	8663 79 86	8742 77 87	8819 75 89	8894 74 90	8968 72 91	9040 70 92	9110 67 93	9177 95	840
850	8667 82 85	8749 80 87	8829 79 88	8908 76 89	8984 75 91	9059 73 92	9132 71 93	9203 69 94	9272 95	850
860	8752 84 84	8836 81 86	8917 80 88	8997 78 89	9075 76 90	9151 74 92	9225 72 93	9297 70 94	9367 95	860
870	8836 86 85	8922 83 86	9005 81 87	9086 79 88	9165 78 90	9243 75 91	9318 73 93	9391 71 94	9462 95	870
880	8921 87 84	9008 84 86	9092 82 88	9174 81 89	9255 79 90	9334 77 91	9411 74 92	9485 72 94	9557 95	880
890	9005 89 85	9094 86 86	9180 83 87	9263 82 89	9345 80 90	9425 78 91	9503 76 92	9579 73 93	9652 95	890
900	9090 90	9180 87	9267 85	9352 83	9435 81	9516 79	9595 77	9672 75	9747	900
V.										V.
(c)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c)
Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C

TABLE VI.

 $\phi = 40^\circ$.

ANGLE OF FALL.

Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C
(c) (10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c)	
V.										V.
600	5945 17 33	5928 18 32	5910 19 31	5891 20 31	5871 21 30	5850 22 29	5828 23 28	5805 23 27	5782 26	600
610	5978 18 32	5960 19 32	5941 19 31	5922 21 30	5901 22 30	5879 23 29	5856 24 28	5832 24 27	5808 25	610
620	6010 18 31	5992 20 31	5972 20 30	5952 21 29	5931 23 28	5908 24 28	5884 25 27	5859 26 26	5833 24	620
630	6041 18 30	6023 21 29	6002 21 29	5981 22 28	5959 23 27	5936 25 26	5911 26 25	5885 28 24	5857 23	630
640	6071 19 30	6052 21 29	6031 22 28	6009 23 27	5986 24 26	5962 26 25	5936 27 24	5909 29 23	5880 22	640
650	6101 20 29	6081 22 28	6059 23 27	6036 24 26	6012 25 25	5987 27 24	5960 28 23	5932 30 22	5902 21	650
660	6130 21 28	6109 23 27	6086 24 26	6062 25 25	6037 26 24	6011 28 23	5983 29 22	5954 31 21	5923 20	660
670	6158 22 28	6136 24 27	6112 25 26	6087 26 24	6061 27 22	6034 29 21	6005 30 20	5975 32 19	5943 18	670
680	6186 23 28	6163 25 26	6138 27 25	6111 28 23	6083 28 22	6055 30 21	6025 31 19	5994 33 18	5961 17	680
690	6214 25 26	6189 26 25	6163 29 23	6134 29 23	6105 29 22	6076 32 20	6044 32 19	6012 34 17	5978 16	690
700	6240 26 26	6214 28 25	6186 29 24	6157 30 22	6127 31 20	6096 33 19	6063 34 18	6029 35 17	5994 15	700
710	6266 27 25	6239 29 24	6210 31 23	6179 32 21	6147 32 20	6115 34 18	6081 35 17	6046 37 16	6009 15	710
720	6291 28 24	6263 30 23	6233 33 21	6200 33 20	6167 34 19	6133 35 18	6098 36 16	6062 38 15	6024 14	720
730	6315 29 23	6286 32 21	6254 34 20	6220 34 19	6186 35 18	6151 37 17	6114 37 16	6077 39 14	6038 13	730
740	6338 31 22	6307 33 20	6274 35 19	6239 35 18	6204 36 17	6168 38 16	6130 39 15	6091 40 14	6051 13	740
750	6360 33 21	6327 34 20	6293 36 19	6257 36 18	6221 37 16	6184 39 15	6145 40 14	6105 41 13	6064 12	750
760	6381 34 21	6347 35 19	6312 37 18	6275 38 17	6237 38 16	6199 40 14	6159 41 13	6118 42 12	6076 12	760
770	6402 36 20	6366 36 19	6330 38 17	6292 39 16	6253 40 15	6213 41 14	6172 42 13	6130 42 12	6088 11	770
780	6422 37 18	6385 38 17	6347 39 16	6308 40 15	6268 41 14	6227 42 13	6185 43 12	6142 43 11	6099 10	780
790	6440 38 17	6402 39 16	6363 40 15	6323 41 14	6282 42 13	6240 43 12	6197 44 11	6153 44 10	6109 9	790
800	6457 39 17	6418 40 16	6378 41 15	6337 42 14	6295 43 13	6252 44 12	6208 45 11	6163 45 10	6118 9	800
810	6474 40 16	6434 41 15	6393 42 14	6351 43 13	6308 44 12	6264 45 11	6219 46 10	6173 46 9	6127 8	810
820	6490 41 15	6449 42 14	6407 43 13	6364 44 12	6320 45 11	6275 46 10	6229 47 9	6182 47 8	6135 7	820
830	6505 42 15	6463 43 14	6420 44 12	6376 45 11	6331 46 10	6285 47 9	6238 48 8	6190 48 7	6142 7	830
840	6520 43 14	6477 45 13	6432 45 12	6387 46 10	6341 47 9	6294 48 8	6246 49 7	6197 48 7	6149 6	840
850	6534 44 13	6490 46 12	6444 47 11	6397 47 10	6350 48 9	6302 49 8	6253 49 7	6204 49 6	6155 5	850
860	6547 45 12	6502 47 11	6455 48 10	6407 48 9	6359 49 8	6310 50 7	6260 50 6	6210 50 5	6160 4	860
870	6559 46 12	6513 48 10	6465 49 9	6416 49 8	6367 50 7	6317 51 6	6266 51 5	6215 51 4	6164 3	870
880	6571 48 11	6523 49 10	6474 50 8	6424 50 7	6374 51 6	6323 52 5	6271 52 4	6219 52 4	6167 3	880
890	6582 49 10	6533 51 9	6482 51 8	6431 51 7	6380 52 5	6328 53 4	6275 52 4	6223 53 3	6170 3	890
900	6592 50	6542 52	6490 52	6438 53	6385 53	6332 53	6279 53	6226 53	6173	900
V.										V.
(c) (10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c)	
Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C

$\phi = 40^\circ$.

TERMINAL VELOCITY.

TABLE VI.

Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C
(c)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c)
V.										V.
600	3780 39 22	3819 39 23	3858 40 24	3898 40 25	3938 41 26	3979 41 28	4020 42 30	4062 43 32	4105 33	600
610	3802 40 22	3842 40 23	3882 41 24	3923 41 25	3964 43 26	4007 43 27	4050 44 29	4094 44 31	4138 33	610
620	3924 41 22	3865 41 23	3906 42 24	3948 42 25	3990 44 26	4034 45 27	4079 46 29	4125 46 31	4171 33	620
630	3846 42 21	3888 42 22	3930 43 23	3973 43 25	4016 45 27	4061 47 28	4108 48 29	4156 48 31	4204 33	630
640	3867 43 22	3910 43 23	3953 45 24	3998 45 25	4043 46 27	4089 48 29	4137 50 30	4187 50 31	4237 33	640
650	3889 44 21	3933 44 23	3977 46 25	4023 47 26	4070 48 27	4118 49 29	4167 51 30	4218 52 31	4270 33	650
660	3910 46 21	3956 46 22	4002 47 24	4049 48 26	4097 50 27	4147 50 29	4197 52 31	4249 54 32	4303 33	660
670	3931 47 22	3978 48 23	4026 49 24	4075 49 26	4124 52 28	4176 52 29	4228 53 31	4281 55 33	4336 34	670
680	3953 48 21	4001 49 23	4050 51 25	4101 51 26	4152 53 28	4205 54 29	4259 55 31	4314 56 32	4370 34	680
690	3974 50 21	4024 51 22	4075 52 24	4127 53 26	4180 54 28	4234 56 30	4290 56 31	4346 58 33	4404 34	690
700	3995 51 22	4046 53 23	4099 54 25	4153 55 26	4208 56 28	4264 57 29	4321 58 31	4379 59 32	4438 34	700
710	4017 52 22	4069 55 24	4124 55 25	4179 57 26	4236 57 27	4293 59 29	4352 59 31	4411 61 33	4472 35	710
720	4039 54 22	4093 56 23	4149 56 24	4205 58 26	4263 59 28	4322 61 30	4383 61 31	4444 63 33	4507 35	720
730	4061 55 21	4116 57 23	4173 58 24	4231 60 26	4291 61 28	4352 62 29	4414 63 31	4477 65 33	4542 35	730
740	4082 57 21	4139 58 22	4197 60 24	4257 62 26	4319 62 27	4381 64 29	4445 65 31	4510 67 33	4577 35	740
750	4103 58 22	4161 60 23	4221 62 25	4283 63 27	4346 64 28	4410 66 30	4476 67 32	4543 69 33	4612 35	750
760	4125 59 22	4184 62 24	4246 64 25	4310 64 27	4374 66 29	4440 68 30	4508 68 32	4576 71 34	4647 36	760
770	4147 61 23	4208 63 24	4271 66 26	4337 66 27	4403 67 28	4470 70 30	4540 70 32	4610 73 34	4683 36	770
780	4170 62 22	4232 65 24	4297 67 25	4364 67 27	4431 69 29	4500 72 31	4572 72 32	4644 75 34	4719 36	780
790	4192 64 22	4256 66 24	4322 69 26	4391 69 27	4460 71 29	4531 73 31	4604 74 32	4678 77 34	4755 36	790
800	4214 66 23	4280 68 24	4348 70 26	4418 71 27	4489 73 28	4562 74 30	4636 76 32	4712 79 34	4791 37	800
810	4237 67 22	4304 70 24	4374 71 25	4445 72 27	4517 75 29	4592 76 31	4668 78 33	4746 82 35	4828 37	810
820	4259 69 23	4328 71 24	4399 73 26	4472 74 27	4546 77 29	4623 78 31	4701 80 33	4781 84 35	4865 37	820
830	4282 70 22	4352 73 24	4425 74 26	4499 76 28	4575 79 30	4654 80 31	4734 82 33	4816 86 35	4902 37	830
840	4304 72 23	4376 75 25	4451 76 26	4527 78 28	4605 80 30	4685 82 32	4767 84 34	4851 88 36	4939 37	840
850	4327 74 22	4401 76 24	4477 78 26	4555 80 28	4635 82 30	4717 84 32	4801 86 34	4887 89 36	4976 38	850
860	4349 76 23	4425 78 24	4503 80 26	4583 82 27	4665 84 29	4749 86 32	4835 88 34	4923 91 36	5014 38	860
870	4372 77 22	4449 80 24	4529 81 26	4610 84 28	4694 87 30	4781 88 32	4869 90 35	4959 93 37	5052 39	870
880	4394 79 23	4473 82 24	4555 83 26	4638 86 28	4724 89 30	4813 91 32	4904 92 34	4996 95 37	5091 39	880
890	4417 80 23	4497 84 25	4581 85 26	4666 88 28	4754 91 30	4845 93 32	4938 95 34	5033 97 36	5130 39	890
900	4440 82	4522 85	4607 87	4694 90	4784 93	4877 95	4972 97	5069 100	5169	900
V.										V.
(c)	(10.351) dif.	(10.839) dif.	(11.350) dif.	(11.885) dif.	(12.445) dif.	(13.032) dif.	(13.646) dif.	(14.289) dif.	(14.962) dif.	(c)
Log. C	1.015	1.035	1.055	1.075	1.095	1.115	1.135	1.155	1.175	Log. C

INTRODUCTION TO TABLE VII

Table VII consists of extracts from Volume II of *Exterior Ballistic Tables Based on Numerical Integration* (Ordnance Department, U. S. Army, 1931). The complete Volume II includes tables of summittal values of range, time of flight, remaining velocity, and ordinate (i.e., maximum ordinate), for initial velocities from 80 m.s. to 1000 m.s., and for values of $\text{Log } C$ from 0.000 to 1.250. For each of these four elements there are two series of tables, one for values of $\text{Log } C$ from 0.000 to 0.600 and one for values of $\text{Log } C$ from 0.650 to 1.250. Each of these two series consists of separate tables for initial velocities from 80 m.s. to 200 m.s. at intervals of 40 m.s., from 200 m.s. to 400 m.s. at intervals of 20 m.s., and from 400 m.s. to 1000 m.s. at intervals of 40 m.s. Thus there are 58 separate tables for each of the four elements, or 232 separate tables in all; each separate table forms one page.

The extracts given in this volume comprise tables only for the maximum ordinate, for values of $\text{Log } C$ from 0.650 to 1.250 and of initial velocity from 600 m.s. to 920 m.s. These extracts are adequate for the determination of maximum ordinates of trajectories for naval guns having a caliber equal to 6" or more.

This table is in *metric units*; the value of $\text{Log } C$, however, is found in the usual manner, employing English units. The derivation and use of this table are explained in Chapters 7 and 8, *Exterior Ballistics*, 1935.

TABLE VII.

 $V = 600 \text{ m/s}$

MAXIMUM ORDINATE.

