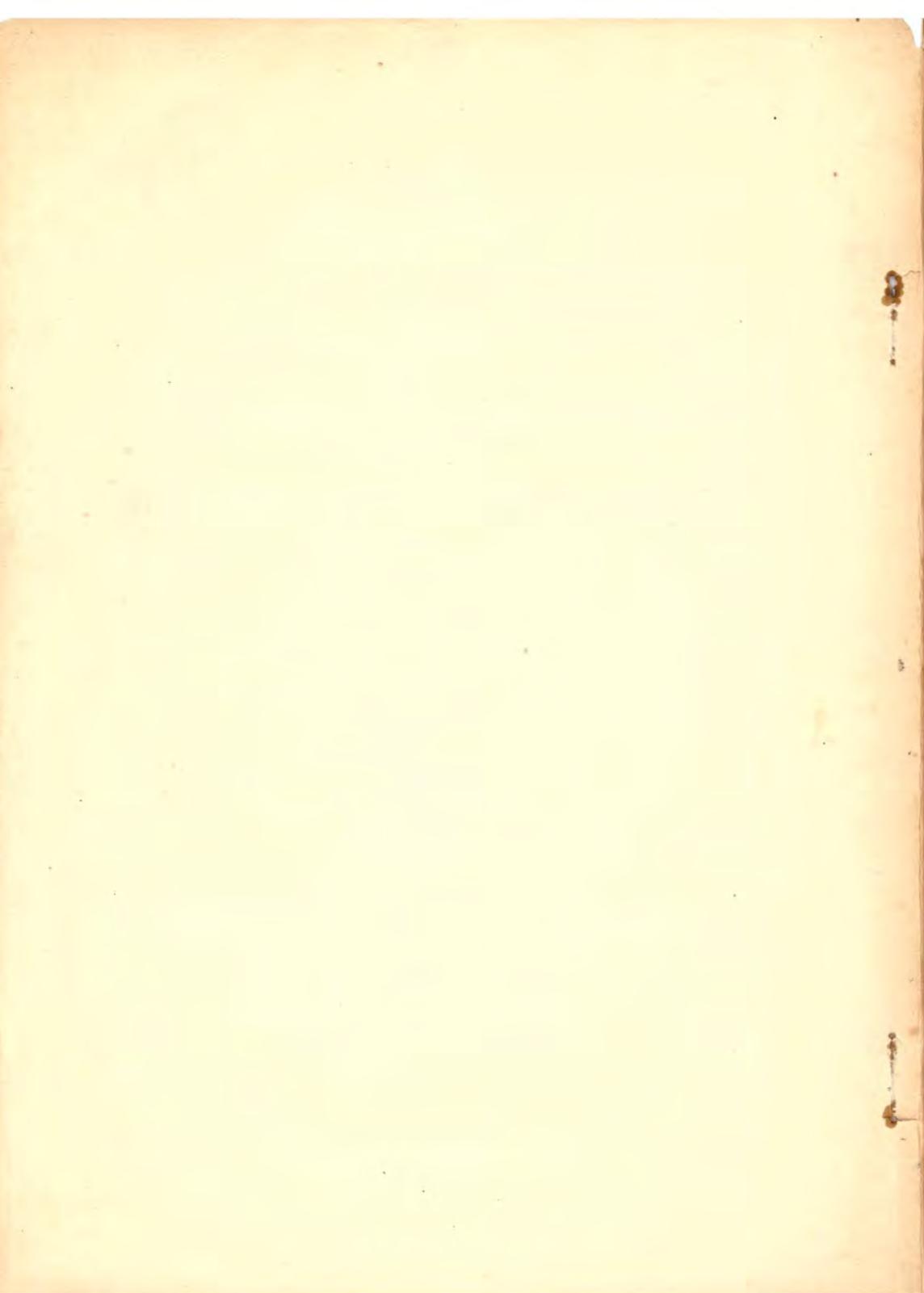CONFIDENTIAL

FIRING TABLES
FOR
12 INCH S. C. GUN, MODELS OF 1895 AND 1895 MI
MOUNTED ON
12 INCH BARBETTE CARRIAGE, MODEL OF 1917
FIRING
900 LB. A. P. SHELL
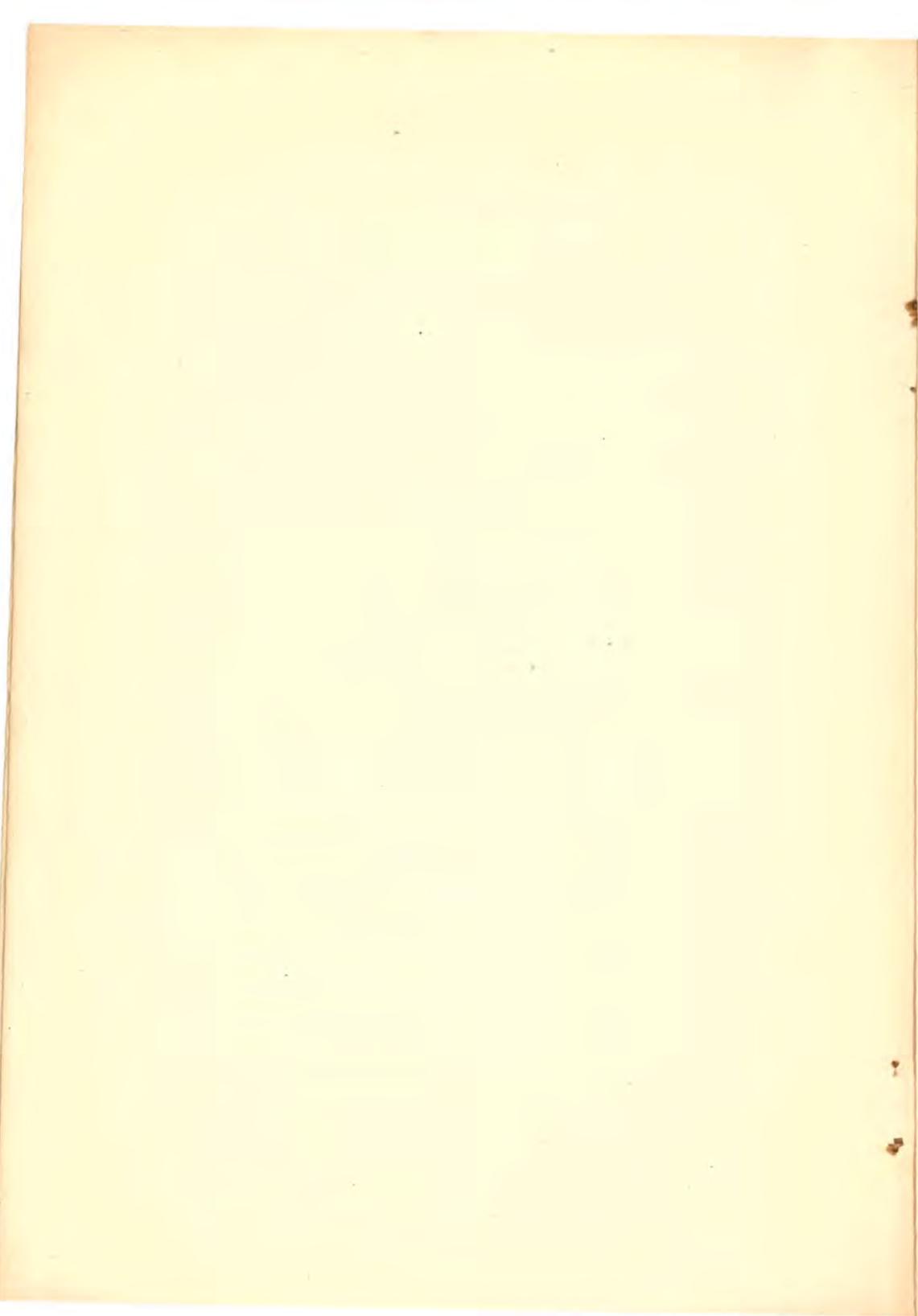
PREPARED BY THE
ORDNANCE DEPARTMENT, U. S. A.
AUGUST 1923

FIRING TABLES FOR 12-INCH S. C. GUN, MODEL OF 1895

FIRING 900 LB. A. P. SHELL

TABLE OF CONTENTS

FIRING TABLES FOR 12-INCH S. C. GUN, MODEL OF 1895

FIRING 900 LB. A. P. SHELL

GENERAL INFORMATION

These tables are based on firings conducted at the Aberdeen Proving Ground, Maryland, during December 1920, January, February, March and May 1921, under O. B. Program No. 4138.

12-INCH S. C. GUN, MODEL OF 1895

Diameter of the bore between lands	inches	12
Diameter of the bore between grooves	inches	12.12
Diameter of the bore between grooves for relined guns	inches	12.14
Total length of gun	inches	442.6
Length of rifled portion	inches	335.96
Travel of 900 lb. A. P. Shell	inches	344.42
Length of powder chamber	inches	73.63
Diameter of powder chamber	inches	14.2
Capacity of powder chamber	cubic inches	11728
Number of grooves		72
Number of grooves for relined guns		108
Character of rifling	increasing right hand twist	
Final twist of rifling	1 in 25 calibers	
Maximum pressure	lbs./sq. in	38000

12-INCH BARBETTE MOUNT, MODEL OF 1917

Total traverse	6400	mils =	360°
Minimum elevation	0	mils =	0°
Maximum elevation	622.2	mils =	35°
Traverse for one turn of traversing crank (quick motion)	44.75	mils =	2° 31.0'
Traverse for one turn of traversing handwheel (slow motion)	1.28	mils =	0° 04.3'
Change in elevation for one turn of elevating crank (quick motion)	28.14	mils =	1° 35.0'
Change in elevation for one turn of elevating handwheel (slow motion)	5.92	mils =	0° 20.0'

PROJECTILE

A. P. 900 lb. Shell

FUZES.

Base detonating Mark X.

NOTE: These tables may be used for the 1895 Models on other mounts, and for the 1888 Models mounted on 1901 Disappearing Carriage; provided suitable corrections are made for difference in jump.

EXPLANATION OF THE TABLES

This firing table has been divided into two parts. Part 1 comprises data applicable to any possible combination of projectile, fuze, and powder charge, and will serve equally well for all firing tables. It is printed on white paper. Part 2 gives data pertaining to a particular combination of projectile, fuze and powder charge. It is readily distinguished from Part 1 by a difference in the color of the paper upon which it is printed.

II

12-INCH S. C. GUN

Throughout the tables, certain conditions are assumed as standard. Mention may be made of the following:

Wind, none
Muzzle velocity, as listed in table.
Air density at battery, (59° F., and 29.53 in. of mercury) 525.9 grains per cubic foot.
Temperature of air at battery (for elasticity effect) 59° F.
Temperature of powder 70° F.
Weight of projectile, as listed in table.

In addition to the standard air conditions at the battery, a standard atmospheric structure aloft has been assumed. The observed ranges, obtained from test firings, upon which these tables are based, were corrected on the basis of a comparison of observed muzzle velocity, weight of projectile, air conditions at all altitudes with the assumed standards and for rotation of the earth.

In connection with Part 1, it is to be noted that the azimuth of a wind is indicated by reference to the direction _from_ which it blows. Since the meteorological message gives the azimuth of the wind as measured clockwise from the true north, it is necessary to find the equivalent tabular direction before proceeding with the use of the wind component chart. This tabular azimuth or chart direction of the wind is therefore measured in mils (6400 to the circle) clockwise from the plane of fire, that is, from the direction toward which the gun is fired. The choice of signs for cross wind effects accords with the deflection graduations upon the standard panoramic sight. For example, a wind from the left, when the target is viewed from the position of the gun, will carry the projectile to the right. To correct for this, it is necessary to traverse the gun to the left, and this corresponds to an increased deflection setting on the sight. The effect of such a wind, being opposite in sign to the correction, is thus seen to be negative.

Although the maximum wind speed noted on this chart is only ten miles per hour, it is not to be understood that this figure is in any way intended as a restricting limit on the use of the data of the chart itself. Thus to obtain the components of a 12 mi/h wind the components of a 10 mi/h wind can be added to the corresponding components of a 2 mi/h wind.

The other tables formulae and charts of Part 1 require no individual discussion. The principal use of the information contained in Part 1 is in the conversion of the data of the meteorological message into a form that is directly applicable to a particular battery.

Table A of Part 2 give the range elevation relation, maximum ordinate ballistic coefficient, and the characteristics of the trajectory at the point of fall or at the point of burst. The range listed in column (1) and throughout the table are "curved" ranges; that is, they are regarded as measured along the surface of the sphere concentric with the earth and passing through the gun. Such measurements are understood to be made from the gun to the points where the trajectories pierce this spherical surface; or in case of the correction tables for the height of target, to points on this surface directly above or below the target. These points are all at

12-INCH S. C. GUN

the same height above sea level as the gun, and hence may be called "level points". It should be emphasized that no correction for curvature of the earth should be applied to these ranges. Whenever the level points concerned are at the target or directly above or below it, it is evident that these ranges are equal to the geographical distance from muzzle to target such as would be read from an accurate map, and they will later be referred to as "map ranges". Such ranges are sensibly equal to the rectilinear distances between gun and level point, though the straight line joining these points would not be exactly horizontal at the gun. In connection with range settings in general, and with especial reference to cases where gun and target are at different levels, the term "range" is sometimes used less exactly to refer to distances from gun to level points not related to the target.

The tabular elevations given in columns (2) and (3) are strictly exact only when the gun and target are at the same level. In this case the elevation coincides with the quadrant elevation. For other cases see tables B and C. The word "change" in the headings (4) and (5) (6) and (7) is employed because in each of these columns there are tabulated mean values to be used for decreases as well as increases. In case of ballistic air temperature other than 59° F. table H, is to be used. The deflection due to drift columns (13) and (14) of Table A includes the effect of lateral jump. In the case of gun designed with trunnion axis not level with respect to the carriage the effect on deflection of this "permanent cant" is included in the tabular drift. Thus, with no cross wind, and in the absence of accidental disturbance, these columns give the total deviation of the projectile from the plane of fire, (the vertical plane containing the axis of the piece when laid for firing). The signs used are in accord with the deflection graduations upon the standard panoramic sight. The negative sign indicates that the projectile is carried to the right and the positive sign indicates that this combination of the effects of drift and lateral jump has resulted in a deviation of the projectile to the left of the plane of fire.

It is to be noted that in this case and throughout the tabulation of differential variations, the signs given are those of the effects and not of the correction. For example the effect is given as positive if the trajectory is so altered that the projectile is caused to fall beyond its normal objective point. The fork tabulated in column (16) may be defined as the change in elevation necessary to produce a change in range equivalent to 4 times the Proving Ground probable error in range. The latter is tabulated in column (17).

The characteristics of the trajectory at the point of fall is given in columns (9), (10), (11) and (12). The ballistic coefficient column (15) is the so-called "normal" of "short arc" C. Its value is such that when it is used with muzzle velocity and angle of departure for the computation of the trajectory by the method of numerical integration, the resulting range will be that tabulated.

The effect of the earth's rotation on range and deflection is a function of the latitude of the gun and of the azimuth of the plane of fire. It cannot, therefore, be incorporated in the elevation and drift columns. This effect becomes quite appreciable in the case of long range guns. The effect of Rotation of the Earth on Range is given in Table E,

12-INCH S. C. GUN

and the effect on deflection is given in Table K. It is to be noted that the azimuth is measured from the true North.

Tables B and C are for use when the target is below or above the level of the gun. For example, in the table for target below gun, (Table B), for any given map range and height of target, the quantity appearing as the "range effect" is the distance by which the map range for the given target exceeds the "range to level point", when the latter range is determined for that standard trajectory whose continuation passes through the target. These "effects", then, are given positive signs so that the correction may be made by subtracting them from map range. The resulting corrected range is that range whose corresponding angle of elevation (as listed in the table) is to be used as the elevation required to strike the target, (provided we assume for the moment that there are no other variations from standard).

Table D to J inclusive give the various differential effects, thus Table F gives the range effects corresponding to increase or decrease in muzzle velocity 10, 20, 30, 40, 50, 60, 70, 80, 90 up to 150 feet per second.

Table K gives the deflection effects in mils due to Rotation of the Earth for varying latitudes and azimuths.

Although cant of the carriage axle, by changing the angle of departure, has some effect upon the range, that effect is here disregarded; for, at low elevations, a fairly large cant will produce only a very small change, in the angle of departure, and at high elevations, where a large cant will produce a somewhat larger change in angle of departure than at low elevations it requires a quite large change in departure to produce a small change in range.

Among the symbols and abbreviations used are the following:

ω (read: "omega"), meaning the quadrant angle of fall for gun and target at the same level.

P. E. the probable error.

in. inches.

ft. feet.

y. or yds. yards.

f/s feet per second.

F. Fahrenheit.

m.d.p. meteorological datum plane.

% percent.

$\mathcal{A}$ mils.

M. V. muzzle velocity

$V - V_o$ velocity adjustment.

12-INCH S. C. GR.

(a) <u>Position Corrections</u> are determinable as soon as relative location of gun and target is known. For land firing, their geographical location would determine both the map range and the difference in altitude; for seacoast batteries, the height of the tide may also be required. Position corrections consist of those for difference in altitude of gun and target. Corrections for Rotation of the Earth may be regarded as Position Corrections. The drift may be regarded as necessitating a position correction in deflection, the cant effect due to the carriage not being level also necessitates a position correction in deflection since it is determinable from a knowledge of the map range. Tables B and C giving "position effects", may be entered with "Map Range" as one argument and "Height of Target" as the other argument. The position effect must be algebraically subtracted from the map range to determine the geographical distance to the level point on that trajectory, or its continuation, which, under standard conditions, passes through the target.

(b) <u>Materiel Corrections</u> are determinable, for a given range, when the weight and the markings of the projectile and the relatively permanent characteristics of the particular piece and powder lot are known. These corrections consist of those for (1) variation from normal in weight of projectile, (2) estimated change in muzzle velocity, $(V - V_0)$, due to the conditions of the piece or of the powder when the powder is at standard powder temperature (70° F.). The correction on account of variation in weight of projectile is usually obtained from Table D, Part 2, for any given marking. The estimated change in muzzle velocity is called the velocity adjustment, $V - V_0$, and is made by reference to the record of performance of the particular piece and powder lot, or other empirical methods. Usually the results of observation of previous firings are available. The necessary correction is then found by the use of the effects tabulated in Part 2, Table F.

(c) <u>Weather Corrections</u> are determinable only upon receipt of the regular meteorological message or other reports of observation made at or near the time of firing. These corrections consist of those for (1), air density, (2) air temperature (elasticity effect), (3) range wind, (4) variation of the powder temperature from standard. The deflection effect of the cross wind may be regarded as leading to weather corrections. The air density, air temperature, range wind, and cross wind to be used in any case are, respectively, the ballistic density, temperature at the battery, ballistic range wind, and ballistic cross wind; all as given in or obtained from the meteorological message. In the absence of such information it will ordinarily be necessary to utilize such observation of air conditions as can be made at the battery. The maximum ordinate corresponding to the map range for use with the Meteorological Message is found in Part 2, Table A, column (8).

The ballistic wind, given in speed and direction, is resolved into components along and across the line of fire by means of the chart of Part 1A. The range component is the ballistic range wind to be used with Part 2, Table I. The cross component is the ballistic cross wind, and the resulting deflection effects are found by reference to Part 2, Table J. The effect of the variation of the powder temperature from the standard powder temperature is found as the effect of an equivalent change in muzzle velocity. This muzzle velocity change may be read from Part 1, I.

12-INCH S. C. GUN

message, making use of the exact maximum ordinate.

The above mentioned is a special case of the general method dealing with the Meteorological data for battery and m.d.p. at any levels. The meteorological message is designed primarily for batteries in or near the m.d.p. When serious differences in level occur, the data of the meteorological message must be corrected to the level of the battery. Maximum Ordinates will be measured from the battery level, for all purposes. Such corrections as are made, utilize that 7 digit group of the message which corresponds to the maximum ordinate so defined. The wind at a given altitude above the battery is assumed to be idential with that at an equal altitude above the m.d.p., but the temperature and ballistic density need separate consideration. The temperature at the battery is obtained either by direct observation or by correcting to the level of the battery the temperature given in the first group of the meteorological message. This correction is made by means of the Thermometric Formula, Part 1B.

The ballistic density depends upon the maximum ordinate considered. Anyone of the 7 figure groups of the message gives the ballistic density for a certain maximum ordinate measured from the m.d.p. This density when corrected by means of the Density Formula, Part 1B, becomes the ballistic density for that maximum ordinate measured from the battery.

USE OF THE TABLES.

For convenience in reference, the differential variations and the corresponding corrections will be considered in three groups. The designation of the groups of corrections, in the order in which they will be treated, are:

        (a) Position corrections,
        (b) Materiel corrections, and
        (c) Weather corrections.

This grouping corresponds in a general way to the order in which the data for the corrections are obtained. When the corrections refer to changes in deflection or in height of burst, they are so indicated. Otherwise they refer to changes in range. When all the variations from standard are numerically small, and hence comparable in magnitude, it is known that a slight increase in formal accuracy is secured by making these corrections successively; that is, by correcting the map range to account for the first variation considered, and using the resulting first corrected range as a basis for determining the magnitude of the second variations, and so forth. In most cases which will occur in practice, this increase in formal accuracy is meaningless, since the data themselves are seldom known with sufficient refinement to warrant the slight apparent gain in accuracy. Consequently, for general use with this table, all corrections may be calculated on the basis of the same fundamental quantity, namely, the map range. At the same time should it prove more convenient, there is no objection to imposing the corrections successively, except where someone of the corrections is much larger than the others. The only case which occurs frequently enough to warrant particular consideration is that of a large correction due to height of target. For this situation it has been verified that greater accuracy is secured by imposing simultaneously the velocity and height of site corrections than by imposing these corrections successively in either order.

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(a) Position Corrections for Range

Entering Table B, for target below gun, we find corresponding to a map range of 16050 yards and a height of target of -432 ft. a range effect of   +501 yds.

Entering Table E, for effects on range due to rotation of the earth, we find, corresponding to a latitude of 42° and an azimuth of 24.° 6, a range effect of   +31 yds.

(b) Materiel Corrections for Range

Entering Table D, we find the effect on range for 1.1% decrease in weight of the projectile to be   +18 yds.

In a similar manner, from Table F_b, we find the effect on range for an estimated decrease of 18 f/s in Muzzle Velocity to be   -195 yds.

(c) Weather Corrections for Range

The actual or estimated temperature of the powder at the time of firing being 62° F., instead of the standard temperature for powder of 70° F., a correction must be introduced. The effect on muzzle velocity is obtained from Part 1, I and is -16 f/s. The effect on range thus occasioned is found in the same manner as above from Table F_b to be   -173 yds.

To obtain the effects of the remaining variations, the meteorological message must be deciphered and such information as is applicable to the particular trajectory considered must be utilized.

From column (8) of Table A, the maximum ordinate is found to be about 2940 ft., so that in addition to the introductory inform-ation obtained in the meteorological message only that group of the message numbered 3 and which gives data for a maximum ordinate of 3000 ft. will be used.

From the Meteorological Message the following information is obtained.

Altitude of the m.d.p. above mean sea level	100 ft.
Temperature at the m.d.p.	62° F.
Azimuth of the ballistic wind (for group "3")	5900 mils
Velocity of the ballistic wind (for group "3")	11 mi/h
Ballistic density (for group "3")	95%

To obtain the components of the ballistic wind, it is necessary to secure from the recorded azimuths of target and ballistic wind, the chart direction of the wind for which the line of fire is the reference direction. Subtracting 437 mils from 5900 mils, we have for the chart direction from which the wind is blowing 5463 mils.

Using the wind component chart, Part 1A with 11 mi/h as the wind velocity we have corresponding to 5463 mils a range component,

12-INCH S. C. GUN

The algebraic sum of all of the range effects hitherto mentioned, namely, of those due to position variations, materiel variations, weather variations, are added together algebraically and this algebraic sum subtracted from the map range. This amounts to changing the signs of the effects, thus converting them into the corrections desired, and then adding the corrections to the map range. When these calculations are made previous to a series of firings, the result is known as the <u>initial range</u>. being the range at which firing is begun. With it, entry is made in Part 2, Table A, and the corresponding angle of elevation is read from either columns (2) or (3). The deflection effects, when added algebraically give the total deflection effect, and a change of sign gives the deflection corrections to be used with the panoramic sight.

When observation of fire are possible, the center of impact for succeeding rounds is adjusted to the center of target on the basis of rounds already observed, and the range corresponding to the resultant setting is called the adjusted range. The difference between the adjusted range and the <u>initial range</u> as defined above is assumed to be due to a variation which necessitates a correction to be applied upon $V - V_0$. The value of $V - V_0$ thus continually revised, is called the <u>velocity adjustment</u> and requires reference to Part 2, Table F. It is used in the next firing or in firing at a different range, and is then considered as a materiel correction.

The following example illustrates the use of the tables:

Given: 12" Gun, Model 1895, Tabular Muzzle Velocity = 2325 f/s.
        900 lb. A. P. Projectile (Shell)

Data as to Position:

        Altitude of battery = 450 ft. above sea level.
        Map range to target = 16050 yards
        Height of target = -432 ft. (432 ft. below gun)
        Azimuth of target (measured clockwise from the North) = 437 mils (24.6°)
        Latitude of the gun = 42° North

Data as to Materiel:

        Weight of Projectile = 890 lb. (1.1% below normal)
        Preliminary Velocity Adjustment $(V - V_0)$ = -18 f/s (18 f/s below
            tabular velocity)

Weather Data:

        Temperature of Powder = 62° F.
        Meteorological Message: MSL MSL 30162 0620799 1620898
            2600997 3591195 4600992

<u>Required</u>: Quadrant Elevation and Deflection Setting.

<u>Solution</u>: The tables Parts 1 and 2 are used throughout.

12-INCH S. C. GUN

(a) Position Corrections for Range

Entering Table B, for target below gun, we find corresponding to a map range of 16050 yards and a height of target of -432 ft. a range effect of   +501 yds.

Entering Table E, for effects on range due to rotation of the earth, we find, corresponding to a latitude of 42° and an azimuth of 24.° 6, a range effect of   +31 yds.

(b) Materiel Corrections for Range

Entering Table D, we find the effect on range for 1.1% decrease in weight of the projectile to be   +18 yds.

In a similar manner, from Table F_b, we find the effect on range for an estimated decrease of 18 f/s in Muzzle Velocity to be -195 yds.

(c) Weather Corrections for Range

The actual or estimated temperature of the powder at the time of firing being 62° F., instead of the standard temperature for powder of 70° F., a correction must be introduced. The effect on muzzle velocity is obtained from Part 1, I and is -16 f/s. The effect on range thus occasioned is found in the same manner as above from Table F_b to be   -173 yds.

To obtain the effects of the remaining variations, the meteorological message must be deciphered and such information as is applicable to the particular trajectory considered must be utilized.

From column (8) of Table A, the maximum ordinate is found to be about 2940 ft., so that in addition to the introductory information obtained in the meteorological message only that group of the message numbered 3 and which gives data for a maximum ordinate of 3000 ft. will be used.

From the Meteorological Message the following information is obtained.

Altitude of the m.d.p. above mean sea level	100 ft.
Temperature at the m.d.p.	62° F.
Azimuth of the ballistic wind (for group "3")	5900 mils
Velocity of the ballistic wind (for group "3")	11 mi/h
Ballistic density (for group "3")	95%

To obtain the components of the ballistic wind, it is necessary to secure from the recorded azimuths of target and ballistic wind, the chart direction of the wind for which the line of fire is the reference direction. Subtracting 437 mils from 5900 mils, we have for the chart direction from which the wind is blowing 5463 mils.

Using the wind component chart, Part 1A with 11 mi/h as the wind velocity we have corresponding to 5463 mils a range component,

12-INCH S. C. GUN

W_x, of   -6.6 mi/h
and a cross component, W_y, of   -8.8 mi/h

The components of 1 mi/h is added to the corresponding components of 10 mi/h to obtain the components of 11 mi/h

Entering Table I, we find the effect on range for a -6.6 mi/h range wind (the negative sign here indicates a head wind)   -28 yds.

The temperature at the m.d.p. given in the Meteorological Message cannot be used directly since the battery is not situated in the m.d.p., but is seen to be above the m.d.p.   350 ft.

Using the Thermometric Formula, Part 1B, the decrease in temperature for this height is 1° F. so that the temperature for the battery is 61° F.

Entering Table H, we find the temperature (elasticity) effect on range for a temperature of 61° F (or 2° Fahrenheit above the normal temperature of 59° F.) to be   -4 yds.

The ballistic density given in the Meteorological Message for this trajectory cannot be used directly since the battery is 350 ft. above the m.d.p.

Using the density formula, Part 1B, the decrease in density for this height is 1% so that the ballistic density for the battery is   94%

Entering Table Ga, we find the effect on range for the ballistic air density of 94% (or 6% below normal) to be   +263 yds.

The total range effect is now obtained by adding the separate range effects algebraically. It has the value of +501+31+18-195-173-28-4+263 =   +413 yds.

The total range correction is obtained by merely changing the sign of the total range effect. It is   -413 yds.

The corrected range, found by adding algebraically the total correction to the map range (or what is the same thing, subtracting algebraically the total effect) is 16050 yds - 413 yds., i. e.   15637 yds.

The elevation corresponding to the corrected range of 15613 yds., is found in either columns 2 or 3 of Table A. It is   205.0 mils

The deflection effects are found in a similar manner.