ϕ deg.	Log C C	0.650 4.467	0.700 5.012	0.750 5.623	0.800 6.310	0.850 7.079	0.900 7.943	0.950 8.913	1.000 10.00	1.050 11.22	1.100 12.59	1.150 14.13	1.200 15.85	1.250 17.78
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	5.3	5.4	5.4	5.4	5.4	5.4	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
2	20.6	20.8	20.9	21.0	21.2	21.3	21.4	21.5	21.6	21.7	21.7	21.7	21.8	21.9
3	44.8	45.6	45.8	46.5	46.6	47.0	47.2	47.6	47.9	48.2	48.4	48.4	48.6	48.7
4	77.2	78.6	79.3	80.6	81.1	82.0	82.5	83.3	83.8	84.5	84.9	84.9	85.3	85.7
5	117.0	119.4	120.6	123.0	124.0	126.1	127.0	128.4	129.0	130.4	131.0	132.3	132.3	132.6
6	163.6	167.4	169.6	172.9	174.8	177.8	179.6	182.1	183.1	185.4	186.6	188.2	188.2	189.2
7	216.5	221.9	225.4	230.4	234.0	237.7	240.1	243.8	245.8	249.1	250.8	253.3	253.3	255.1
8	275.3	282.7	287.6	294.7	300.6	305.0	308.5	313.7	316.8	321.3	323.8	327.8	327.8	330.3
9	339.7	349.3	356.1	365.0	373.6	379.1	384.1	391.1	395.4	401.5	405.2	410.9	410.9	414.2
10	409	422	430	442	453	460	467	476	481	489	494	502	502	506
11	484	499	510	524	534	547	556	567	575	584	592	600	600	606
12	563	581	595	612	624	640	652	666	676	687	696	706	706	714
13	646	668	685	705	721	740	753	770	783	797	808	820	820	830
14	734	759	780	803	823	844	862	889	897	913	927	941	941	953
15	826	855	879	906	929	954	975	996	1016	1035	1052	1068	1068	1083
16	922	954	983	1014	1041	1069	1094	1118	1142	1163	1183	1203	1203	1220
17	1021	1056	1091	1125	1157	1188	1218	1246	1273	1298	1322	1343	1343	1364
18	1124	1162	1202	1240	1276	1312	1347	1379	1410	1439	1466	1490	1490	1515
19	1230	1273	1318	1360	1402	1441	1481	1517	1552	1585	1616	1644	1644	1672
20	1339	1388	1437	1485	1531	1574	1619	1660	1699	1737	1772	1804	1804	1835
21	1452	1506	1560	1612	1665	1712	1762	1808	1851	1893	1932	1969	1969	2003
22	1568	1627	1686	1744	1802	1855	1908	1960	2008	2055	2099	2139	2139	2177
23	1686	1751	1816	1878	1942	2002	2059	2116	2170	2222	2270	2315	2315	2357
24	1807	1878	1948	2017	2085	2151	2216	2276	2337	2392	2446	2496	2496	2543
25	1931	2008	2084	2159	2233	2305	2375	2441	2507	2568	2627	2681	2681	2734
26	2059	2142	2224	2304	2384	2462	2535	2611	2682	2748	2812	2871	2871	2929
27	2189	2277	2366	2452	2538	2622	2702	2782	2860	2931	3002	3066	3066	3128
28	2322	2416	2510	2602	2695	2786	2875	2958	3040	3120	3195	3266	3266	3332
29	2458	2557	2657	2756	2856	2951	3050	3136	3224	3313	3392	3470	3470	3541
30	2595	2701	2807	2913	3018	3121	3225	3320	3414	3508	3594	3678	3678	3754
32	2876	2994	3115	3233	3352	3471	3584	3696	3804	3909	4007	4102	4102	4191
34	3166	3297	3431	3564	3695	3829	3956	4083	4205	4322	4433	4540	4540	4642
36	3463	3610	3756	3905	4048	4197	4340	4479	4616	4745	4872	4989	4989	5104
38	3768	3929	4088	4252	4412	4573	4732	4884	5036	5178	5320	5450	5450	5576
40	4078	4253	4428	4605	4783	4957	5130	5298	5463	5622	5774	5921	5921	6057
42	4393	4582	4774	4966	5158	5347	5535	5720	5897	6072	6236	6397	6397	
44	4712	4915	5124	5329	5537	5742	5942	6144	6336	6524	6704	6876	6876	
46	5032	5251	5474	5697	5919	6141	6358	6572	6781	6982	7176	7360	7360	
48	5354	5590	5827	6067	6303	6540	6774	7002	7226	7440	7648	7846	7846	
50	5675	5927	6180	6435	6689	6940	7189	7432	7670	7900	8120	8332	8332	
52	5995	6262	6530	6801	7072	7338	7602	7860	8112	8356	8588	8813	8813	
54	6311	6594	6878	7164	7450	7733	8011	8285	8549	8807	9055	9290	9290	
56	6623	6920	7221	7521	7822	8121	8413	8701	8981	9251				
58	6928	7240	7556	7872	8187	8500	8808	9109	9403	9686				
60	7224	7552	7882	8213	8542	8869	9191	9506	9813	10109				
62	7510	7853	8196	8542	8886	9226	9563	9890	10210	10518				
64	7785	8142	8500	8858	9217	9570	9918	10260	10589	10909				
66	8048	8417	8788	9160	9531	9896	10257	10610	10951	11282				
68	8295	8676	9061	9444	9827	10206	10577	10940	11293	11631				
70	8526	8290	9314	9710	10104	10494	10876	11250	11613					
72	8740	9145	9550	9956	10360	10760	11154	11536	11907					
74	8938	9350	9765	10181	10594	11004	11406	11796	12176					
76	9114	9534	9958	10383	10804	11222	11632	12030	12417					
78	9268	9696	10128	10560	10989	11414	11831	12236	12629					
80	9400	9835	10275	10713	11149	11579	12001	12413	12810					
82	9510	9950	10396	10838	11280	11715	12142	12560	12960					
84	9596	10041	10489	10937	11383	11821	12252	12672	13077					
86	9659	10107	10556	11009	11456	11898	12332	12755						
88	9695	10148	10600	11052	11501	11944	12381							
90	9709	10163	10612	11066	11512	11958	12400							

MAXIMUM ORDINATE.

 $V = 640 \text{ m/s}$

Log C C	0.650 4.467	0.700 5.012	0.750 5.623	0.800 6.310	0.850 7.079	0.900 7.943	0.950 8.913	1.000 10.00	1.050 11.22	1.100 12.59	1.150 14.13	1.200 15.85	1.250 17.78
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	6.1	6.1	6.1	6.1	6.2	6.2	6.2	6.2	6.3	6.3	6.3	6.3	6.3
2	23.4	23.6	23.7	23.9	24.0	24.2	24.3	24.4	24.5	24.6	24.6	24.7	24.7
3	50.6	51.2	51.7	52.2	52.7	53.1	53.5	53.8	54.2	54.5	54.8	55.0	55.2
4	86.8	88.1	89.4	90.6	91.6	92.6	93.4	94.2	94.9	95.5	96.1	96.6	97.1
5	130.9	133.9	135.5	138.1	139.4	141.9	142.8	144.9	145.7	147.4	148.0	149.3	150.0
6	182.6	187.3	190.0	194.0	196.3	199.8	201.7	204.9	206.6	209.4	210.4	212.7	213.8
7	241.0	247.9	252.3	257.9	261.4	266.3	269.7	274.3	276.9	280.9	283.1	286.5	288.1
8	305.9	315.1	321.4	329.1	334.3	341.3	346.1	352.6	356.4	361.8	365.0	369.8	372.5
9	377.0	388.5	396.9	407.3	414.7	424.1	430.7	439.0	444.8	451.8	456.4	462.6	466.4
10	454	468	479	492	502	514	523	533	541	550	557	564	570
11	535	553	567	584	596	611	622	636	645	657	666	675	683
12	622	643	660	680	696	714	728	744	757	771	782	795	804
13	714	738	759	783	802	824	842	860	876	894	907	922	934
14	809	839	863	891	914	940	961	982	1003	1023	1040	1057	1072
15	908	943	972	1004	1032	1061	1087	1111	1136	1159	1180	1200	1217
16	1012	1051	1086	1121	1155	1186	1218	1247	1277	1302	1327	1350	1372
17	1121	1162	1203	1242	1282	1318	1355	1388	1424	1451	1480	1507	1533
18	1232	1278	1325	1369	1415	1456	1498	1536	1576	1607	1641	1671	1701
19	1347	1399	1452	1501	1551	1598	1646	1689	1733	1770	1808	1843	1877
20	1466	1523	1582	1637	1692	1746	1798	1847	1895	1939	1981	2021	2059
21	1588	1651	1716	1777	1838	1897	1955	2010	2063	2113	2160	2204	2248
22	1714	1782	1853	1920	1989	2053	2118	2178	2237	2292	2344	2394	2442
23	1842	1917	1994	2068	2143	2213	2284	2351	2416	2477	2535	2590	2643
24	1973	2055	2138	2219	2300	2378	2455	2528	2600	2667	2732	2792	2849
25	2107	2196	2285	2373	2461	2546	2630	2710	2788	2862	2932	3000	3062
26	2244	2340	2436	2532	2626	2718	2809	2896	2980	3061	3138	3212	3279
27	2384	2487	2590	2693	2794	2894	2992	3086	3179	3266	3349	3429	3502
28	2527	2636	2747	2856	2967	3073	3179	3281	3380	3475	3564	3650	3730
29	2672	2789	2907	3024	3142	3256	3370	3480	3585	3688	3784	3876	3963
30	2820	2944	3070	3194	3320	3443	3564	3682	3794	3905	4007	4107	4201
32	3123	3262	3402	3544	3684	3824	3961	4095	4222	4348	4468	4581	4690
34	3434	3590	3745	3903	4059	4217	4370	4520	4666	4806	4942	5069	5192
36	3754	3925	4097	4272	4446	4619	4790	4956	5120	5276	5427	5570	5707
38	4080	4268	4458	4649	4842	5030	5219	5403	5584	5757	5924	6082	6234
40	4413	4618	4826	5033	5244	5450	5656	5860	6056	6247	6431	6607	
42	4753	4973	5198	5425	5652	5877	6101	6323	6536	6745	6945		
44	5095	5334	5576	5821	6064	6310	6552	6790	7022	7248	7466		
46	5440	5697	5956	6220	6482	6745	7007	7261	7512	7756	7994		
48	5785	6061	6338	6620	6902	7182	7462	7735	8003	8264			
50	6130	6424	6721	7020	7322	7620	7918	8210	8495	8772			
52	6473	6786	7103	7419	7740	8057	8372	8682	8985	9277			
54	6816	7144	7480	7816	8154	8490	8821	9150	9470	9779			
56	7153	7498	7850	8206	8561	8916	9267	9610	9946	10272			
58	7481	7845	8214	8588	8961	9333	9701	10062	10414	10755			
60	7801	8184	8570	8959	9351	9738	10123	10502	10869	11226			
62	8110	8510	8913	9319	9728	10133	10533	10927	11308				
64	8407	8822	9243	9664	10089	10511	10926	11335	11728				
66	8691	9120	9558	9995	10434	10871	11302	11724	12127				
68	8959	9403	9854	10307	10760	11211	11657	12091	12508				
70	9210	9667	10131	10599	11065	11529	11987	12435	12870				
72	9442	9912	10388	10868	11348	11822	12293	12753					
74	9654	10136	10622	11114	11605	12091	12572	13042					
76	9844	10336	10833	11335	11837	12333	12822	13301					
78	10012	10514	11020	11529	12040	12546	13042	13530					
80	10155	10665	11180	11697	12214	12728	13232	13725					
82	10274	10790	11311	11834	12358	12879	13389	13886					
84	10368	10888	11415	11942	12472	12997	13512						
86	10435	10960	11489	12021	12553	13080	13600						
88	10476	11003	11534	12068	12600	13132	13656						
90	10490	11017	11550	12083	12615	13151	13679						