The deflection effect due to a -8.8 mi/h cross wind (from left to right) is found from Table J to be   -1.6 mils

The drift is found from columns (13) or (14) to be   -6 mils

12-INCH S. C. GUN

     The deflection effect due to rotation of the earth for a
latitude of 42° North and an azimuth of 24°.6 is found from Table K
to be   -1.1 mils

     The total deflection <u>effect</u> is obtained by adding algebraic-
ally the separate deflection effects. It has the value of
-1.6 - 6 - 1.1 =   -9 mils

     The total deflection <u>correction</u> is obtained by merely
changing the sign of the total deflection effect. It is   +9 mils

     The deflection set off at the gun will be + 9 mils
(9 mils to the left) when the target is used as aiming point.
For any other aiming point 9 mils must be added to the deflection
of the target. To obtain the azimuth setting it must be recalled
that deflections and azimuths are measured in opposite senses.
The correction of +9 mils in deflection is the same as a correc-
tion of -9 mils in azimuth. The azimuth setting then is 437 mils
-9 mils =   428 mils
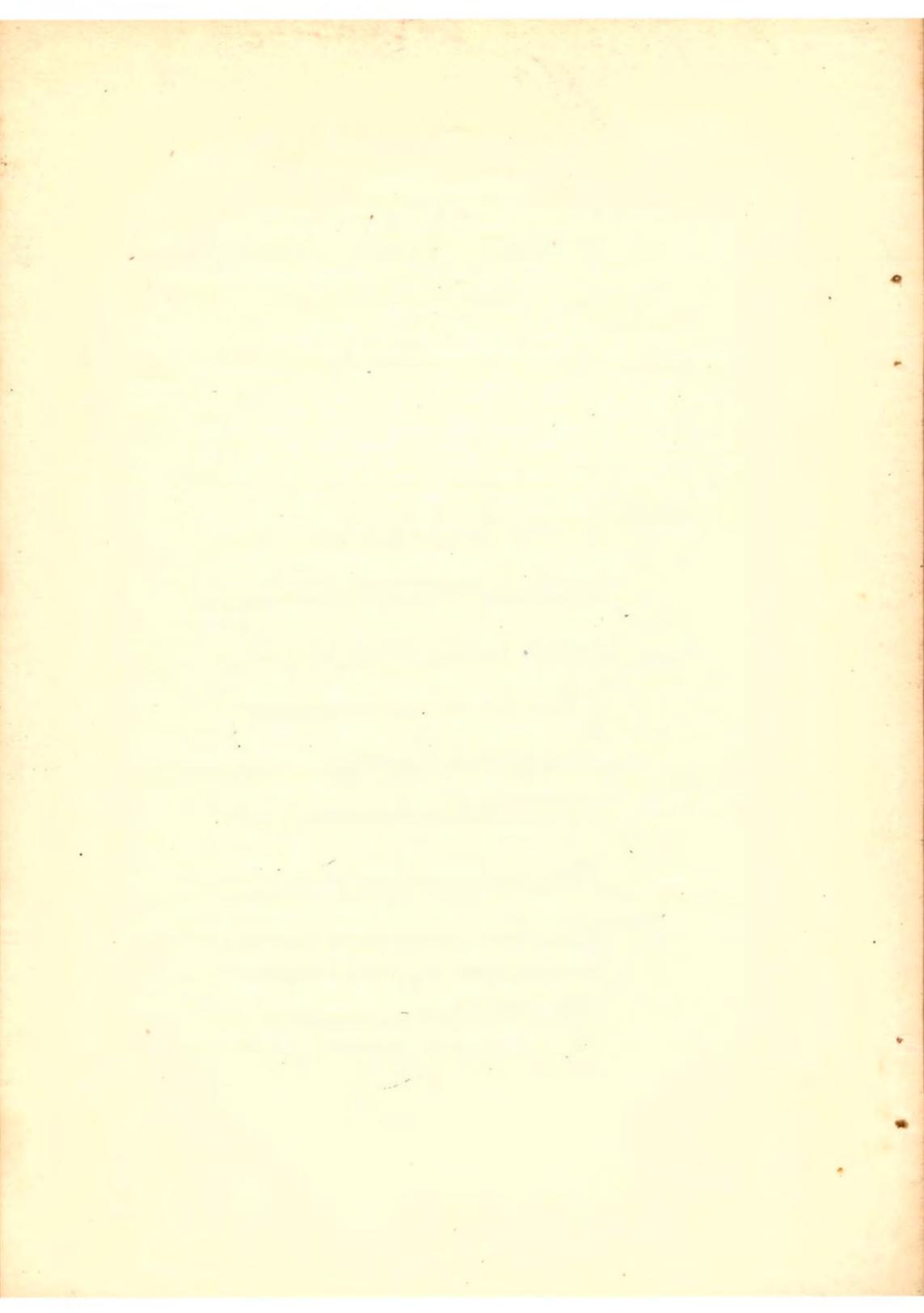
PART 1

12-INCH S. C. GUN

MODELS OF 1895 AND 1895 MI

FIRING

900 LB. A. P. SHELL

PART IA WIND COMPONENT CHART

WIND DIMINISHES THE
RANGE AND CARRIES
THE PROJECTILE
TO THE RIGHT

LINE OF FIRE

6200
6000
5800
5600
5400
5200
5000

CROSS WIND (W_y) 4800 -9 -8 -7 -6 -5 -4 -3 -2

4600

4400

4200

4000

3800

3600

3400

3200

RANGE WIND (W_x)
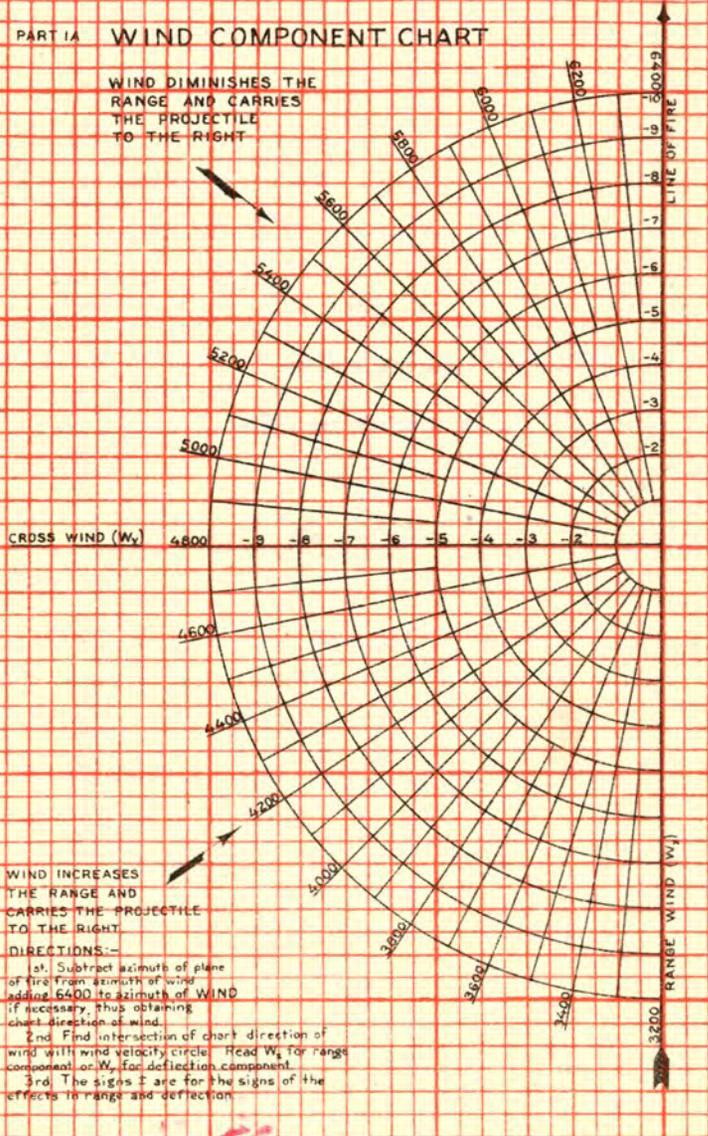
WIND INCREASES
THE RANGE AND
CARRIES THE PROJECTILE
TO THE RIGHT

DIRECTIONS:—

1st. Subtract azimuth of plane
of fire from azimuth of wind
adding 6400 to azimuth of WIND
if necessary, thus obtaining
chart direction of wind.

2nd. Find intersection of chart direction of
wind with wind velocity circle. Read W_x for range
component or W_y for deflection component.

3rd. The signs ± are for the signs of the
effects in range and deflection.

WIND COMPONENT CHART PART IA
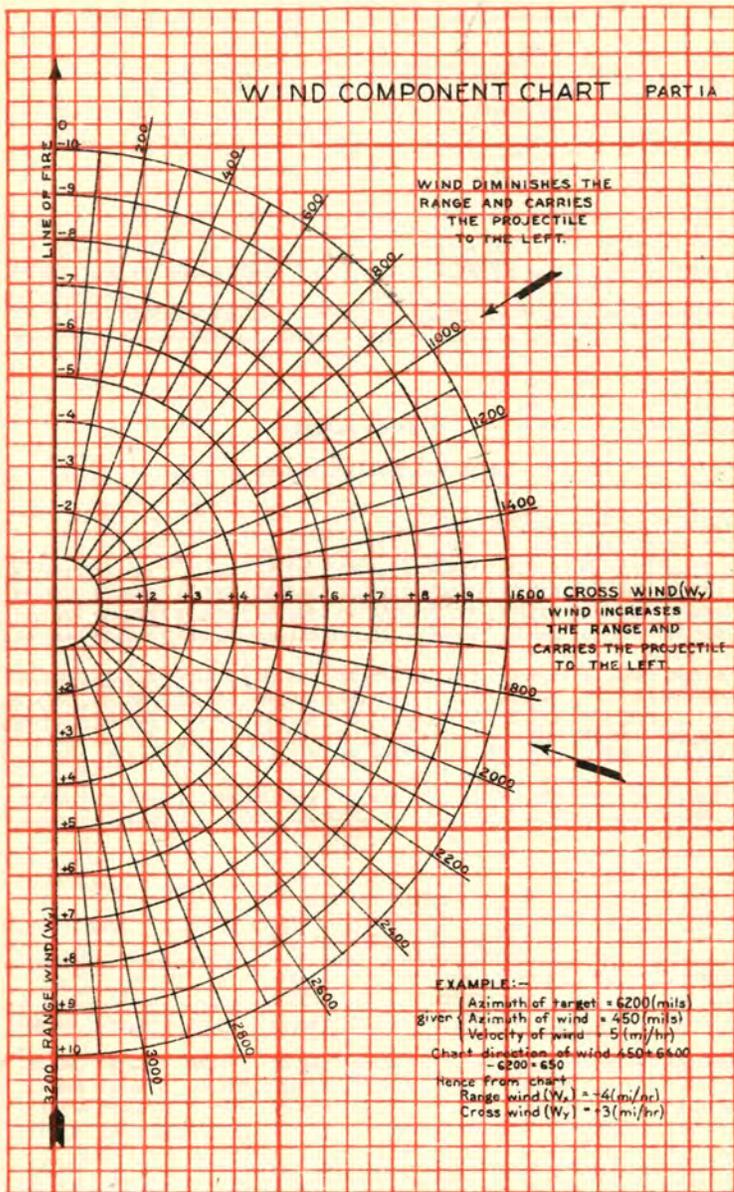
PART IB.

THERMOMETRIC FORMULA

$\frac{1}{5}$°F. = DECREASE IN TEMPERATURE FOR 100 FT. INCREASE IN ALTITUDE

$\frac{1}{5}$°F. = INCREASE IN TEMPERATURE FOR 100 FT. DECREASE IN ALTITUDE

DENSITY FORMULA

0.3% = DECREASE IN AIR DENSITY FOR 100 FT. INCREASE IN ALTITUDE

0.3% = INCREASE IN AIR DENSITY FOR 100 FT DECREASE IN ALTITUDE

PART IC.

YARDS TO METERS

1 yd = 0.91440183 meters

YARDS	0	10	20	30	40	50	60	70	80	90
0	00	9.14	18.29	27.43	36.58	45.72	54.86	64.01	73.15	82.30
100	91.44	100.58	109.73	118.87	128.02	137.16	146.30	155.45	164.59	173.74
200	182.88	192.02	201.17	210.31	219.46	228.60	237.74	246.89	256.03	265.18
300	274.32	283.46	292.61	301.75	310.90	320.04	329.18	338.33	347.47	356.62
400	365.76	374.90	384.05	393.19	402.34	411.48	420.62	439.77	438.81	448.06
500	457.20	466.34	475.49	484.63	493.78	502.92	512.07	521.21	530.35	539.50
600	548.64	557.79	566.93	576.07	585.22	594.36	603.51	612.65	621.79	630.94
700	640.08	649.23	658.37	667.51	676.66	685.80	694.95	704.09	713.23	722.38
800	731.52	740.67	749.81	758.95	768.10	777.24	786.39	795.53	804.67	813.82
900	822.96	832.11	841.25	850.39	859.54	868.68	877.83	886.97	896.11	905.26
1000	914.40	923.55	932.69	941.83	950.98	960.12	969.27	978.41	987.55	996.70

PART ID.

METERS TO YARDS

1 meter = 1.0936111 yds.

METERS	0	10	20	30	40	50	60	70	80	90
0	0	10.94	21.87	32.81	43.74	54.68	65.62	76.55	87.49	98.42
100	109.36	120.30	131.23	142.17	153.11	164.04	174.98	185.91	196.85	207.79
200	218.72	229.66	240.59	251.53	262.47	273.40	284.34	295.27	306.21	317.15
300	328.08	339.02	349.96	360.89	371.83	382.76	393.70	404.64	415.57	426.51
400	437.44	448.38	459.32	470.25	481.19	492.12	503.06	514.00	524.93	535.87
500	546.81	557.74	568.68	579.61	590.55	601.49	612.42	623.36	634.29	645.23
600	656.18	667.10	678.04	688.97	699.91	710.85	721.78	732.72	743.66	754.59
700	765.53	776.46	787.40	798.34	809.27	820.21	831.14	842.08	853.02	863.95
800	874.89	885.82	896.76	907.70	918.63	929.57	940.51	951.44	962.38	973.31
900	984.25	995.19	1006.12	1017.06	1027.99	1038.93	1049.87	1060.80	1071.74	1082.67
1000	1093.61	1104.55	1115.48	1126.42	1137.36	1148.29	1159.23	1170.16	1181.10	1192.04

PART 1E

Angular Conversion Table - Degrees to mils

Degrees	0	1	2	3	4	5	6	7	8	9
00	0	18	36	53	71	89	107	124	142	160
10	178	196	213	231	249	267	284	302	320	338
20	356	373	391	409	427	444	462	480	498	516
30	533	551	569	587	604	622	640	658	676	693
40	711	729	747	764	782	800	818	836	853	871
50	889	907	924	942	960	978	996	1013	1031	1049
60	1067	1084	1102	1120	1138	1156	1173	1191	1209	1227
70	1244	1262	1280	1298	1316	1333	1351	1369	1387	1404
80	1422	1440	1458	1476	1493	1511	1529	1547	1564	1582
90	1600	(Conversion Factor, 1^0 = 17.77778 mils)								

PART 1F

Natural Trigonometric Functions

Mils	N.Sin.	N.Cos.	N.Tan.	N.Cot.	Mils	N.Sin.	N.Cos.	N.Tan.	N.Cot.
0	0.0000	1.0000	0.0000	----	800	0.7071	0.7071	1.000	1.0000
50	.0491	.9988	.0491	20.355	850	.7410	.6716	1.103	.9063
100	.0980	.9952	.0985	10.153	900	.7730	.6344	1.219	.8207
150	.1467	.9892	.1483	6.741	950	.8032	.5957	1.348	.7416
200	.1951	.9808	.1989	5.027	1000	.8315	.5556	1.497	.6682
250	.2430	.9700	.2505	3.992	1050	.8577	.5141	1.668	.5994
300	.2903	.9569	.3033	3.297	1100	.8819	.4714	1.871	.5345
350	.3369	.9415	.3578	2.795	1150	.9040	.4276	2.114	.4730
400	.3827	.9239	.4142	2.414	1200	.9239	.3827	2.414	.4142
450	.4276	.9040	.4730	2.114	1250	.9415	.3369	2.795	.3578
500	.4714	.8819	.5345	1.871	1300	.9569	.2903	3.297	.3033
550	.5141	.8577	.5994	1.668	1350	.9700	.2430	3.992	.2505
600	.5556	.8315	.6682	1.497	1400	.9808	.1951	5.027	.1989
650	.5957	.8032	.7416	1.348	1450	.9892	.1467	6.741	.1483
700	.6344	.7730	.8207	1.219	1500	.9952	.0980	10.153	.0985
750	.6716	.7410	.9063	1.103	1550	.9988	.0491	20.355	.0491
800	0.7071	0.7071	1.0000	1.000	1600	1.0000	0.0000	----	0.0000

TABLE OF PROBABILITY FACTORS.

$$\left[\text{"Prob"} = \frac{2}{\sqrt{\pi}} \int_0^t e^{-t^2} \, dt \text{ where } \frac{t}{.476936\ldots} = \text{Factor} \right]$$

Factor	Prob.	Factor	Prob.	Factor	Prob.	Factor	Prob.
0.00	0.0000	1.00	0.5000	2.00	0.8227	3.00	0.9570
0.05	0.0269	1.05	0.5212	2.05	0.8332	3.05	0.9603
0.10	0.0538	1.10	0.5419	2.10	0.8433	3.10	0.9635
0.15	0.0806	1.15	0.5621	2.15	0.8530	3.15	0.9664
0.20	0.1073	1.20	0.5817	2.20	0.8622	3.20	0.9691
0.25	0.1339	1.25	0.6008	2.25	0.8709	3.25	0.9716
0.30	0.1604	1.30	0.6194	2.30	0.8792	3.30	0.9740
0.35	0.1867	1.35	0.6375	2.35	0.8871	3.35	0.9762
0.40	0.2127	1.40	0.6550	2.40	0.8945	3.40	0.9782
0.45	0.2385	1.45	0.6719	2.45	0.9016	3.50	0.9817
0.50	0.2640	1.50	0.6883	2.50	0.9083	3.60	0.9848
0.55	0.2893	1.55	0.7042	2.55	0.9146	3.70	0.9874
0.60	0.3143	1.60	0.7195	2.60	0.9205	3.80	0.9896
0.65	0.3389	1.65	0.7343	2.65	0.9261	3.90	0.9915
0.70	0.3632	1.70	0.7485	2.70	0.9314	4.00	0.9930
0.75	0.3871	1.75	0.7621	2.75	0.9364	4.20	0.9954
0.80	0.4106	1.80	0.7753	2.80	0.9411	4.40	0.9970
0.85	0.4336	1.85	0.7879	2.85	0.9454	4.60	0.9981
0.90	0.4562	1.90	0.8000	2.90	0.9495	4.80	0.9988
0.95	0.4783	1.95	0.8116	2.95	0.9534	5.00	0.9993

Explanation: "Prob." is the probable proportion of shots falling in an interval of width F times the fifty per cent zone (or 2 F times the probable error) with center of impact in the middle of the interval; F is the "probability factor".