TABLE VII.

 $V = 680 \text{ m/s}$

MAXIMUM ORDINATE.

ϕ deg.	Log C	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000	1.050	1.100	1.150	1.200	1.250
	C	4.467	5.012	5.623	6.310	7.079	7.943	8.913	10.00	11.22	12.59	14.13	15.85	17.78
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	6.8	6.9	6.9	6.9	7.0	7.0	7.0	7.0	7.1	7.1	7.1	7.1	7.2	7.2
2	26.2	26.5	26.6	26.8	27.0	27.2	27.3	27.5	27.6	27.7	27.8	27.9	28.1	28.1
3	56.4	57.2	58.0	58.6	59.2	59.8	60.2	60.6	60.8	61.2	61.6	62.0	62.4	62.4
4	97.1	98.7	100.1	101.3	102.4	103.5	104.5	105.5	106.4	107.3	108.1	108.8	109.4	109.4
5	145.8	148.9	151.2	154.0	155.8	158.4	159.9	162.1	163.2	165.4	166.3	168.2	168.8	168.8
6	202.4	207.8	211.1	216.0	218.8	223.1	225.5	229.3	231.3	234.6	236.0	238.9	240.1	240.1
7	266.8	274.5	279.5	286.6	291.0	297.3	301.1	306.4	309.7	314.4	316.8	321.0	323.1	323.1
8	338.0	348.4	355.7	365.2	371.7	380.4	386.4	393.2	398.0	404.2	408.4	414.4	417.3	417.3
9	415.4	429.0	438.9	451.2	460.2	471.6	480.3	489.2	495.8	504.4	510.4	517.6	521.9	521.9
10	499	516	529	544	556	571	582	594	603	614	622	631	637	637
11	588	609	625	644	660	677	691	706	718	732	742	754	763	763
12	682	707	728	751	770	791	808	827	842	858	872	887	898	898
13	781	811	835	863	886	912	933	955	974	993	1011	1028	1043	1043
14	885	919	949	981	1008	1039	1065	1090	1114	1136	1159	1178	1196	1196
15	993	1031	1067	1103	1137	1172	1202	1232	1261	1287	1313	1336	1358	1358
16	1106	1147	1190	1230	1272	1310	1347	1380	1415	1446	1476	1503	1529	1529
17	1223	1270	1318	1364	1411	1454	1497	1536	1576	1612	1646	1678	1709	1709
18	1344	1396	1451	1503	1556	1605	1653	1699	1744	1785	1824	1860	1896	1896
19	1468	1527	1588	1648	1706	1760	1816	1868	1918	1964	2009	2050	2091	2091
20	1596	1662	1729	1796	1860	1922	1983	2042	2097	2149	2200	2247	2292	2292
21	1728	1800	1874	1947	2019	2087	2155	2221	2283	2341	2398	2451	2500	2500
22	1862	1942	2023	2102	2183	2259	2333	2405	2474	2540	2603	2661	2715	2715
23	2000	2087	2175	2262	2350	2433	2515	2594	2671	2744	2814	2877	2938	2938
24	2141	2236	2331	2426	2521	2611	2703	2789	2873	2954	3030	3100	3168	3168
25	2285	2388	2492	2594	2697	2795	2895	2989	3080	3168	3251	3329	3405	3405
26	2432	2543	2655	2765	2876	2983	3089	3193	3293	3388	3478	3565	3647	3647
27	2583	2701	2822	2940	3060	3176	3287	3402	3510	3614	3712	3806	3894	3894
28	2736	2862	2991	3118	3246	3372	3491	3616	3731	3844	3949	4053	4146	4146
29	2892	3026	3164	3301	3436	3573	3700	3833	3956	4078	4191	4303	4403	4403
30	3050	3193	3339	3486	3630	3776	3915	4054	4186	4317	4439	4558	4666	4666
32	3375	3535	3698	3864	4026	4192	4350	4506	4662	4807	4949	5081	5209	5209
34	3708	3888	4069	4252	4435	4618	4799	4973	5149	5314	5473	5625	5768	5768
36	4050	4248	4450	4651	4855	5056	5258	5453	5647	5833	6010	6182	6341	6341
38	4400	4617	4838	5059	5284	5505	5726	5946	6157	6363	6561	6749		
40	4759	4992	5234	5475	5721	5965	6205	6445	6679	6903	7122	7328		
42	5121	5376	5637	5899	6164	6430	6694	6952	7208	7452	7690	7916		
44	5488	5764	6044	6328	6614	6901	7187	7466	7741	8009	8269			
46	5856	6154	6456	6761	7069	7375	7683	7985	8279	8568	8855			
48	6227	6545	6870	7194	7524	7854	8180	8506	8822	9128				
50	6600	6936	7281	7628	7980	8333	8680	9025	9364	9689				
52	6969	7326	7693	8063	8435	8808	9180	9544	9903	10250				
54	7335	7714	8101	8493	8887	9281	9673	10059	10437	10804				
56	7695	8096	8503	8916	9332	9746	10159	10566	10962	11350				
58	8049	8470	8897	9331	9768	10205	10637	11064						
60	8393	8834	9283	9735	10193	10650	11103	11549						
62	8726	9187	9655	10129	10604	11082	11554	12017						
64	9048	9525	10012	10506	11001	11496	11987	12469						
66	9353	9849	10355	10865	11379	11890	12399	12899						
68	9642	10155	10676	11205	11736	12265	12788	13304						
70	9913	10442	10978	11524	12070	12616	13153	13683						
72	10164	10706	11260	11818	12380	12940	13493	14034						
74	10393	10949	11515	12087	12662	13235	13801							
76	10598	11166	11744	12329	12915	13500	14077							
78	10779	11358	11947	12543	13139	13733	14321							
80	10933	11522	12121	12725	13331	13933	14529							
82	11062	11658	12264	12876	13490	14099	14700							
84	11164	11766	12377	12995	13614	14229	14835							
86	11238	11843	12458	13080	13703	14322	14936							
88	11282	11890	12508	13131	13758	14379								
90	11297	11905	12524	13145	13778	14401								

MAXIMUM ORDINATE.