Example:

Given: Zone, normal to line of fire, 40 yds. wide, 60 yds. from center of impact.
Probable Error in Range, 50 yds.

To determine probable proportion of hits in zone.

For $(60 + 40)$ -zone, $F = \frac{2(60 + 40)}{2(50)} = 2$, hence from table, Prob. = .82;

For (60)-zone, $F = \frac{2(60)}{2(50)} = 1.2$, hence from table, Prob. = .58

Subtracting, Prob. for the two zones which together satisfy the condition, = .82 - .58. Hence, Prob. for either one of the two possible zones defined, is $\frac{1}{2}$ (.82 - .58) = 12%.

A less accurate but frequently more convenient approximation is given by the "Dispersion Ladder":

Center of Impact

4 P.E.	3 P.E.	2 P.E.	1 P.E.		1 P.E.	2 P.E.	3 P.E.	4 P.E.
$\frac{1}{2}$%	$1\frac{1}{2}$%	7%	16%	25%	25%	16%	7%	$1\frac{1}{2}$%	$\frac{1}{2}$%

This gives differences in Prob. for even integral multiples of the probable error.

Part I H

TABLE OF SLOPE COEFFICIENTS

$$\sin\omega / \sin(\omega - n').$$

ω = angle of fall (mils) (measured from line of site).

n %	n, positive (relative forward slope).										
ω →	10	20	31	51	102	152	201	297	388	472	1,600
n →	1	2	3	5	10	15	20	30	40	50	
50	.81	.71	.62	.50	.35	.25	.20	.15	.12	.10	.05
100	.93	.83	.77	.66	.50	.40	.34	.26	.21	.18	.10
150	.94	.88	.83	.75	.60	.50	.43	.35	.29	.26	.15
200	.95	.91	.87	.80	.67	.58	.51	.42	.36	.32	.20
250	.96	.93	.89	.83	.72	.63	.57	.48	.41	.37	.25
300	.97	.94	.91	.86	.76	.68	.61	.52	.46	.42	.30
350	.97	.95	.92	.88	.79	.71	.65	.57	.51	.47	.36
400	.98	.95	.93	.89	.81	.74	.69	.61	.55	.51	.41
500	.98	.96	.95	.92	.85	.79	.74	.67	.62	.58	.53
600	.99	.97	.96	.93	.87	.83	.78	.72	.67	.64	.67
700	.99	.98	.97	.94	.90	.85	.82	.76	.72	.69	.82
800	.99	.98	.97	.95	.91	.88	.85	.80	.77	.75	1.00
900	.99	.98	.98	.96	.93	.90	.88	.84	.81	.79	1.22
1000	.99	.99	.98	.97	.94	.92	.90	.87	.85	.84	1.50
1100	.99	.99	.98	.98	.95	.94	.92	.90	.89	.88	1.87
1200	1.00	.99	.99	.98	.97	.95	.94	.93	.92	.93	2.41

-n, positive (relative reverse slope).										
10	20	31	51	102	152	201	297	388	472
1	2	3	5	10	15	20	30	40	50
1.26	1.69	2.57							
1.11	1.26	1.44	2.03						
1.07	1.16	1.25	1.51	3.08					
1.05	1.11	1.18	1.34	2.02	4.11				
1.04	1.09	1.14	1.25	1.67	2.52	5.06			
1.03	1.07	1.11	1.20	1.50	2.00	2.99	94.86		
1.03	1.06	1.09	1.16	1.39	1.74	2.31	6.46		
1.02	1.05	1.08	1.14	1.32	1.59	1.97	3.78	31.39	
1.02	1.04	1.06	1.10	1.24	1.41	1.63	2.38	4.33	17.31
1.02	1.03	1.05	1.08	1.18	1.30	1.46	1.89	2.68	4.44
1.01	1.03	1.04	1.07	1.14	1.24	1.35	1.65	2.10	2.86
1.01	1.02	1.03	1.05	1.12	1.19	1.27	1.49	1.80	2.24
1.01	1.02	1.03	1.04	1.09	1.15	1.22	1.39	1.60	1.90
1.01	1.01	1.02	1.04	1.08	1.12	1.18	1.31	1.47	1.68
1.01	1.01	1.02	1.03	1.06	1.10	1.14	1.24	1.37	1.53
1.00	1.01	1.01	1.02	1.05	1.08	1.11	1.19	1.29	1.41

n ≡ slope with respect to line of site (per cent and mils)(n ≡ n' - s + 300).

Directions.-Multiply range probable error (from range table) by coefficient shown above. Here ω denotes the angle of fall (measured to line of site)(for practical purposes equal to the range table angle of fall which is 1 value for site 300 ȳ, i.e. for a level trajectory); n', the quadrant angle of slope, positive for forward slope (ground rising in enemy direction), and negative for reverse slope (ground falling in enemy direction); n', the angle of site, positive for target above gun, negative for target below gun; n'(≡ n' - s + 300), the slope relative to the line of site. NOTE.- The quadrant angle of fall, ω' ≡ ω - s + 300.

Example: Given target on reverse slope between contour lines 150 ft., and 140 ft., mean distance between contour ≡ 67 ft., site ≡ -20 mils,(s ≡ 280), angle of fall (tabulated)≡ 250 mils, range probable error (in range table)≡ 83 yd. Then, n'(in per cent) ≡ 100 $\frac{130-140}{67}$ ≡ -15(%)or -152 mils,n'≡ s+300 ≡ -158-(-20) ≡ -132 mils. Interpolating between 1.67(for 102 mils)and 2.52(for 152 mils), slope coefficient ≡ 1.67 - $\frac{20}{50}$ x 0.85 ≡ 2.01. Hence, range probable error to be used ≡ 2.01 x 83 yd. ≡ 167 yd.

CHART FOR PERCENTAGE PART 11
CHANGE IN MUZZLE VELOCITY
FOR TEMPERATURE OF POWDER DIFFERENT FROM NORMAL.

$$\left[\frac{\Delta V}{V} = .00867 \left(2^{.032t} - 4.73\right)\right]$$

PERCENTAGE CHANGE IN M.V.

TEMPERATURE DEGREES FAHRENHEIT
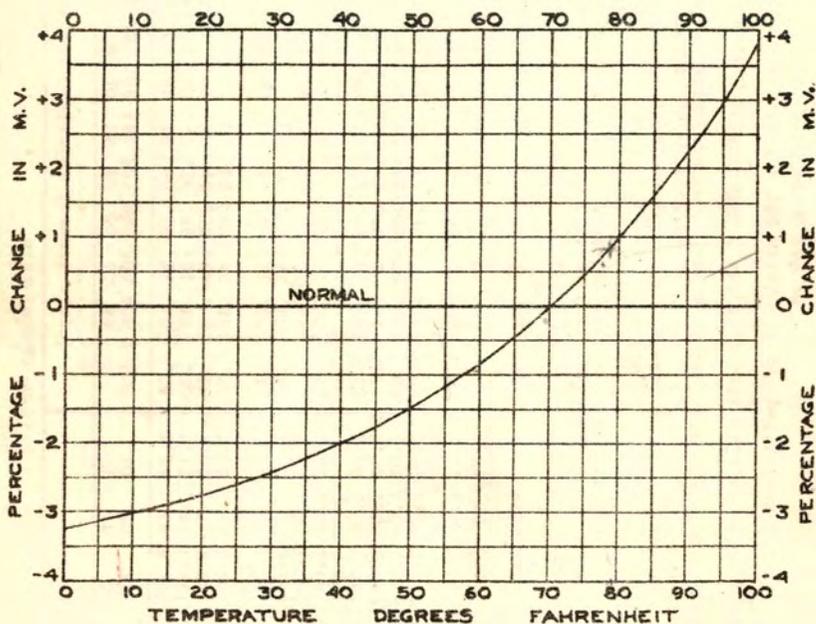
DIRECTIONS:-

Enter chart with temperature of powder. Follow vertical line to the curve, and from there the horizontal line to either edge of the chart where the percentage change in the muzzle velocity may be read.

EXAMPLE :-

Suppose temperature of powder=59°F, and muzzle velocity (Standard) = 2250 (f/s). Then change in M.V. is,-0.9% = -.009 × 2250=-20 (f/s) approximately.

Muzzle Velocity to be expected
= 2250 - 20 = 2230 (f/s).

PART 2

12- INCH S. C. GUN, MODELS OF
1895 AND 1895 MI

900 LB. A. P. SHELL

FUZE, BASE DETONATING, MARK X

MUZZLE VELOCITY = 2325 f/s (708.7 m/s)

JUMP =-1.2 MILS

NOTE: Standard Air Temperature for Density
and Elasticity is 59° F. Standard
Temperature of Powder is 70° F.

900 LB. A. P. SHELL

For 12-Inch Gun, Model 1895
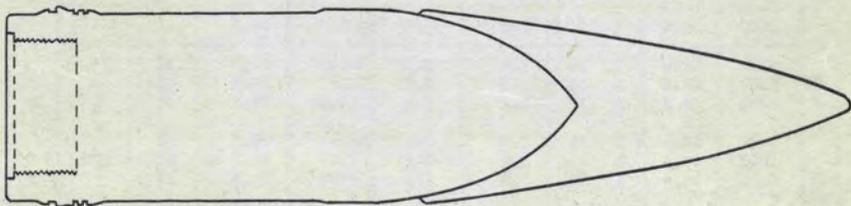
Drawing of Band and Band Seat
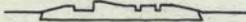
Class 75, Division 10, Drawing 21.

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.		Change in Elev. for 100 yds. change in Range		Change in Range for		Maximum Ordinate	Terminal Velocity
					1 mil change in Elev.	1 min		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o '	mils	min.	yards	yards	feet	f/s
0	1.2	0 04	0.9	3.1	110.4	32.7	0	2325
100	2.0	0 07	0.9	3.1	109.9	32.6	0	
200	3.0	0 10	0.9	3.1	109.5	32.4	0	
300	3.8	0 13	0.9	3.1	109.1	32.3	1	
400	4.8	0 16	0.9	3.1	108.6	32.2	1	
500	5.8	0 19	0.9	3.1	108.2	32.1	2	2294
600	6.6	0 22	0.9	3.1	107.8	31.9	2	
700	7.6	0 25	0.9	3.1	107.3	31.8	3	
800	8.6	0 29	0.9	3.2	106.9	31.7	4	
900	9.4	0 32	0.9	3.2	106.4	31.5	5	
1000	10.4	0 35	0.9	3.2	106.0	31.4	7	2264
1100	11.2	0 38	0.9	3.2	105.6	31.3	8	
1200	12.2	0 41	0.9	3.2	105.1	31.1	10	
1300	13.2	0 45	1.0	3.2	104.7	31.0	11	
1400	14.2	0 48	1.0	3.2	104.3	30.9	13	
1500	15.2	0 51	1.0	3.2	103.9	30.8	15	2233
1600	16.2	0 54	1.0	3.3	103.4	30.6	17	
1700	17.0	0 58	1.0	3.3	103.0	30.5	19	
1800	18.0	1 01	1.0	3.3	102.6	30.4	21	
1900	19.0	1 04	1.0	3.3	102.2	30.3	24	
2000	20.0	1 07	1.0	3.3	101.8	30.2	27	2203
2100	21.0	1 11	1.0	3.3	101.4	30.0	30	
2200	22.0	1 14	1.0	3.3	101.0	29.9	33	
2300	23.0	1 17	1.0	3.4	100.6	29.8	36	
2400	24.0	1 21	1.0	3.4	100.2	29.7	39	
2500	25.0	1 24	1.0	3.4	99.8	29.6	43	2172
2600	26.0	1 28	1.0	3.4	99.4	29.5	47	
2700	27.0	1 31	1.0	3.4	99.0	29.3	51	
2800	28.0	1 34	1.0	3.4	98.6	29.2	55	
2900	29.0	1 38	1.0	3.4	98.2	29.1	59	
3000	30.0	1 41	1.0	3.5	97.8	29.0	63	2142

900 LB. A.P. PROJ. (SHELL)   M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall		Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in		Time of Flight	Range
(10)	(11)	(12)	(13)	(14)	(15)	(16)	Range (17)	Defl. (18)	(19)	(20)
mils	o '	1 on –	mils	o		mils	yds.	yds.	sec.	yds.
0	0 00		0	0.00	13.40	1.8	50	0	0.0	0
1	0 03	1146							0.1	100
2	0 06	560							0.3	200
3	0 09	375							0.4	300
4	0 12	279							0.5	400
5	0 16	218	0	0.00	13.39	1.9	51	0	0.6	500
6	0 19	180							0.7	600
7	0 22	155							0.8	700
8	0 25	137							1.0	800
9	0 29	122							1.1	900
10	0 32	109	0	0.00	13.38	1.9	51	0	1.3	1000
11	0 35	98							1.4	1100
12	0 39	90							1.6	1200
13	0 42	83							1.7	1300
14	0 46	76							1.8	1400
15	0 49	71	0	0.00	13.37	2.0	52	0	2.0	1500
16	0 52	66							2.1	1600
17	0 56	62							2.2	1700
18	0 59	58							2.4	1800
19	1 03	55							2.5	1900
20	1 07	52	0	0.00	13.36	2.0	52	0	2.6	2000
21	1 10	49							2.8	2100
22	1 14	46							2.9	2200
23	1 18	44							3.0	2300
24	1 22	42							3.2	2400
25	1 26	40	0	-0.05	13.35	2.1	53	1	3.3	2500
27	1 30	38							3.4	2600
28	1 34	36							3.6	2700
29	1 38	35							3.7	2800
30	1 41	34							3.8	2900
31	1 45	33	-1	-0.05	13.33	2.2	54	1	4.0	3000