 $V = 720 \text{ m/s}$

ϕ deg.	Log C C	0.650 4.467	0.700 5.012	0.750 5.623	0.800 6.310	0.850 7.079	0.900 7.943	0.950 8.913	1.000 10.00	1.050 11.22	1.100 12.59	1.150 14.13	1.200 15.85	1.250 17.78
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	7.6	7.7	7.7	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0
2	29.0	29.5	29.6	30.0	30.1	30.3	30.4	30.6	30.8	31.0	31.2	31.3	31.4	31.4
3	62.6	63.7	64.1	65.2	65.6	66.6	66.8	67.8	67.8	68.6	68.8	69.6	69.9	69.9
4	106.6	109.2	110.3	112.5	113.5	115.3	116.1	117.8	118.3	119.8	120.3	121.9	122.2	122.2
5	160.4	164.7	166.9	170.6	172.5	175.6	177.4	180.3	181.7	184.2	185.0	187.5	188.2	188.2
6	222.7	229.3	233.1	238.7	242.3	246.8	250.1	254.6	256.9	260.8	262.9	266.1	267.6	267.6
7	292.9	302.0	308.0	316.2	321.5	328.6	333.2	340.0	343.7	349.4	352.6	357.5	359.8	359.8
8	370.4	382.4	391.3	402.5	410.1	419.9	426.5	435.5	441.4	449.0	453.8	460.5	464.2	464.2
9	454.9	470.3	482.4	496.5	507.2	519.9	529.6	540.9	549.3	559.6	566.2	575.0	580.6	580.6
10	545	565	580	598	612	629	641	656	667	680	689	701	708	708
11	642	666	685	708	725	746	762	780	794	811	823	837	847	847
12	744	773	797	824	845	870	890	913	931	950	966	983	997	997
13	851	885	914	945	972	1002	1027	1053	1076	1098	1119	1139	1157	1157
14	964	1001	1037	1071	1106	1140	1170	1200	1230	1255	1281	1304	1326	1326
15	1080	1122	1165	1205	1246	1284	1322	1356	1391	1421	1452	1479	1505	1505
16	1202	1249	1299	1344	1392	1435	1480	1519	1560	1596	1631	1663	1694	1694
17	1327	1381	1437	1490	1544	1593	1645	1690	1736	1777	1819	1856	1892	1892
18	1457	1518	1581	1640	1701	1757	1814	1867	1919	1967	2014	2057	2098	2098
19	1590	1658	1729	1796	1863	1927	1991	2051	2110	2164	2217	2266	2314	2314
20	1728	1803	1882	1955	2032	2102	2173	2241	2307	2368	2427	2483	2537	2537
21	1869	1952	2038	2116	2204	2283	2361	2438	2511	2579	2645	2707	2767	2767
22	2013	2105	2197	2285	2380	2469	2555	2639	2720	2797	2869	2939	3004	3004
23	2160	2261	2362	2462	2560	2659	2754	2846	2935	3023	3101	3178	3249	3249
24	2311	2421	2530	2641	2746	2854	2958	3058	3156	3251	3339	3424	3502	3502
25	2466	2584	2703	2822	2938	3054	3168	3276	3383	3485	3583	3676	3761	3761
26	2624	2751	2878	3006	3133	3260	3381	3500	3616	3727	3833	3935	4029	4029
27	2785	2920	3058	3195	3332	3469	3598	3729	3853	3974	4088	4198	4303	4303
28	2949	3093	3241	3388	3535	3681	3821	3961	4096	4226	4349	4468	4583	4583
29	3116	3270	3426	3584	3741	3897	4050	4198	4344	4483	4618	4744	4868	4868
30	3285	3449	3616	3784	3950	4117	4282	4441	4597	4747	4891	5025	5158	5158
32	3632	3816	4002	4191	4381	4568	4756	4935	5114	5286	5449	5605		
34	3988	4194	4402	4611	4824	5034	5243	5446	5647	5842	6025	6204		
36	4354	4580	4811	5042	5278	5513	5743	5972	6194	6411	6618	6817		
38	4730	4975	5229	5485	5742	6000	6255	6509	6756	6994	7228	7443		
40	5111	5379	5654	5934	6215	6497	6779	7056	7327	7590	7844	8087		
42	5498	5790	6086	6391	6698	7002	7310	7612	7907	8195	8474			
44	5889	6204	6526	6853	7185	7514	7847	8174	8494	8806	9111			
46	6284	6622	6970	7320	7676	8033	8388	8740	9087	9421	9752			
48	6683	7043	7414	7789	8169	8554	8934	9310	9681	10039				
50	7080	7464	7859	8261	8665	9074	9481	9880						
52	7475	7885	8303	8729	9161	9593	10024	10450						
54	7867	8301	8743	9194	9651	10109	10564	11015						
56	8253	8711	9178	9654	10134	10617	11096	11571						
58	8633	9114	9605	10106	10610	11116	11621	12119						
60	9003	9506	10021	10545	11073	11603	12131	12652						
62	9363	9887	10424	10971	11524	12074	12625	13167						
64	9707	10253	10812	11380	11955	12530	13099							
66	10036	10604	11182	11772	12367	12963	13552							
68	10346	10934	11533	12142	12757	13372	13984							
70	10638	11243	11862	12490	13122	13756	14384							
72	10908	11529	12166	12811	13462	14111	14756							
74	11155	11791	12442	13105	13771	14435	15095							
76	11377	12026	12691	13368	14048	14727								
78	11572	12236	12912	13600	14292	14983								
80	11740	12414	13101	13799	14502	15203								
82	11879	12561	13258	13964	14675	15384								
84	11988	12677	13381	14094	14812	15528								
86	12068	12761	13470	14187	14909	15630								
88	12117	12812	13522	14242	14969									
90	12130	12829	13537	14259	14992									

TABLE VII.

 $V = 760 \text{ m/s}$

MAXIMUM ORDINATE.

ϕ deg.	Log C C	0.650 4.467	0.700 5.012	0.750 5.623	0.800 6.310	0.850 7.079	0.900 7.943	0.950 8.913	1.000 10.00	1.050 11.22	1.100 12.59	1.150 14.13	1.200 15.85	1.250 17.78
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	8.5	8.5	8.6	8.6	8.6	8.7	8.7	8.7	8.8	8.8	8.8	8.8	8.8	8.8
2	32.2	32.6	32.9	33.2	33.4	33.6	33.8	34.1	34.3	34.5	34.6	34.8	34.8	34.8
3	68.9	70.0	70.9	71.9	72.7	73.6	74.2	74.8	75.3	75.9	76.3	76.6	76.6	76.9
4	117.2	120.1	121.5	124.1	125.2	127.5	128.4	129.4	130.6	132.0	133.3	134.8	134.8	135.2
5	175.7	180.4	183.4	187.7	190.1	194.1	195.8	198.3	200.8	203.9	205.0	207.8	207.8	208.5
6	243.6	251.0	255.7	262.3	266.1	272.1	275.5	280.8	283.6	288.4	290.8	295.0	295.0	296.2
7	320.7	330.4	337.3	346.9	353.2	361.6	366.8	374.6	378.8	385.7	389.0	395.1	395.1	398.0
8	406.4	418.0	428.1	440.9	449.7	461.4	469.0	479.4	486.2	495.2	500.5	508.5	508.5	513.4
9	497.0	513.1	526.9	543.3	555.7	570.6	581.7	595.3	604.6	616.8	624.5	634.4	634.4	641.4
10	593	615	633	654	670	689	704	721	734	749	760	773	773	782
11	697	724	747	773	793	816	835	857	873	892	906	923	923	936
12	807	839	867	898	924	952	975	1001	1022	1045	1064	1082	1082	1100
13	922	960	994	1028	1062	1095	1124	1154	1180	1206	1232	1253	1253	1275
14	1043	1084	1126	1165	1206	1244	1281	1315	1348	1378	1408	1431	1431	1462
15	1168	1215	1265	1310	1358	1400	1445	1484	1525	1560	1596	1627	1627	1659
16	1298	1352	1409	1462	1516	1565	1616	1662	1709	1750	1792	1829	1829	1866
17	1433	1494	1558	1618	1680	1737	1795	1848	1901	1949	1998	2040	2040	2083
18	1573	1640	1713	1780	1850	1915	1979	2041	2100	2156	2211	2260	2260	2309
19	1716	1792	1872	1948	2026	2098	2170	2240	2307	2371	2433	2490	2490	2544
20	1862	1948	2036	2120	2205	2288	2367	2446	2522	2594	2664	2728	2728	2788
21	2013	2107	2203	2298	2390	2484	2572	2659	2743	2825	2901	2973	2973	3040
22	2167	2271	2375	2480	2582	2684	2783	2878	2972	3062	3146	3227	3227	3302
23	2325	2438	2552	2667	2779	2891	3000	3104	3207	3306	3399	3488	3488	3572
24	2486	2610	2734	2857	2980	3102	3221	3336	3448	3558	3659	3757	3757	3849
25	2651	2784	2918	3053	3186	3318	3448	3574	3696	3815	3926	4034	4034	4134
26	2819	2963	3107	3253	3396	3540	3680	3817	3951	4078	4199	4317	4317	4426
27	2991	3145	3299	3457	3611	3766	3916	4065	4210	4347	4480	4603	4603	4725
28	3166	3330	3496	3664	3830	3994	4158	4318	4474	4623	4768	4896	4896	5033
29	3344	3519	3695	3874	4051	4228	4405	4576	4744	4906	5060	5197	5197	5348
30	3524	3710	3898	4089	4278	4467	4657	4838	5018	5193	5354	5506	5506	5671
32	3894	4103	4314	4528	4748	4958	5171	5377	5583	5781	5969	6147	6147	
34	4274	4506	4743	4979	5225	5463	5700	5938	6165	6388	6603	6809	6809	
36	4665	4919	5181	5446	5712	5981	6245	6510	6767	7013	7253	7488	7488	
38	5065	5342	5628	5922	6213	6510	6802	7092	7378	7653	7919	8169	8169	
40	5471	5774	6085	6404	6726	7049	7369	7692	8001	8306	8602			
42	5883	6213	6551	6896	7247	7597	7949	8299	8637	8968	9293			
44	6300	6657	7024	7395	7774	8156	8533	8910	9282	9637	9992			
46	6724	7104	7499	7900	8306	8717	9126	9529	9929	10315	10695			
48	7148	7556	7976	8407	8842	9280	9720	10154						
50	7572	8009	8455	8914	9380	9846	10313	10779						
52	7995	8457	8933	9420	9915	10413	10907	11399						
54	8414	8905	9410	9923	10446	10972	11499	12016						
56	8827	9346	9878	10422	10972	11526	12080	12627						
58	9236	9778	10338	10909	11490	12070	12651	13226						
60	9632	10202	10786	11386	11992	12603	13208	13808						
62	10017	10612	11223	11847	12481	13118	13746							
64	10385	11006	11644	12294	12952	13613								
66	10740	11383	12044	12718	13401	14086								
68	11073	11739	12424	13121	13827	14535								
70	11388	12073	12779	13498	14224	14954								
72	11678	12384	13108	13847	14594	15341								
74	11943	12667	13409	14166	14931	15698								
76	12181	12920	13681	14454	15234	16015								
78	12392	13146	13920	14708	15502	16298								
80	12572	13338	14123	14925	15732									
82	12722	13498	14294	15104	15921									
84	12839	13623	14427	15246	16070									
86	12924	13714	14522	15346	16176									
88	12976	13768	14580	15408										
90	12993	13786	14596	15432										

TABLE VII.

MAXIMUM ORDINATE.

 $V = 800 \text{ m/s}$

ϕ deg.	Log C C	0.650 4.467	0.700 5.012	0.750 5.623	0.800 6.310	0.850 7.079	0.900 7.943	0.950 8.913	1.000 10.00	1.050 11.22	1.100 12.59	1.150 14.13	1.200 15.85	1.250 17.78
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	9.3	9.4	9.5	9.5	9.6	9.6	9.6	9.7	9.7	9.7	9.7	9.7	9.7	9.8
2	35.2	35.8	36.1	36.7	36.8	37.2	37.3	37.8	37.7	38.0	38.0	38.4	38.3	38.3
3	75.7	77.1	77.8	79.3	80.0	81.2	81.6	82.7	83.0	83.9	84.0	85.0	85.0	85.2
4	128.1	131.3	133.0	136.1	137.5	140.2	141.2	143.4	144.1	146.3	146.8	148.6	148.6	149.3
5	191.7	197.2	200.6	205.5	208.3	212.8	215.0	219.0	220.7	224.0	225.5	228.6	228.6	229.7
6	265.1	273.6	278.9	286.6	291.2	298.1	302.0	308.1	311.5	316.7	319.7	324.0	324.0	326.3
7	347.6	359.3	367.5	378.3	385.5	395.2	401.6	410.4	415.7	423.6	428.0	434.3	434.3	438.0
8	438.0	453.9	465.5	480.3	490.4	503.6	512.9	524.9	532.7	543.4	550.1	558.7	558.7	564.5
9	535.9	556.6	572.1	591.1	605.2	622.5	635.3	651.1	661.9	675.8	685.4	697.2	697.2	705.3
10	641	667	687	711	729	751	768	788	802	820	833	849	849	859
11	753	784	809	838	862	888	910	934	954	976	993	1011	1011	1027
12	871	907	939	974	1003	1034	1062	1090	1117	1142	1164	1186	1186	1207
13	994	1036	1075	1116	1152	1187	1223	1255	1289	1318	1347	1372	1372	1398
14	1123	1170	1218	1264	1308	1350	1393	1431	1471	1505	1541	1571	1571	1602
15	1257	1310	1367	1418	1472	1521	1571	1616	1662	1703	1744	1781	1781	1816
16	1396	1457	1521	1580	1641	1698	1756	1809	1862	1910	1957	2000	2000	2042
17	1540	1609	1681	1748	1819	1883	1948	2010	2069	2126	2180	2230	2230	2278
18	1688	1765	1847	1923	2003	2075	2148	2218	2286	2351	2412	2470	2470	2525
19	1841	1927	2017	2103	2191	2274	2355	2435	2511	2585	2654	2720	2720	2782
20	1998	2094	2191	2288	2384	2479	2569	2659	2744	2827	2905	2980	2980	3049
21	2159	2264	2369	2479	2584	2689	2790	2890	2985	3077	3165	3248	3248	3326
22	2323	2439	2554	2675	2790	2906	3018	3127	3233	3335	3432	3524	3524	3612
23	2490	2617	2745	2874	3001	3128	3251	3372	3488	3601	3706	3810	3810	3906
24	2662	2801	2941	3077	3217	3356	3491	3622	3750	3873	3988	4103	4103	4209
25	2838	2987	3139	3287	3439	3589	3735	3878	4018	4153	4280	4404	4404	4521
26	3017	3178	3341	3503	3666	3828	3985	4141	4294	4439	4581	4712	4712	4841
27	3200	3372	3546	3722	4898	4072	4242	4410	4575	4732	4887	5029	5029	5169
28	3386	3570	3755	3945	4134	4319	4505	4685	4862	5032	5198	5354	5354	5504
29	3575	3771	3968	4171	4372	4572	4771	4964	5155	5338	5516	5686	5686	5846
30	3767	3976	4186	4401	4616	4830	5042	5249	5455	5651	5841	6024	6024	
32	4161	4394	4632	4872	5116	5359	5599	5838	6067	6294	6510	6722	6722	
34	4567	4824	5090	5359	5632	5903	6172	6442	6702	6956	7201	7434	7434	
36	4982	5265	5559	5859	6162	6463	6764	7062	7355	7639	7913			
38	5405	5719	6039	6368	6701	7035	7370	7699	8022	8338	8642			
40	5837	6180	6529	6888	7251	7620	7987	8350	8702	9052	9393			
42	6276	6647	7028	7417	7812	8214	8614	9010	9395	9776	10155			
44	6722	7120	7534	7954	8384	8817	9250	9680	10100	10510	10916			
46	7172	7600	8043	8498	8960	9425	9892	10355	10812	11260	11690			
48	7624	8084	8557	9043	9539	10038	10537	11033						
50	8076	8567	9073	9590	10118	10653	11184	11714						
52	8527	9049	9587	10137	10697	11265	11830	12393						
54	8976	9527	10096	10681	11274	11874	12473	13068						
56	9419	10000	10601	11218	11845	12476	13108							
58	9853	10466	11098	11745	12404	13068	13732							
60	10277	10920	11583	12261	12950	13647								
62	10688	11360	12053	12762	13483	14208								
64	11086	11784	12505	13244	13994	14750								
66	11466	12191	12938	13704	14482	15265								
68	11825	12576	13349	14140	14945	15753								
70	12160	12935	13734	14550	15378									
72	12472	13269	14091	14930	15782									
74	12757	13574	14416	15277	16150									
76	13013	13848	14709	15590	16479									
78	13239	14091	14968	15864	16771									
80	13434	14299	15190	16100	17020									
82	13596	14472	15373	16294	17226									
84	13722	14608	15517	16446	17390									
86	13814	14705	15622	16556	17505									
88	13869	14763	15685	16625										
90	13889	14779	15708	16650										

TABLE VII.