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ.(SHELL) M.V.=2325 F/s. FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.		Change in Elev. for 100 yds. change in Range		Change in Range for		Maximum Ordinate	Terminal Velocity
					1 mil change in Elev.	1 min		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o '	mils	min.	yards	yards	feet	f/s
3000	30.0	1 41	1.0	3.5	97.8	29.0	63	2142
3100	31.0	1 45	1.0	3.5	97.4	28.9	68	
3200	32.0	1 48	1.0	3.5	97.0	28.7	73	
3300	33.0	1 52	1.0	3.5	96.6	28.6	78	
3400	34.2	1 55	1.0	3.5	96.3	28.5	83	
3500	35.2	1 59	1.0	3.5	95.9	28.4	88	2111
3600	36.2	2 02	1.0	3.5	95.5	28.3	93	
3700	37.2	2 06	1.0	3.5	95.2	28.2	99	
3800	38.4	2 09	1.0	3.6	94.8	28.1	105	
3900	39.4	2 13	1.1	3.6	94.4	28.0	111	
4000	40.4	2 16	1.1	3.6	94.0	27.9	117	2081
4100	41.4	2 20	1.1	3.6	93.6	27.7	123	
4200	42.6	2 24	1.1	3.6	93.3	27.6	130	
4300	43.6	2 27	1.1	3.6	92.9	27.5	137	
4400	44.6	2 31	1.1	3.6	92.5	27.4	144	
4500	45.8	2 34	1.1	3.7	92.1	27.3	151	2050
4600	46.8	2 38	1.1	3.7	91.8	27.2	158	
4700	48.0	2 42	1.1	3.7	91.4	27.1	166	
4800	49.0	2 45	1.1	3.7	91.0	27.0	174	
4900	50.0	2 49	1.1	3.7	90.7	26.9	182	
5000	51.2	2 53	1.1	3.7	90.3	26.8	190	2020
5100	52.2	2 56	1.1	3.8	89.9	26.6	198	
5200	53.4	3 00	1.1	3.8	89.5	26.5	207	
5300	54.6	3 04	1.1	3.8	89.2	26.4	216	
5400	55.6	3 08	1.1	3.8	88.8	26.3	225	
5500	56.8	3 12	1.1	3.8	88.4	26.2	234	1990
5600	57.8	3 15	1.1	3.8	88.1	26.1	244	
5700	59.0	3 19	1.1	3.8	87.7	26.0	254	
5800	60.2	3 23	1.1	3.9	87.3	25.9	264	
5900	61.4	3 27	1.1	3.9	86.9	25.8	274	
6000	62.4	3 31	1.1	3.9	86.6	25.7	284	1960

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall			Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in Range	Defl.	Time of Flight	Range
(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
mils	o	'	1 on -	mils	o		mils	yds.	yds.	sec.	yds.
31	1	45	33	-1	-0.05	13.33	2.2	54	1	4.0	3000
32	1	49	32							4.1	3100
53	1	53	31							4.3	3200
35	1	57	30							4.4	3300
36	2	01	29	-1	-0.05	13.31	2.3	55	1	4.6	3400
37	2	05	28							4.7	3500
38	2	09	27							4.9	3600
40	2	13	26							5.0	3700
41	2	17	25							5.2	3800
42	2	21	24							5.3	3900
43	2	25	24	-1	-0.05	13.30	2.4	56	1	5.5	4000
44	2	29	23							5.6	4100
46	2	33	23							5.8	4200
47	2	37	22							5.9	4300
48	2	41	21	-1	-0.05	13.28	2.5	57	1	6.1	4400
49	2	45	21							6.2	4500
50	2	49	20							6.3	4600
51	2	53	20							6.5	4700
53	2	58	19							6.6	4800
54	3	02	19							6.8	4900
55	3	06	19	-1	-0.05	13.26	2.6	58	1	6.9	5000
56	3	10	18							7.0	5100
58	3	15	18							7.2	5200
59	3	19	17							7.3	5300
60	3	23	17	-1	-0.05	13.24	2.7	59	1	7.5	5400
61	3	28	17							7.6	5500
63	3	32	16							7.8	5600
64	3	36	16							7.9	5700
65	3	40	16							8.1	5800
66	3	45	15							8.2	5900
68	3	50	15	-1	-0.10	13.22	2.8	60	2	8.4	6000

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.		Change in Elev. for 100 yds. change in Range		Change in Range for		Maximum Ordinate	Terminal Velocity
					1 mil change in Elev.	1 min change in Elev.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o '	mils	min.	yards	yards	feet	f/s
6000	62.4	3 31	1.1	3.9	86.6	25.7	284	1960
6100	63.6	3 35	1.2	3.9	86.2	25.5	295	
6200	64.8	3 38	1.2	3.9	85.8	25.4	306	
6300	65.8	3 42	1.2	4.0	85.4	25.3	317	
6400	67.0	3 46	1.2	4.0	85.1	25.2	328	
6500	68.2	3 50	1.2	4.0	84.7	25.1	339	1930
6600	69.4	3 54	1.2	4.0	84.3	25.0	351	
6700	70.6	3 58	1.2	4.0	84.0	24.9	363	
6800	71.8	4 02	1.2	4.0	83.6	24.8	375	
6900	73.0	4 06	1.2	4.1	83.2	24.7	387	
7000	74.2	4 10	1.2	4.1	82.9	24.6	400	1901
7100	75.4	4 14	1.2	4.1	82.5	24.5	413	
7200	76.6	4 18	1.2	4.1	82.2	24.4	426	
7300	77.8	4 22	1.2	4.1	81.8	24.2	439	
7400	79.0	4 26	1.2	4.1	81.5	24.1	453	
7500	80.2	4 30	1.2	4.2	81.1	24.0	467	1872
7600	81.4	4 35	1.2	4.2	80.7	23.9	481	
7700	82.6	4 39	1.2	4.2	80.4	23.8	495	
7800	83.8	4 43	1.2	4.2	80.0	23.7	510	
7900	85.2	4 47	1.3	4.2	79.6	23.6	525	
8000	86.4	4 51	1.3	4.3	79.3	23.5	540	1843
8100	87.6	4 56	1.3	4.3	78.9	23.4	555	
8200	88.8	5 00	1.3	4.3	78.5	23.3	571	
8300	90.2	5 04	1.3	4.3	78.2	23.2	587	
8400	91.4	5 09	1.3	4.3	77.8	23.1	603	
8500	92.8	5 13	1.3	4.4	77.4	22.9	619	1814
8600	94.0	5 17	1.3	4.4	77.1	22.8	636	
8700	95.4	5 22	1.3	4.4	76.7	22.7	653	
8800	96.6	5 26	1.3	4.4	76.3	22.6	670	
8900	98.0	5 30	1.3	4.4	76.0	22.5	688	
9000	99.2	5 35	1.3	4.5	75.6	22.4	706	1786

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall		Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in Range	Defl.	Time of Flight	Range
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
mils	o '	1 on -	mils	o		mils	yds.	yds.	sec.	yds.
68	3 50	15	-1	-0.10	13.22	2.8	60	2	8.4	6000
69	3 54	15							8.6	6100
71	3 59	14							8.7	6200
72	4 03	14							8.9	6300
74	4 08	14	-2	-0.10	13.20	2.9	61	2	9.0	6400
75	4 13	14							9.2	6500
77	4 18	13							9.3	6600
78	4 23	13							9.5	6700
80	4 28	13							9.7	6800
81	4 33	13							9.8	6900
83	4 38	12	-2	-0.10	13.18	3.0	62	2	10.0	7000
84	4 43	12							10.2	7100
86	4 49	12							10.3	7200
87	4 54	12							10.5	7300
89	4 59	11	-2	-0.10	13.15	3.1	63	2	10.6	7400
90	5 04	11							10.8	7500
92	5 10	11							11.0	7600
93	5 15	11							11.1	7700
95	5 21	11							11.3	7800
97	5 26	10							11.4	7900
99	5 32	10	-2	-0.10	13.13	3.2	64	2	11.6	8000
100	5 38	10							11.8	8100
102	5 44	9.9							11.9	8200
104	5 50	9.8							12.1	8300
105	5 55	9.6	-2	-0.10	13.10	3.3	65	2	12.3	8400
107	6 01	9.5							12.4	8500
109	6 07	9.3							12.6	8600
110	6 13	9.2							12.7	8700
112	6 19	9.0							12.9	8800
114	6 25	8.9							13.1	8900
116	6 31	8.7	-2	-0.15	13.07	3.5	66	2	13.3	9000

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.			Change in Elev. for 100 yds. change in Range		Change in Range for 1 mil 1 min change in Elev.		Maximum Ordinate	Terminal Velocity
(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o	'	mils	min.	yards	yards	feet	f/s
9000	99.2	5	35	1.3	4.5	75.6	22.4	706	1786
9100	100.6	5	39	1.3	4.5	75.3	22.3	724	
9200	101.8	5	44	1.3	4.5	74.9	22.2	743	
9300	103.2	5	48	1.3	4.5	74.5	22.1	762	
9400	104.6	5	53	1.3	4.5	74.2	22.0	781	
9500	105.8	5	58	1.3	4.6	73.8	21.9	800	1758
9600	107.2	6	02	1.4	4.6	73.4	21.7	820	
9700	108.6	6	07	1.4	4.6	73.1	21.6	840	
9800	110.0	6	11	1.4	4.6	72.7	21.5	860	
9900	111.4	6	16	1.4	4.7	72.3	21.4	880	
10000	112.8	6	21	1.4	4.7	72.0	21.3	901	1730
10100	114.2	6	25	1.4	4.7	71.6	21.2	922	
10200	115.6	6	30	1.4	4.7	71.2	21.1	944	
10300	117.0	6	35	1.4	4.8	70.9	21.0	966	
10400	118.4	6	39	1.4	4.8	70.5	20.9	988	
10500	119.8	6	44	1.4	4.8	70.1	20.8	1010	1703
10600	121.2	6	49	1.4	4.8	69.8	20.7	1033	
10700	122.6	6	54	1.4	4.9	69.4	20.6	1056	
10800	124.0	6	59	1.4	4.9	69.0	20.5	1080	
10900	125.6	7	04	1.4	4.9	68.7	20.4	1104	
11000	127.0	7	09	1.5	4.9	68.3	20.2	1128	1676
11100	128.4	7	14	1.5	5.0	67.9	20.1	1153	
11200	129.8	7	18	1.5	5.0	67.6	20.0	1178	
11300	131.4	7	23	1.5	5.0	67.2	19.9	1203	
11400	132.8	7	28	1.5	5.0	66.9	19.8	1228	
11500	134.4	7	34	1.5	5.1	66.5	19.7	1254	1650
11600	135.8	7	39	1.5	5.1	66.2	19.6	1280	
11700	137.4	7	44	1.5	5.1	65.8	19.5	1307	
11800	138.8	7	49	1.5	5.2	65.4	19.4	1334	
11900	140.4	7	54	1.5	5.2	65.1	19.3	1362	
12000	142.0	7	59	1.5	5.2	64.7	19.2	1390	1624

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall			Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in		Time of Flight	Range
								Range	Defl.		
(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
mils	o	'	1 on -	mils	o		mils	yds.	yds.	sec.	yds.
116	6	31	8.7	-2	-0.15	13.07	3.5	66	2	13.3	9000
118	6	38	8.6							13.4	9100
120	6	44	8.5							13.6	9200
122	6	51	8.3							13.8	9300
124	6	57	8.2							14.0	9400
125	7	03	8.1	-2	-0.15	13.03	3.6	67	2	14.1	9500
127	7	10	7.9							14.3	9600
129	7	16	7.8							14.5	9700
131	7	23	7.7							14.7	9800
133	7	29	7.6							14.8	9900
135	7	36	7.5	-3	-0.15	12.99	3.8	68	3	15.0	10000
137	7	42	7.4							15.2	10100
139	7	49	7.3							15.4	10200
141	7	56	7.2							15.6	10300
143	8	03	7.1							15.7	10400
145	8	10	7.0	-3	-0.15	12.94	3.9	69	3	15.9	10500
147	8	17	6.9							16.1	10600
149	8	24	6.8							16.3	10700
151	8	31	6.7							16.5	10800
154	8	39	6.6							16.6	10900
156	8	46	6.5	-3	-0.15	12.90	4.1	70	3	16.8	11000
158	8	53	6.4							17.0	11100
160	9	01	6.3							17.2	11200
163	9	08	6.2							17.4	11300
165	9	16	6.1							17.5	11400
167	9	23	6.1	-3	-0.20	12.85	4.3	72	3	17.7	11500
169	9	31	6.0							17.9	11600
171	9	38	5.9							18.1	11700
174	9	46	5.8							18.3	11800
176	9	53	5.7							18.4	11900
178	10	01	5.7	-3	-0.20	12.80	4.5	73	3	18.6	12000

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.		Change in Elev. for 100 yds. change in Range		Change in Range for		Maximum Ordinate	Terminal Velocity
					1 mil change in Elev.	1 min		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o '	mils	min.	yards	yards	feet	f/s
12000	142.0	7 59	1.5	5.2	64.7	19.2	1390	1624
12100	143.6	8 04	1.6	5.2	64.3	19.1	1418	
12200	145.0	8 10	1.6	5.3	64.0	19.0	1447	
12300	146.6	8 15	1.6	5.3	63.6	18.8	1476	
12400	148.2	8 20	1.6	5.3	63.3	18.7	1506	
12500	149.8	8 26	1.6	5.4	62.9	18.6	1536	1599
12600	151.4	8 31	1.6	5.4	62.5	18.5	1566	
12700	153.0	8 36	1.6	5.4	62.2	18.4	1597	
12800	154.6	8 42	1.6	5.5	61.8	18.3	1628	
12900	156.2	8 47	1.6	5.5	61.5	18.2	1660	
13000	157.8	8 53	1.6	5.5	61.1	18.1	1692	1575
13100	159.6	8 58	1.6	5.6	60.7	18.0	1725	
13200	161.2	9 04	1.7	5.6	60.4	17.9	1758	
13300	162.8	9 10	1.7	5.6	60.0	17.8	1792	
13400	164.6	9 15	1.7	5.7	59.7	17.7	1826	
13500	166.2	9 21	1.7	5.7	59.3	17.6	1860	1551
13600	168.0	9 27	1.7	5.7	59.0	17.5	1895	
13700	169.6	9 33	1.7	5.8	58.6	17.4	1931	
13800	171.4	9 38	1.7	5.8	58.3	17.3	1967	
13900	173.2	9 44	1.7	5.8	57.9	17.2	2004	
14000	174.8	9 50	1.7	5.9	57.6	17.1	2041	1528
14100	176.6	9 56	1.7	5.9	57.3	17.0	2079	
14200	178.4	10 02	1.8	5.9	56.9	16.9	2117	
14300	180.2	10 08	1.8	6.0	56.6	16.8	2156	
14400	182.0	10 14	1.8	6.0	56.2	16.7	2196	
14500	183.8	10 20	1.8	6.0	55.9	16.6	2236	1506
14600	185.6	10 26	1.8	6.1	55.6	16.5	2277	
14700	187.4	10 32	1.8	6.1	55.2	16.4	2318	
14800	189.2	10 39	1.8	6.1	54.9	16.3	2360	
14900	191.0	10 45	1.8	6.2	54.5	16.2	2403	
15000	192.8	10 51	1.8	6.2	54.2	16.1	2446	1484

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall			Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in		Time of Flight	Range
								Range	Defl.		
(10)		(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
mils	o	'	1 on -	mils	o		mils	yds.	yds.	sec.	yds.
178	10	01	5.7	-3	-0.20	12.80	4.5	73	3	18.6	12000
181	10	09	5.6							18.8	12100
183	10	17	5.5							19.0	12200
185	10	25	5.4							19.2	12300
188	10	33	5.4	-4	-0.20	12.74	4.7	74	3	19.3	12400
190	10	41	5.3							19.5	12500
192	10	49	5.2							19.7	12600
195	10	58	5.2							19.9	12700
197	11	06	5.1							20.1	12800
200	11	14	5.0							20.3	12900
202	11	22	5.0	-4	-0.20	12.68	4.9	75	3	20.5	13000
205	11	31	4.9							20.7	13100
207	11	39	4.9							20.9	13200
210	11	48	4.8							21.1	13300
212	11	56	4.7							21.3	13400
215	12	05	4.7	-4	-0.25	12.61	5.1	77	3	21.5	13500
217	12	14	4.6							21.7	13600
220	12	23	4.6							21.9	13700
223	12	32	4.5							22.1	13800
225	12	40	4.5							22.3	13900
228	12	49	4.4	-4	-0.25	12.54	5.4	78	4	22.5	14000
231	12	58	4.3							22.7	14100
233	13	07	4.3							22.9	14200
236	13	16	4.2							23.1	14300
239	13	26	4.2							23.3	14400
242	13	35	4.1	-5	-0.25	12.46	5.6	79	4	23.5	14500
245	13	45	4.1							23.8	14600
247	13	54	4.0							24.0	14700
250	14	04	4.0							24.2	14800
253	14	14	3.9							24.4	14900
256	14	24	3.9	-5	-0.30	12.38	5.9	80	4	24.6	15000

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.		Change in Elev. for 100 yds. change in Range		Change in Range for 1 mil / 1 min change in Elev.		Maximum Ordinate	Terminal Velocity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o '	mils	min.	yards	yards	feet	f/s
15000	192.8	10 51	1.8	6.2	54.2	16.1	2446	1484
15100	194.8	10 57	1.9	6.3	53.9	16.0	2490	
15200	196.6	11 04	1.9	6.3	53.5	15.9	2534	
15300	198.6	11 10	1.9	6.3	53.2	15.8	2579	
15400	200.4	11 16	1.9	6.4	52.8	15.7	2625	
15500	202.4	11 23	1.9	6.4	52.5	15.6	2671	1463
15600	204.2	11 29	1.9	6.5	52.2	15.5	2718	
15700	206.2	11 36	1.9	6.5	51.9	15.4	2766	
15800	208.2	11 42	1.9	6.6	51.5	15.3	2814	
15900	210.0	11 49	1.9	6.6	51.2	15.2	2863	
16000	212.0	11 56	2.0	6.6	50.9	15.1	2913	1443
16100	214.0	12 02	2.0	6.7	50.6	15.0	2964	
16200	216.0	12 09	2.0	6.7	50.3	14.9	3015	
16300	218.0	12 16	2.0	6.8	49.9	14.8	3067	
16400	220.0	12 23	2.0	6.8	49.6	14.7	3119	
16500	222.0	12 29	2.0	6.8	49.3	14.6	3172	1424
16600	224.0	12 36	2.0	6.9	49.0	14.5	3226	
16700	226.2	12 43	2.0	6.9	48.7	14.4	3280	
16800	228.2	12 50	2.1	7.0	48.4	14.3	3335	
16900	230.2	12 57	2.1	7.0	48.1	14.3	3391	
17000	232.4	13 04	2.1	7.1	47.8	14.2	3448	1405
17100	234.4	13 11	2.1	7.1	47.5	14.1	3506	
17200	236.6	13 18	2.1	7.1	47.2	14.0	3564	
17300	238.6	13 26	2.1	7.2	46.9	13.9	3623	
17400	240.8	13 33	2.2	7.2	46.6	13.8	3683	
17500	243.0	13 40	2.2	7.3	46.3	13.7	3743	1387
17600	245.2	13 47	2.2	7.3	46.0	13.6	3804	
17700	247.4	13 55	2.2	7.4	45.7	13.5	3866	
17800	249.6	14 02	2.2	7.4	45.4	13.5	3929	
17900	251.8	14 10	2.2	7.5	45.2	13.4	3993	
18000	254.0	14 17	2.2	7.5	44.9	13.3	4057	1371

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall		Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in Range	Defl.	Time of Flight	Range
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
mils	o '	1 on –	mils	o		mils	yds.	yds.	sec.	yds.
256	14 24	3.9	-5	-0.30	12.38	5.9	80	4	24.6	15000
259	14 34	3.8							24.8	15100
262	14 44	3.8							25.0	15200
265	14 54	3.8							25.3	15300
268	15 05	3.7							25.5	15400
271	15 15	3.7	-5	-0.30	12.30	6.2	81	4	25.7	15500
274	15 26	3.6							26.0	15600
277	15 36	3.6							26.2	15700
280	15 47	3.5							26.4	15800
284	15 58	3.5							26.6	15900
287	16 09	3.5	-6	-0.30	12.23	6.5	83	4	26.8	16000
291	16 20	3.4							27.1	16100
294	16 31	3.4							27.3	16200
297	16 42	3.3							27.5	16300
301	16 54	3.3							27.8	16400
304	17 05	3.3	-6	-0.35	12.16	6.8	84	4	28.0	16500
307	17 17	3.2							28.3	16600
311	17 28	3.2							28.5	16700
314	17 40	3.1							28.7	16800
317	17 51	3.1							29.0	16900
321	18 03	3.1	-6	-0.35	12.10	7.2	86	4	29.2	17000
325	18 15	3.0							29.5	17100
328	18 27	3.0							29.7	17200
332	18 39	3.0							30.0	17300
335	18 51	2.9							30.2	17400
339	19 03	2.9	-7	-0.40	12.04	7.5	87	4	30.4	17500
342	19 15	2.9							30.7	17600
346	19 28	2.8							31.0	17700
350	19 40	2.8							31.2	17800
353	19 53	2.8							31.4	17900
357	20 05	2.7	-7	-0.40	11.98	7.9	89	5	31.7	18000

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.		Change in Elev. for 100 yds. change in Range		Change in Range for 1 mil 1 min change in Elev.		Maximum Ordinate	Terminal Velocity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o '	mils	min.	yards	yards	feet	f/s
18000	254.0	14 17	2.2	7.5	44.9	13.3	4057	1371
18100	256.2	14 25	2.2	7.6	44.6	13.2	4122	
18200	258.4	14 32	2.3	7.6	44.3	13.1	4188	
18300	260.6	14 40	2.3	7.7	44.1	13.1	4255	
18400	263.0	14 47	2.3	7.7	43.8	13.0	4323	
18500	265.2	14 55	2.3	7.8	43.5	12.9	4391	1356
18600	267.6	15 03	2.3	7.8	43.2	12.8	4460	
18700	269.8	15 11	2.3	7.8	43.0	12.7	4530	
18800	272.2	15 19	2.3	7.9	42.7	12.7	4601	
18900	274.6	15 27	2.4	7.9	42.5	12.6	4673	
19000	277.0	15 35	2.4	8.0	42.2	12.5	4745	1341
19100	279.4	15 43	2.4	8.0	42.0	12.4	4820	
19200	281.8	15 51	2.4	8.1	41.7	12.4	4895	
19300	284.2	15 59	2.4	8.1	41.4	12.3	4970	
19400	286.6	16 07	2.4	8.2	41.2	12.2	5045	
19500	289.0	16 16	2.4	8.3	40.9	12.1	5120	1328
19600	291.4	16 24	2.5	8.3	40.6	12.0	5200	
19700	294.0	16 32	2.5	8.4	40.4	12.0	5280	
19800	296.4	16 41	2.5	9.4	40.1	11.9	5360	
19900	299.0	16 49	2.5	8.5	39.8	11.8	5440	
20000	301.4	16 58	2.5	8.5	39.6	11.7	5520	1316
20100	304.0	17 06	2.5	8.6	39.3	11.6	5600	
20200	306.6	17 15	2.6	8.6	39.1	11.6	5680	
20300	309.2	17 23	2.6	8.7	38.8	11.5	5765	
20400	311.8	17 32	2.6	8.8	38.5	11.4	5850	
20500	314.4	17 41	2.6	8.8	38.3	11.3	5940	1306
20600	317.0	17 50	2.6	8.9	38.0	11.3	6030	
20700	319.6	17 59	2.6	8.9	37.8	11.2	6120	
20800	322.2	18 08	2.7	9.0	37.5	11.1	6210	
20900	325.0	18 17	2.7	9.1	37.2	11.0	6300	
21000	327.6	18 26	2.7	9.1	37.0	11.0	6390	1297

900 LB. A.P. PROJ. (SHELL)   M.V. = 2325 f/s.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall			Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in		Time of Flight	Range
								Range	Defl.		
(10)		(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
mils	o	'	1 on -	mils	o		mils	yds.	yds.	sec.	yds.
357	20	05	2.7	-7	-0.40	11.98	7.9	89	5	31.7	18000
361	20	17	2.7							31.9	18100
365	20	30	2.7							32.2	18200
368	20	42	2.6							32.4	18300
372	20	55	2.6							32.7	18400
376	21	08	2.6	-8	-0.45	11.92	8.3	90	5	33.0	18500
380	21	21	2.6							33.2	18600
384	21	34	2.5							33.5	18700
387	21	47	2.5					-		33.7	18800
391	22	00	2.5							34.0	18900
395	22	13	2.4	-8	-0.45	11.87	8.7	92	5	34.3	19000
399	22	26	2.4							34.5	19100
403	22	39	2.4							34.8	19200
407	22	52	2.4							35.0	19300
411	23	06	2.3	-8	-0.45	11.82	9.1	93	5	35.3	19400
415	23	19	2.3							35.6	19500
419	23	33	2.3							35.8	19600
423	23	46	2.3							36.0	19700
427	24	00	2.2							36.3	19800
431	24	13	2.2							36.6	19900
435	24	27	2.2	-9	-0.50	11.77	9.6	95	5	36.9	20000
439	24	41	2.2							37.1	20100
443	24	54	2.2							37.4	20200
447	25	08	2.1							37.7	20300
451	25	22	2.1							38.0	20400
455	25	36	2.1	-9	-0.50	11.72	10.1	96	5	38.3	20500
459	25	50	2.1							38.6	20600
464	26	04	2.0							38.8	20700
468	26	18	2.0							39.1	20800
472	26	32	2.0							39.4	20900
476	26	46	1.98	-10	-0.55	11.67	10.6	98	5	39.7	21000

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ.(SHELL) M.V.= 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.			Change in Elev. for 100 yds. change in Range		Change in Range for 1 mil change in Elev.	1 min	Maximum Ordinate	Terminal Velocity
(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o	'	mils	min.	yards	yards	feet	f/s
21000	327.6	18	26	2.7	9.1	37.0	11.0	6390	1297
21100	330.4	18	35	2.7	9.2	36.7	10.9	6485	
21200	333.2	18	44	2.7	9.3	36.4	10.8	6580	
21300	335.8	18	53	2.8	9.3	36.2	10.7	6675	
21400	338.6	19	03	2.8	9.4	35.9	10.6	6770	
21500	341.4	19	12	2.8	9.5	35.6	10.5	6865	1289
21600	344.2	19	22	2.8	9.6	35.3	10.5	6965	
21700	347.0	19	31	2.8	9.6	35.1	10.4	7065	
21800	350.0	19	41	2.9	9.7	34.8	10.3	7165	
21900	352.8	19	51	2.9	9.8	34.5	10.2	7270	
22000	355.8	20	01	2.9	9.8	34.3	10.2	7375	1283
22100	358.6	20	10	2.9	9.9	34.0	10.1	7480	
22200	361.6	20	20	2.9	10.0	33.8	10.0	7585	
22300	364.6	20	30	3.0	10.1	33.5	9.9	7695	
22400	367.6	20	40	3.0	10.2	33.2	9.8	7805	
22500	370.6	20	51	3.0	10.2	33.0	9.8	7915	1278
22600	373.6	21	01	3.0	10.3	32.7	9.7	8025	
22700	376.6	21	11	3.1	10.4	32.5	9.6	8140	
22800	379.8	21	22	3.1	10.5	32.2	9.5	8255	
22900	382.8	21	32	3.1	10.6	31.9	9.5	8370	
23000	386.0	21	43	3.1	10.6	31.7	9.4	8490	1273
23100	389.2	21	53	3.2	10.7	31.4	9.3	8610	
23200	392.4	22	04	3.2	10.8	31.1	9.2	8730	
23300	395.6	22	15	3.2	10.9	30.8	9.1	8855	
23400	398.8	22	26	3.3	11.0	30.6	9.1	8980	
23500	402.0	22	37	3.3	11.1	30.3	9.0	9105	1269
23600	405.4	22	48	3.3	11.2	30.0	8.9	9235	
23700	408.8	22	59	3.3	11.3	29.8	8.8	9365	
23800	412.0	23	11	3.4	11.4	29.5	8.7	9495	
23900	415.4	23	22	3.4	11.5	29.2	8.7	9630	
24000	418.8	23	34	3.4	11.6	29.0	8.6	9765	1267

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall		Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in		Time of Flight	Range
							Range	Defl.		
(10)		(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
mils	o	'	1 on –	mils	o		mils	yds.	yds.	sec.	yds.
476	26	46	1.98	–10	–0.55	11.67	10.6	98	5	39.7	21000
480	27	00	1.96							40.0	21100
484	27	14	1.94							40.2	21200
488	27	28	1.92							40.5	21300
493	27	43	1.90							40.8	21400
497	27	57	1.88	–10	–0.55	11.62	11.2	99	5	41.1	21500
501	28	11	1.87							41.4	21600
505	28	25	1.85							41.7	21700
509	28	39	1.83							42.0	21800
514	28	54	1.81							42.3	21900
518	29	08	1.79	–10	–0.60	11.57	11.8	101	6	42.6	22000
522	29	22	1.78							42.9	22100
526	29	36	1.76							43.2	22200
531	29	51	1.74							43.5	22300
535	30	05	1.73							43.8	22400
539	30	20	1.71	–11	–0.60	11.52	12.5	103	6	44.1	22500
544	30	35	1.69							44.4	22600
548	30	50	1.68							44.7	22700
552	31	04	1.66							45.0	22800
557	31	19	1.64							45.4	22900
561	31	34	1.63	–11	–0.65	11.47	13.3	105	6	45.7	23000
565	31	49	1.61							46.0	23100
570	32	04	1.60							46.3	23200
574	32	19	1.58							46.7	23300
579	32	34	1.57							47.0	23400
583	32	49	1.55	–12	–0.65	11.41	14.2	107	6	47.3	23500
588	33	04	1.54							47.7	23600
592	33	19	1.52							48.0	23700
597	33	34	1.51							48.3	23800
601	33	50	1.49							48.6	23900
606	34	05	1.48	–13	–0.70	11.36	15.1	109	6	49.0	24000

*This is the Proving Ground Probable Error.