 $V=840 \text{ m/s}$

MAXIMUM ORDINATE.

ϕ deg.	Log C C	0.650 4.467	0.700 5.012	0.750 5.623	0.800 6.310	0.850 7.079	0.900 7.943	0.950 8.913	1.000 10.00	1.050 11.22	1.100 12.59	1.150 14.13	1.200 15.85	1.250 17.78
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	10.3	10.3	10.4	10.4	10.4	10.4	10.5	10.5	10.6	10.6	10.6	10.6	10.6	10.7
2	38.8	39.2	39.6	40.1	40.4	40.7	41.0	41.2	41.4	41.7	41.9	42.1	42.2	42.2
3	82.6	84.0	85.3	86.4	87.4	88.4	89.1	90.7	91.4	92.0	92.6	93.2	93.8	93.8
4	139.8	142.6	145.4	148.1	150.6	152.9	154.9	156.8	158.5	160.0	161.2	162.2	162.2	163.0
5	208.1	214.3	218.0	223.7	227.0	232.0	234.7	239.2	241.4	245.4	247.0	249.6	249.6	250.9
6	287.1	296.4	302.9	311.4	317.0	324.7	329.4	336.7	340.4	346.3	349.4	354.6	354.6	357.2
7	375.8	388.9	398.4	410.8	418.8	430.0	437.5	447.4	453.7	462.4	467.6	475.3	475.3	478.9
8	472.7	490.4	503.7	520.2	532.4	547.5	558.0	571.6	580.6	592.9	600.4	610.8	610.8	617.3
9	578.1	601.1	618.2	639.7	656.0	675.6	689.7	707.9	720.8	737.1	747.7	761.4	761.4	770.9
10	690	718	742	768	790	815	833	856	873	894	908	926	926	939
11	809	844	873	906	933	962	988	1014	1038	1060	1082	1104	1104	1121
12	935	976	1012	1051	1085	1117	1152	1181	1213	1240	1269	1293	1293	1316
13	1067	1112	1158	1201	1244	1283	1325	1361	1400	1432	1466	1495	1495	1525
14	1205	1255	1310	1359	1412	1459	1508	1551	1598	1636	1676	1712	1712	1747
15	1348	1406	1469	1526	1588	1643	1700	1751	1803	1849	1897	1939	1939	1980
16	1495	1563	1634	1701	1770	1834	1899	1959	2021	2074	2128	2179	2179	2225
17	1649	1725	1806	1881	1960	2032	2106	2176	2243	2308	2368	2427	2427	2481
18	1806	1892	1982	2068	2155	2239	2320	2401	2477	2551	2620	2687	2687	2750
19	1967	2064	2162	2260	2357	2452	2543	2635	2722	2803	2882	2958	2958	3029
20	2133	2241	2349	2458	2565	2672	2774	2875	2972	3065	3155	3240	3240	3319
21	2303	2423	2542	2662	2780	2898	3013	3124	3232	3335	3436	3530	3530	3620
22	2478	2610	2736	2872	3001	3131	3258	3380	3500	3614	3725	3831	3831	3930
23	2657	2800	2939	3086	3228	3369	3508	3644	3775	3902	4024	4140	4140	
24	2840	2994	3148	3305	3460	3614	3766	3914	4059	4198	4332	4458	4458	
25	3027	3193	3360	3528	3697	3865	4030	4190	4350	4501	4646	4786	4786	
26	3218	3396	3575	3757	3940	4121	4301	4474	4647	4811	4970	5120	5120	
27	3412	3602	3795	3991	4187	4383	4577	4765	4952	5131	5303	5461	5461	
28	3609	3812	4019	4230	4440	4650	4858	5063	5264	5457	5641	5814	5814	
29	3809	4026	4247	4473	4698	4922	5145	5366	5579	5788	5985	6176	6176	
30	4013	4244	4480	4719	4960	5199	5438	5674	5902	6126	6335	6545	6545	
32	4432	4690	4956	5224	5497	5768	6037	6307	6570	6820				
34	4862	5146	5444	5746	6049	6357	6659	6960	7256	7541				
36	5302	5620	5945	6281	6620	6958	7300	7634	7962	8290				
38	5751	6102	6458	6827	7203	7576	7951	8324	8690	9065				
40	6210	6592	6984	7386	7795	8208	8619	9029						
42	6678	7090	7518	7956	8398	8851	9302	9747						
44	7153	7595	8059	8532	9012	9501	9992	10476						
46	7630	8109	8604	9114	9636	10161	10687							
48	8110	8625	9154	9701	10259	10823	11388							
50	8593	9140	9707	10291	10886	11487	12093							
52	9075	9655	10258	10879	11513	12151								
54	9553	10169	10806	11463	12135	12815								
56	10024	10676	11351	12043	12751	13468								
58	10488	11174	11883	12615	13358	14109								
60	10942	11660	12406	13170	13951	14738								
62	11384	12133	12910	13711	14527	15348								
64	11808	12590	13401	14233	15082									
66	12213	13026	13868	14734	15610									
68	12598	13440	14311	15206	16116									
70	12957	13828	14726	15651	16589									
72	13292	14185	15112	16060	17024									
74	13599	14516	15463	16436	17422									
76	13874	14812	15782	16776										
78	14118	15074	16062	17073										
80	14326	15298	16302	17329										
82	14498	15483	16500	17540										
84	14635	15629	16656	17707										
86	14733	15734	16769	17829										
88	14792	15797	16836											
90	14812	15821	16864											

MAXIMUM ORDINATE.