900-LB. A.P. PROJ. (SHELL) M.V. = 2325 F/S. FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.			Change in Elev. for 100 yds. change in Range		Change in Range for 1 mil 1 min change in Elev.		Maximum Ordinate	Terminal Velocity
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o	'	mils	min.	yards	yards	feet	f/s
24000	418.8	23	34	3.4	11.6	29.0	8.6	9765	1267
24100	422.4	23	46	3.5	11.8	28.7	8.5	9900	
24200	426.0	23	57	3.5	11.9	28.4	8.4	10040	
24300	429.4	24	09	3.6	12.0	28.1	8.3	10180	
24400	433.0	24	21	3.6	12.1	27.9	8.3	10325	
24500	436.6	24	33	3.6	12.2	27.6	8.2	10470	1266
24600	440.2	24	46	3.7	12.4	27.3	8.1	10620	
24700	443.8	24	58	3.7	12.5	27.0	8.0	10770	
24800	447.6	25	10	3.7	12.6	26.7	7.9	10920	
24900	451.4	25	23	3.8	12.7	26.5	7.9	11070	
25000	455.0	25	36	3.8	12.9	26.2	7.8	11230	1256
25100	459.0	25	49	3.9	13.0	25.9	7.7	11390	
25200	462.8	26	02	3.9	13.2	25.6	7.6	11550	
25300	466.8	26	15	3.9	13.3	25.3	7.5	11710	
25400	470.8	26	29	4.0	13.4	25.1	7.4	11870	
25500	474.8	26	42	4.0	13.6	24.8	7.3	12040	1267
25600	478.8	26	56	4.1	13.8	24.5	7.3	12210	
25700	483.0	27	10	4.1	13.9	24.2	7.2	12380	
25800	487.0	27	24	4.2	14.1	23.9	7.1	12560	
25900	491.2	27	38	4.2	14.3	23.6	7.0	12740	
26000	495.6	27	52	4.3	14.5	23.3	6.9	12920	1269
26100	499.8	28	07	4.3	14.7	23.0	6.8	13110	
26200	504.2	28	22	4.4	14.9	22.7	6.7	13300	
26300	508.8	28	37	4.5	15.1	22.4	6.6	13490	
26400	513.2	28	52	4.5	15.3	22.1	6.5	13680	
26500	517.8	29	08	4.6	15.5	21.8	6.5	13880	1272
26600	522.4	29	23	4.7	15.7	21.5	6.4	14080	
26700	527.0	29	39	4.7	15.9	21.2	6.3	14290	
26800	531.8	29	55	4.8	16.1	20.9	6.2	14500	
26900	536.6	30	11	4.9	16.4	20.5	6.1	14710	
27000	541.6	30	28	5.0	16.7	20.2	6.0	14930	1276

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/S. FUZE, BASE DET. MARK X

Part 2, Table A.

Angle of Fall			Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P.E. in Range)	*Probable Error in Range	Defl.	Time of Flight	Range
(10)		(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
mils	°	'	1 on -	mils	°		mils	yds.	yds.	sec.	yds.
606	34	05	1.48	-13	-0.70	11.36	15.1	109	6	49.0	24000
611	34	21	1.46							49.3	24100
615	34	36	1.45							49.7	24200
620	34	52	1.44							50.0	24300
624	35	08	1.42	-13	-0.75	11.30	16.1	111	6	50.3	24400
629	35	24	1.41							50.7	24500
634	35	40	1.39							51.1	24600
639	35	56	1.38							51.4	24700
643	36	12	1.37							51.8	24800
648	36	29	1.35							52.1	24900
653	36	45	1.34	-14	-0.80	11.24	17.3	113	6	52.5	25000
658	37	02	1.33							52.9	25100
663	37	18	1.31							53.2	25200
668	37	35	1.30							53.6	25300
673	37	52	1.29	-15	-0.80	11.18	18.6	115	6	54.0	25400
678	38	09	1.27							54.4	25500
683	38	26	1.26							54.8	25600
688	38	43	1.25							55.1	25700
693	39	01	1.23							55.5	25800
699	39	18	1.22							55.9	25900
704	39	36	1.21	-15	-0.85	11.11	20.1	117	7	56.3	26000
709	39	54	1.20							56.7	26100
715	40	12	1.18							57.1	26200
720	40	30	1.17							57.5	26300
726	40	49	1.16	-16	-0.90	11.04	21.9	119	7	57.9	26400
731	41	07	1.15							58.3	26500
737	41	26	1.13							58.7	26600
742	41	44	1.12							59.2	26700
748	42	03	1.11							59.6	26800
753	42	22	1.10							60.0	26900
759	42	41	1.08	-17	-0.95	10.97	24.	121	7	60.5	27000

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table A.

Range	Angle of Elev.		Change in Elev. for 100 yds. change in Range		Change in Range for 1 mil 1 min change in Elev.		Maximum Ordinate	Terminal Velocity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
yards	mils	o '	mils	min.	yards	yards	feet	f/s
27000	541.6	30 28	5.0	16.7	20.2	6.0	14930	1276
27100	546.6	30 45	5.0	17.0	19.9	5.9	15160	
27200	551.6	31 02	5.1	17.3	19.5	5.8	15390	
27300	556.8	31 19	5.2	17.6	19.2	5.7	15620	
27400	562.0	31 37	5.3	17.9	18.8	5.6	15860	1281
27500	567.4	31 55	5.4	18.2	18.5	5.5	16100	
27600	572.8	32 13	5.5	18.6	18.1	5.4	16350	
27700	578.4	32 32	5.6	19.0	17.8	5.3	16610	
27800	584.0	32 51	5.8	19.4	17.4	5.2	16880	
27900	589.8	33 11	5.9	19.8	17.1	5.1	17160	
28000	595.8	33 31	6.0	20.2	16.7	4.9	17450	1287
28100	601.8	33 51	6.1	20.7	16.3	4.8	17750	
28200	608.0	34 12	6.3	21.2	15.9	4.7	18050	
28300	614.4	34 34	6.5	21.8	15.5	4.6	18350	
28400	621.0	34 56	6.6	22.4	15.1	4.5	18650	1296
28500	627.8	35 19	6.8	23.0	14.7	4.4	19000	
28600	634.8	35 43	7.0	23.7	14.3	4.2	19350	
28700	642.0	36 07	7.3	24.5	13.8	4.1	19700	
28800	649.4	36 32	7.6	25.5	13.3	3.9	20050	
28900	657.2	36 58	7.9	26.6	12.7	3.8	20450	
29000	665.2	37 25	8.3	27.9	12.1	3.6	20850	1310
29100	673.6	37 54	8.7	29.4	11.5	3.4	21300	1320
29200	682.6	38 34					21800	

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table A.

Angle of Fall		Slope of Fall	Defl. due to Drift		Ballistic Coefficient	Fork (Change in Elev. for 4 P. E. in Range)	*Probable Error in		Time of Flight	Range
(10)	(11)	(12)	(13)	(14)	(15)	(16)	Range (17)	Defl. (18)	(19)	(20)
mils	o '	1 on -	mils	o		mils	yds.	yds.	sec.	yds.
759	42 41	1.08	-17	-0.95	10.97	24.	121	7	60.5	27000
765	43 00	1.07							60.9	27100
770	43 20	1.06							61.4	27200
776	43 39	1.05							61.9	27300
782	43 59	1.04							62.4	27400
788	44 19	1.02	-18	-1.00	10.90	27.	123	7	62.9	27500
794	44 39	1.01							63.4	27600
800	44 59	1.00							63.9	27700
806	45 20	0.99							64.4	27800
812	45 40	0.98							64.9	27900
818	46 01	0.97	-20	-1.10	10.82	30.	126	7	65.4	28000
824	46 22	0.95							65.9	28100
830	46 43	0.94							66.5	28200
837	47 04	0.93							67.0	28300
843	47 25	0.92							67.6	28400
849	47 47	0.91	-22	-1.20	10.74	35.	128	7	68.2	28500
856	48 09	0.90							68.8	28600
862	48 31	0.88							69.5	28700
869	48 53	0.87							70.1	28800
875	49 15	0.86							70.8	28900
882	49 37	0.85	-24	-1.35	10.65	43.	131	7	71.5	29000
889	50 00	0.84						133	7	72.3	29100
896	50 23	0.83	-25	-1.40	10.60				73.1	29200

*This is the Proving Ground Probable Error.

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table B.

TARGET BELOW GUN - RANGE EFFECTS IN YARDS

Height of Target feet	Map Range - yards							
	1000	1500	2000	2500	3000	3500	4000	4500
-10	364	238	174	136	111	94	81	70
-20	734	479	350	273	223	188	161	140
-30	1109	722	527	411	336	282	242	211
-40		966	705	550	450	377	322	281
-50		1212	885	691	565	472	403	352
-60		1460	1066	833	679	567	485	423
-70			1248	974	793	663	567	493
-80			1432	1116	907	759	649	564
-90			1617	1258	1022	855	732	636
-100			1804	1402	1137	951	815	708
-110				1546	1253	1049	898	780
-120				1692	1370	1147	982	852
-130				1839	1488	1245	1066	924
-140				1986	1606	1344	1150	997
-150				2134	1725	1442	1234	1070
-160				2283	1844	1541	1319	1143
-170				2433	1964	1640	1403	1216
-180					2085	1740	1488	1290
-190					2207	1840	1572	1363
-200					2329	1941	1657	1437
-220					2577	2144	1829	1585
-240					2828	2349	2002	1734
-260						2556	2176	1884
-280						2765	2352	2035
-300						2976	2529	2188
-320						3189	2707	2341
-340						3404	2886	2495
-360							3067	2650
-380							3249	2805
-400							3433	2961
-420							3619	3117
-440							3806	3274
-460							3995	3432
-480								3591
-500								3751

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table B.

TARGET BELOW GUN - RANGE EFFECTS IN YARDS

Map Range-yards							Height of Target
5000	5500	6000	6500	7000	7500	8000	feet
62	55	50	45	41	37	34	-10
124	110	99	90	82	75	69	-20
186	166	149	135	123	112	103	-30
248	221	198	180	164	150	137	-40
310	276	248	225	205	187	171	-50
372	331	298	270	246	225	206	-60
434	387	348	315	287	262	240	-70
497	443	398	360	328	300	275	-80
560	499	448	406	369	337	309	-90
623	555	499	452	411	375	344	-100
686	611	549	497	452	413	378	-110
749	667	600	543	494	451	413	-120
812	723	651	589	535	489	448	-130
876	780	702	635	577	527	483	-140
940	837	753	681	619	565	518	-150
1004	894	804	727	661	603	553	-160
1068	951	855	773	702	641	588	-170
1133	1008	906	819	744	679	623	-180
1197	1065	957	865	786	718	658	-190
1262	1125	1009	912	828	756	693	-200
1392	1238	1112	1005	913	834	764	-220
1523	1354	1216	1098	997	911	835	-240
1654	1470	1320	1191	1082	988	905	-260
1786	1587	1424	1285	1167	1065	976	-280
1919	1704	1529	1380	1253	1143	1047	-300
2052	1822	1634	1475	1339	1221	1118	-320
2186	1940	1740	1570	1425	1300	1190	-340
2321	2059	1846	1666	1512	1379	1262	-360
2456	2178	1952	1762	1599	1458	1334	-380
2592	2298	2059	1858	1686	1537	1407	-400
2729	2419	2166	1954	1773	1617	1480	-420
2866	2540	2274	2051	1861	1697	1553	-440
3004	2662	2382	2148	1949	1777	1626	-460
3143	2784	2490	2245	2037	1857	1699	-480
3285	2907	2599	2342	2124	1937	1772	-500

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table B.

TARGET BELOW GUN - RANGE EFFECTS IN YARDS

Height of Target feet	Map Range-yards						
	8500	9000	9500	10000	10500	11000	11500
−10	31	29	27	25	23	22	21
−20	63	58	54	50	46	43	41
−30	95	88	81	75	70	65	61
−40	126	117	108	100	93	87	81
−50	157	145	134	125	116	108	101
−60	189	174	161	150	140	130	121
−70	220	203	188	175	163	152	142
−80	252	232	215	200	186	174	163
−90	284	262	243	226	210	196	183
−100	316	291	270	251	233	217	203
−110	348	321	297	276	257	239	223
−120	380	350	324	301	280	261	244
−130	412	380	351	326	304	283	264
−140	444	409	379	352	327	305	285
−150	476	439	406	377	351	327	305
−160	508	468	433	402	374	349	326
−170	540	498	461	428	398	371	346
−180	573	528	488	453	422	393	367
−190	605	558	516	479	445	415	387
−200	637	587	543	504	469	437	408
−220	702	647	598	555	516	481	449
−240	767	707	654	606	564	526	491
−260	832	767	709	657	611	570	532
−280	897	827	765	709	659	614	573
−300	962	887	820	760	707	659	615
−320	1028	948	876	812	755	704	657
−340	1094	1008	932	864	803	748	698
−360	1160	1069	988	916	851	793	740
−380	1226	1130	1044	968	900	838	782
−400	1292	1190	1100	1020	948	883	824
−420	1359	1251	1156	1072	997	928	866
−440	1425	1312	1213	1125	1046	974	908
−460	1492	1374	1270	1177	1094	1019	951
−480	1559	1436	1327	1230	1143	1065	993
−500	1626	1497	1384	1283	1192	1110	1035

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table B.

TARGET BELOW GUN - RANGE EFFECTS IN YARDS

| Map Range - yards | | | | | | | Height of Target |
12000	12500	13000	13500	14000	14500	15000	feet
19	18	17	16	15	14	13	-10
38	35	33	31	29	28	26	-20
57	53	50	47	44	42	39	-30
76	71	66	62	58	55	52	-40
95	89	83	78	73	69	65	-50
113	106	100	94	88	83	78	-60
132	124	116	109	103	97	91	-70
152	142	133	125	117	110	104	-80
171	160	150	141	132	124	117	-90
190	178	166	156	147	138	130	-100
209	196	183	171	161	152	143	-110
228	213	199	187	176	166	156	-120
247	231	216	203	191	180	169	-130
266	249	233	219	206	194	182	-140
285	267	250	234	220	207	195	-150
305	285	267	250	235	221	208	-160
324	303	284	266	250	235	221	-170
343	321	301	282	265	249	235	-180
362	339	317	297	279	263	248	-190
381	357	334	313	294	277	261	-200
420	395	368	345	324	305	287	-220
459	429	401	376	354	333	313	-240
497	465	435	408	383	361	340	-260
536	501	469	440	413	389	366	-280
575	538	503	471	443	417	393	-300
614	574	537	503	473	445	419	-320
653	611	571	535	502	473	446	-340
692	647	605	567	532	501	472	-360
731	684	640	599	562	529	499	-380
770	720	674	631	529	557	525	-400
809	757	708	663	622	585	551	-420
848	793	742	695	652	613	578	-440
888	830	777	728	683	642	605	-460
927	867	811	760	713	670	631	-480
967	904	846	792	743	699	658	-500

900 LB. A. P. PROJ. (SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table B.

TARGET BELOW GUN - RANGE EFFECTS IN YARDS

Height of Target feet	Map Range - yards						
	15500	16000	16500	17000	17500	18000	18500
-10	12	11	11	10	10	9	9
-20	24	22	22	20	19	18	17
-30	36	34	32	30	29	27	26
-40	49	46	43	41	38	36	34
-50	61	57	54	51	48	46	43
-60	73	69	65	62	58	55	52
-70	85	80	76	72	68	64	60
-80	98	92	87	82	77	73	69
-90	110	104	98	93	87	82	77
-100	122	115	109	103	97	91	86
-110	134	126	119	113	106	100	95
-120	147	138	130	123	116	109	103
-130	159	149	141	133	126	118	112
-140	171	161	152	144	136	128	121
-150	183	173	163	154	145	137	130
-160	196	185	174	164	155	146	138
-170	208	196	185	175	165	156	147
-180	221	208	196	185	175	165	156
-190	233	219	207	195	184	174	165
-200	246	231	218	206	194	183	173
-220	270	254	240	227	214	202	191
-240	295	278	262	247	233	220	208
-260	320	301	284	268	252	238	225
-280	345	325	306	289	272	257	243
-300	370	348	328	310	292	275	260
-320	395	372	350	330	311	294	278
-340	420	395	372	351	331	312	295
-360	445	419	395	372	350	331	313
-380	470	443	417	393	370	349	330
-400	495	466	439	414	390	368	348
-420	520	490	462	435	410	387	366
-440	545	513	483	456	430	406	383
-460	570	537	506	477	449	424	401
-480	595	561	528	498	469	443	418
-500	620	584	550	519	489	462	436

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table B.