 $V = 880 \text{ m/s}$

ϕ deg.	Log C C	0.650 4.467	0.700 5.012	0.750 5.623	0.800 6.310	0.850 7.079	0.900 7.943	0.950 8.913	1.000 10.00	1.050 11.22	1.100 12.59	1.150 14.13	1.200 15.85	1.250 17.78
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	11.2	11.3	11.4	11.4	11.5	11.5	11.6	11.6	11.7	11.8	11.8	11.8	11.8	11.9
2	42.1	42.6	43.1	43.6	44.0	44.4	44.7	45.0	45.3	45.7	45.8	46.3	46.3	46.4
3	89.4	91.2	92.5	93.8	95.1	96.5	97.4	98.4	99.4	100.5	100.9	102.0	102.0	102.3
4	150.9	154.8	157.6	160.4	163.0	166.3	168.1	170.3	172.4	174.6	175.9	178.2	178.2	179.0
5	224.9	231.5	236.6	241.5	246.1	251.8	254.9	259.3	262.9	266.9	269.2	273.3	273.3	274.7
6	309.7	320.0	327.6	335.9	343.2	352.0	357.4	364.3	370.3	376.6	380.6	386.7	386.7	389.1
7	404.3	419.0	429.9	442.5	452.9	465.7	474.0	484.2	493.2	502.7	508.9	517.4	517.4	521.7
8	508.1	527.9	543.1	560.6	574.9	592.2	604.0	618.1	630.5	643.8	653.0	664.6	664.6	671.9
9	620.2	645.3	665.6	689.0	707.7	730.3	746.6	765.3	781.6	799.2	811.9	827.7	827.7	838.5
10	739	771	797	826	851	879	901	925	946	968	985	1006	1006	1021
11	867	906	937	974	1004	1039	1067	1097	1124	1151	1172	1198	1198	1218
12	1001	1047	1085	1128	1167	1208	1243	1280	1313	1346	1373	1404	1404	1430
13	1141	1196	1241	1292	1338	1386	1429	1474	1513	1553	1587	1624	1624	1656
14	1287	1350	1404	1462	1518	1573	1624	1678	1725	1771	1813	1856	1856	1895
15	1438	1511	1574	1640	1706	1768	1829	1891	1947	2000	2052	2101	2101	2147
16	1595	1678	1750	1825	1901	1971	2043	2114	2179	2241	2301	2358	2358	2412
17	1758	1850	1932	2017	2103	2183	2265	2346	2421	2491	2562	2627	2627	2690
18	1924	2028	2121	2215	2313	2402	2495	2587	2672	2752	2834	2909	2909	2980
19	2096	2211	2315	2420	2529	2629	2734	2837	2934	3023	3117	3202	3202	3283
20	2272	2400	2514	2631	2752	2863	2981	3096	3204	3304	3410	3506	3506	3597
21	2452	2592	2719	2848	2981	3104	3236	3362	3484	3594	3714	3820	3820	
22	2637	2790	2929	3071	3216	3353	3498	3638	3772	3895	4027	4145	4145	
23	2826	2992	3143	3299	3458	3608	3767	3921	4069	4204	4350			
24	3019	3199	3362	3533	3706	3871	4044	4211	4374	4523	4682			
25	3217	3410	3586	3772	3960	4140	4328	4510	4687	4850	5022			
26	3419	3625	3814	4016	4220	4415	4619	4815	5008	5185	5372			
27	3624	3844	4047	4265	4485	4697	4916	5128	5336	5529	5730			
28	3833	4068	4284	4518	4755	4984	5219	5448	5671	5881	6096			
29	4046	4294	4525	4777	5030	5277	5528	5774	6014	6242	6471			
30	4263	4525	4771	5040	5309	5576	5843	6107	6362	6610	6853			
32	4704	4994	5275	5582	5884	6188	6490	6787	7081	7364				
34	5158	5477	5795	6142	6477	6819	7161	7493	7827	8147				
36	5624	5973	6329	6714	7087	7468	7850	8221	8596	8951				
38	6102	6482	6876	7299	7714	8134	8556	8968	9382	9774				
40	6590	7002	7436	7897	8352	8814	9279	9731	10184					
42	7086	7532	8005	8504	9003	9506	10014	10507	11002					
44	7590	8072	8584	9121	9663	10208	10762							
46	8098	8617	9168	9746	10331	10920	11520							
48	8609	9165	9756	10377	11004	11636	12285							
50	9121	9715	10345	11009	11682	12356	13053							
52	9634	10268	10937	11644	12355	13073								
54	10143	10818	11526	12275	13026	13787								
56	10646	11362	12108	12899	13692	14498								
58	11141	11899	12681	13513	14350	15204								
60	11625	12424	13242	14114	14991									
62	12095	12934	13788	14700	15615									
64	12549	13424	14314	15263	16219									
66	12983	13891	14816	15802	16794									
68	13396	14334	15294	16313										
70	13782	14750	15743	16793										
72	14141	15136	16159	17238										
74	14470	15491	16539	17646										
76	14766	15812	16882	18014										
78	15026	16094	17184	18337										
80	15248	16336	17442	18610										
82	15433	16537	17657											
84	15580	16696	17828											
86	15685	16811	17950											
88	15748	16881												
90	15765	16904												

TABLE VII

 $V = 920 \text{ m/s}$

MAXIMUM ORDINATE

Log C ϕ deg.	0.650 C 4.467	0.700 5.012	0.750 5.623	0.800 6.310	0.850 7.079	0.900 7.943	0.950 8.913	1.000 10.00	1.050 11.22	1.100 12.59	1.150 14.13	1.200 15.85	1.250 17.78
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	12.1	12.3	12.4	12.5	12.5	12.6	12.7	12.8	12.8	12.8	12.8	12.8	12.9
2	45.5	46.2	46.7	47.3	47.8	48.3	48.7	49.2	49.4	49.7	49.9	50.2	50.4
3	96.4	98.8	99.9	102.1	103.0	104.9	105.7	107.4	107.5	109.3	109.6	111.1	111.5
4	162.3	166.9	169.7	174.0	176.2	180.2	181.9	185.4	186.9	189.9	191.0	193.6	194.4
5	241.3	249.0	254.2	261.3	265.7	272.3	275.6	281.6	284.7	290.0	292.2	296.8	298.7
6	331.9	343.8	351.7	362.7	370.0	380.1	386.1	394.9	399.9	408.5	412.4	419.6	423.0
7	432.8	449.4	461.2	477.0	487.9	502.0	511.6	523.9	532.4	543.7	550.8	560.8	566.6
8	543.4	565.3	582.0	602.9	618.3	637.3	651.1	668.5	680.1	694.9	706.1	719.5	727.8
9	663.2	690.8	713.1	739.5	760.5	785.0	803.8	826.6	843.2	863.5	877.9	895.0	907.8
10	790	824	853	886	913	943	969	998	1020	1045	1065	1088	1105
11	924	966	1002	1042	1077	1111	1147	1179	1210	1239	1267	1292	1318
12	1066	1113	1160	1204	1251	1290	1335	1373	1413	1448	1484	1512	1546
13	1215	1268	1325	1377	1432	1482	1535	1580	1629	1671	1714	1752	
14	1369	1430	1498	1559	1624	1683	1744	1799	1856	1906	1958	2004	
15	1529	1600	1678	1749	1826	1893	1964	2028	2093	2153	2214	2267	
16	1695	1777	1865	1947	2034	2111	2193	2267	2341	2412	2481	2545	
17	1867	1959	2057	2151	2246	2338	2430	2517	2599	2682	2759	2836	
18	2042	2148	2255	2362	2467	2573	2675	2776	2869	2964	3051	3138	
19	2222	2342	2460	2580	2697	2816	2930	3042	3152	3256	3356	3452	
20	2408	2540	2671	2804	2936	3067	3195	3319	3443	3558	3672	3779	
21	2599	2744	2889	3035	3180	3326	3467	3606	3741	3871	3998	4118	
22	2795	2953	3112	3271	3431	3592	3747	3901	4050	4195	4335	4468	
23	2996	3167	3340	3515	3690	3864	4035	4204	4368	4528	4682	4829	
24	3201	3387	3573	3764	3954	4144	4331	4515	4696	4870			
25	3409	3610	3812	4018	4225	4430	4634	4837	5032	5220			
26	3622	3838	4056	4278	4502	4724	4944	5167	5376	5580			
27	3839	4070	4304	4543	4784	5024	5262	5501	5728	5950			
28	4059	4306	4559	4812	5072	5331	5587	5839	6088	6330			
29	4284	4546	4817	5088	5366	5644	5918	6187	6455	6717			
30	4512	4791	5079	5370	5665	5962	6256	6544	6830	7111			
32	4981	5294	5616	5947	6280	6616	6951	7286					
34	5462	5810	6173	6540	6916	7291	7669	8053					
36	5954	6338	6743	7151	7568	7987	8407	8835					
38	6462	6882	7326	7778	8236	8702	9166	9631					
40	6978	7440	7920	8417	8921	9435	9944	10449					
42	7501	8007	8527	9067	9620	10183	10741	11288					
44	8032	8579	9148	9729	10329	10940	11549	12146					
46	8571	9158	9772	10401	11047	11706	12362	13020					
48	9115	9743	10400	11078	11773	12478							
50	9661	10331	11032	11755	12499	13254							
52	10203	10919	11665	12435	13227	14030							
54	10744	11503	12294	13114	13952	14803							
56	11281	12081	12918	13784	14673								
58	11810	12653	13535	14445									
60	12325	13212	14138	15094									
62	12826	13756	14723	15723									
64	13311	14281	15288	16332									
66	13776	14783	15832	16914									
68	14217	15259	16347	17467									
70	14630	15707	16828	17986									
72	15012	16122	17276	18467									
74	15364	16502	17687										
76	15681	16846	18058										
78	15962	17148	18384										
80	16201	17408	18663										
82	16399	17623	18893										
84	16556	17793	19076										
86	16668	17915	19210										
88	16735	17988											
90	16754	18016											