TARGET BELOW GUN — RANGE EFFECTS IN YARDS

Map Range - yards							Height of Target
19000	19500	20000	20500	21000	21500	22000	feet
8	8	7	7	7	6	6	-10
16	15	14	14	14	13	12	-20
24	23	22	21	20	19	18	-30
32	31	29	28	27	25	24	-40
41	39	37	35	33	31	30	-50
49	47	44	42	40	38	36	-60
57	54	51	49	46	44	42	-70
65	62	58	55	53	50	48	-80
73	70	66	62	59	56	54	-90
82	78	73	69	66	63	60	-100
90	85	80	76	72	69	66	-110
98	93	88	83	79	76	72	-120
106	101	95	90	86	83	78	-130
115	109	103	97	93	89	84	-140
123	116	110	104	99	95.	90	-150
131	124	117	111	106	101	96	-160
139	132	125	118	112	107	102	-170
148	140	132	125	119	113	108	-180
156	148	140	132	125	119	114	-190
164	155	147	139	132	126	120	-200
181	171	162	153	145	138	132	-220
197	186	176	167	159	151	144	-240
213	202	191	181	172	164	156	-260
230	218	206	195	185	176	168	-280
246	233	221	210	199	189	180	-300
263	249	236	224	212	202	192	-320
279	264	251	238	226	215	204	-340
296	280	265	252	239	227	216	-360
312	295	280	266	253	240	228	-380
329	311	295	280	266	253	241	-400
346	327	310	294	279	266	253	-420
362	343	325	308	293	279	265	-440
379	358	339	322	306	291	277	-460
395	374	354	336	320	304	289	-480
412	390	369	350	333	317	302	-500

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table B.

TARGET BELOW GUN - RANGE EFFECTS IN YARDS

Height of Target feet	Map Range - yards						
	22500	23000	23500	24000	24500	25000	25500
-10	6	5	5	5	5	4	4
-20	11	11	10	10	10	9	8
-30	17	16	15	15	14	13	12
-40	22	21	20	19	18	17	17
-50	28	27	26	24	23	22	21
-60	34	33	31	29	27	26	25
-70	40	38	36	34	32	31	29
-80	46	44	41	39	37	35	33
-90	51	49	46	44	42	40	38
-100	57	54	52	49	47	44	42
-110	63	60	57	54	51	49	46
-120	68	65	62	59	56	53	50
-130	74	70	67	64	61	58	54
-140	80	76	72	69	66	62	59
-150	85	81	77	74	70	67	63
-160	91	87	83	79	75	71	67
-170	97	92	88	84	80	76	72
-180	103	98	93	89	84	80	76
-190	108	103	98	94	89	85	81
-200	114	109	104	99	94	89	85
-220	126	120	114	109	103	98	93
-240	137	131	125	119	113	107	102
-240	149	142	135	129	122	116	110
-280	160	152	145	138	132	125	119
-300	171	163	156	148	141	134	127
-320	183	174	166	158	150	143	135
-340	194	185	177	168	160	152	144
-360	206	196	187	178	169	161	153
-380	217	207	198	188	179	170	161
-400	229	218	208	198	188	179	170
-420	241	229	218	208	198	188	178
-440	252	240	229	218	207	197	187
-460	264	251	239	227	216	206	196
-480	275	262	249	237	226	215	204
-500	287	273	260	247	235	224	213

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/S. FUZE, BASE DET. MARK X

Part 2. Table B.

TARGET BELOW GUN - RANGE EFFECTS IN YARDS

Map Range-yards							Height of Target
26000	26500	27000	27500	28000	28500	29000	feet
4	4	4	3	3	3	3	-10
8	7	7	7	6	6	6	-20
12	11	11	10	10	9	9	-30
16	15	14	13	13	12	11	-40
20	19	18	17	16	15	14	-50
24	23	21	20	19	18	17	-60
28	26	25	23	22	21	20	-70
32	30	29	27	25	24	23	-80
36	34	32	30	28	27	26	-90
40	38	36	34	32	30	29	-100
44	42	39	37	35	33	32	-110
48	46	43	41	38	36	34	-120
52	50	46	44	41	39	37	-130
56	53	50	47	44	42	40	-140
60	57	53	50	47	45	42	-150
64	61	57	54	51	48	45	-160
68	64	61	57	54	51	48	-170
72	68	65	61	58	54	51	-180
76	72	68	64	61	57	54	-190
80	76	72	68	64	60	57	-200
88	84	79	75	70	66	62	-220
96	91	86	82	77	72	68	-240
104	99	94	89	83	78	73	-260
112	106	101	95	90	84	79	-280
120	114	108	102	96	90	85	-300
128	122	115	109	102	96	91	-320
137	130	123	116	109	103	97	-340
145	137	130	123	116	109	102	-360
153	145	138	130	122	115	108	-380
161	153	145	137	129	121	114	-400
169	161	152	144	135	127	120	-420
177	169	160	151	142	133	125	-440
186	176	167	157	148	139	131	-460
194	184	174	164	154	145	137	-480
202	192	182	171	161	151	143	-500

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/s. FUZE, BASE DET. MARK X

Part 2. Table C.

TARGET ABOVE GUN - RANGE EFFECTS IN YARDS

Height of Target feet	Map Range-yards							
	1000	1500	2000	2500	3000	3500	4000	4500
10	-359	-236	-173	-136	-111	-93	-80	-69
20	-713	-470	-345	-271	-221	-186	-160	-139
30	-1063	-701	-516	-405	-331	-278	-239	-208
40		-930	-685	-539	-441	-370	-318	-278
50		-1156	-853	-672	-550	-463	-397	-347
60		-1378	-1020	-804	-658	-555	-476	-415
70			-1186	-935	-766	-646	-555	-484
80			-1350	-1065	-874	-737	-633	-552
90			-1513	-1195	-981	-827	-711	-621
100			-1675	-1325	-1087	-917	-789	-689
110				-1454	-1193	-1007	-867	-757
120				-1582	-1298	-1096	-944	-825
130				-1709	-1403	-1185	-1021	-893
140				-1836	-1507	-1274	-1098	-960
150				-1962	-1611	-1363	-1175	-1027
160				-2087	-1715	-1451	-1251	-1094
170					-1819	-1539	-1327	-1161
180					-1922	-1627	-1403	-1228
190					-2025	-1715	-1479	-1295
200					-2128	-1802	-1554	-1361
220					-2333	-1976	-1704	-1493
240					-2537	-2149	-1853	-1625
260						-2320	-2002	-1756
280						-2490	-2150	-1886
300						-2659	-2297	-2015
320						-2827	-2443	-2144
340							-2588	-2272
360							-2733	-2399
380							-2877	-2526
400							-3021	-2652
420							-3164	-2778
440							-3306	-2903
460							-3448	-3027
480								-3151
500								-3274

900 LB. A.P. PROJ.(SHELL) M.V.= 2325 F/s. FUZE, BASE DET. MARK X

Part 2. Table C.

TARGET ABOVE GUN - RANGE EFFECTS IN YARDS

Map Range-yards							Height of Target
5000	5500	6000	6500	7000	7500	8000	feet
-61	-55	-49	-44	-40	-37	-34	10
-122	-109	-98	-89	-81	-74	-68	20
-183	-163	-147	-134	-122	-111	-102	30
-245	-218	-196	-178	-162	-148	-136	40
-306	-273	-246	-223	-203	-185	-170	50
-367	-328	-295	-267	-243	-222	-204	60
-428	-382	-344	-311	-284	-259	-238	70
-488	-436	-393	-356	-324	-296	-272	80
-549	-490	-441	-400	-364	-333	-306	90
-609	-544	-490	-444	-404	-369	-339	100
-669	-598	-539	-488	-444	-406	-372	110
-729	-651	-587	-532	-484	-442	-406	120
-789	-705	-635	-576	-524	-478	-439	130
-849	-758	-683	-619	-563	-514	-472	140
-909	-812	-731	-662	-603	-551	-506	150
-968	-865	-779	-705	-642	-587	-539	160
-1028	-918	-827	-749	-682	-624	-572	170
-1087	-971	-874	-792	-721	-660	-606	180
-1146	-1024	-922	-836	-761	-696	-639	190
-1205	-1077	-970	-879	-800	-732	-672	200
-1323	-1182	-1064	-965	-878	-803	-738	220
-1440	-1287	-1159	-1050	-956	-875	-804	240
-1556	-1391	-1253	-1136	-1035	-947	-869	260
-1672	-1495	-1347	-1221	-1113	-1018	-935	280
-1787	-1599	-1441	-1306	-1190	-1089	-1000	300
-1902	-1702	-1534	-1391	-1267	-1160	-1065	320
-2016	-1805	-1627	-1475	-1344	-1230	-1130	340
-2130	-1907	-1719	-1559	-1421	-1301	-1195	360
-2243	-2008	-1811	-1643	-1498	-1371	-1259	380
-2356	-2109	-1902	-1726	-1574	-1441	-1324	400
-2468	-2210	-1993	-1809	-1650	-1510	-1388	420
-2579	-2310	-2084	-1892	-1726	-1580	-1452	440
-2690	-2410	-2174	-1974	-1801	-1649	-1516	460
-2800	-2509	-2264	-2056	-1876	-1718	-1580	480
-2910	-2608	-2354	-2138	-1951	-1787	-1643	500

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 f/s.   FUZE, BASE DET. MARK X

Part 2. Table C.

TARGET ABOVE GUN - RANGE EFFECTS IN YARDS

Height of Target feet	Map Range - yards						
	8500	9000	9500	10000	10500	11000	11500
10	−31	−29	−27	−25	−23	−22	−21
20	−63	−58	−54	−50	−46	−43	−41
30	−94	−87	−80	−74	−69	−65	−61
40	−125	−115	−107	−99	−92	−86	−81
50	−156	−144	−133	−124	−115	−108	−101
60	−188	−173	−160	−148	−138	−129	−121
70	−219	−202	−187	−173	−161	−151	−141
80	−250	−230	−213	−198	−184	−172	−161
90	−281	−259	−240	−223	−207	−193	−181
100	−312	−288	−266	−247	−230	−215	−201
110	−343	−317	−293	−272	−253	−236	−221
120	−374	−345	−319	−296	−276	−258	−241
130	−405	−374	−346	−321	−299	−279	−261
140	−435	−402	−372	−345	−321	−300	−281
150	−466	−430	−398	−369	−344	−322	−301
160	−496	−458	−424	−394	−367	−343	−321
170	−527	−487	−451	−419	−390	−364	−340
180	−558	−515	−477	−443	−412	−385	−360
190	−589	−544	−503	−467	−435	−406	−380
200	−619	−572	−530	−492	−458	−428	−400
220	−680	−628	−582	−541	−504	−470	−439
240	−741	−685	−635	−590	−550	−513	−479
260	−801	−741	−687	−639	−595	−555	−518
280	−862	−797	−739	−687	−640	−597	−557
300	−922	−853	−791	−735	−684	−639	−597
320	−982	−909	−843	−783	−729	−680	−636
340	−1042	−964	−894	−831	−774	−722	−675
360	−1102	−1020	−946	−879	−819	−764	−714
380	−1161	−1075	−997	−927	−863	−805	−753
400	−1221	−1130	−1048	−974	−907	−847	−792
420	−1280	−1185	−1099	−1021	−951	−888	−830
440	−1339	−1239	−1150	−1069	−996	−930	−869
460	−1398	−1294	−1201	−1116	−1040	−971	−908
480	−1457	−1348	−1251	−1163	−1084	−1012	−946
500	−1516	−1403	−1302	−1211	−1128	−1053	−985

900 LB. A.P. PROJ. (SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table C.

TARGET ABOVE GUN - RANGE EFFECTS IN YARDS

Map Range - yards							Height of Target
12000	12500	13000	13500	14000	14500	15000	feet
-19	-18	-17	-16	-15	-14	-13	10
-38	-35	-33	-31	-29	-28	-26	20
-57	-53	-50	-47	-44	-42	-39	30
-75	-70	-66	-62	-58	-55	-52	40
-94	-88	-83	-78	-73	-69	-65	50
-113	-106	-99	-93	-88	-83	-78	60
-132	-124	-116	-109	-102	-96	-91	70
-151	-141	-132	-124	-117	-110	-104	80
-170	-159	-149	-140	-131	-123	-116	90
-188	-176	-165	-155	-146	-137	-129	100
-207	-194	-182	-171	-160	-150	-141	110
-225	-211	-198	-186	-175	-164	-154	120
-244	-228	-214	-201	-189	-178	-167	130
-263	-246	-230	-216	-203	-191	-180	140
-282	-264	-247	-232	-218	-205	-193	150
-300	-281	-263	-247	-232	-218	-206	160
-318	-298	-280	-263	-247	-232	-218	170
-337	-316	-296	-278	-261	-245	-231	180
-356	-333	-312	-293	-275	-259	-244	190
-374	-350	-328	-308	-290	-272	-257	200
-411	-385	-361	-339	-318	-299	-262	220
-448	-419	-393	-369	-347	-326	-307	240
-485	-454	-425	-399	-375	-353	-333	260
-521	-488	-458	-430	-404	-380	-358	280
-558	-523	-490	-460	-433	-407	-384	300
-595	-557	-522	-490	-461	-434	-409	320
-632	-592	-555	-521	-490	-461	-435	340
-668	-625	-587	-551	-518	-488	-460	360
-705	-660	-619	-581	-546	-514	-485	380
-741	-694	-651	-611	-575	-541	-510	400
-777	-728	-683	-641	-603	-568	-535	420
-813	-762	-715	-671	-631	-594	-560	440
-850	-796	-746	-701	-660	-621	-587	460
-886	-830	-778	-731	-688	-648	-610	480
-922	-864	-810	-761	-716	-674	-635	500

900 LB. A.P. PROJ.(SHELL) M.V.= 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table C.

TARGET ABOVE GUN - RANGE EFFECTS IN YARDS

Height of Target feet	Map Range-yards						
	15500	16000	16500	17000	17500	18000	18500
10	-12	-11	-11	-10	-10	-9	-9
20	-24	-23	-22	-20	-19	-18	-17
30	-36	-34	-32	-30	-29	-27	-26
40	-49	-46	-43	-41	-38	-36	-34
50	-61	-57	-54	-51	-48	-46	-43
60	-73	-69	-65	-62	-58	-55	-52
70	-85	-80	-76	-72	-68	-64	-60
80	-97	-91	-86	-82	-77	-73	-69
90	-109	-103	-97	-92	-87	-82	-77
100	-121	-114	-108	-102	-96	-91	-86
110	-133	-125	-118	-112	-106	-100	-94
120	-145	-137	-129	-122	-115	-109	-103
130	-157	-148	-140	-133	-125	-118	-111
140	-170	-160	-151	-143	-135	-127	-120
150	-182	-172	-162	-153	-144	-136	-128
160	-194	-183	-173	-163	-154	-145	-137
170	-206	-195	-184	-173	-163	-154	-146
180	-218	-206	-195	-184	-173	-163	-154
190	-230	-217	-205	-194	-183	-172	-163
200	-242	-228	-216	-204	-192	-181	-171
220	-266	-251	-237	-224	-211	-199	-188
240	-290	-274	-259	-244	-230	-217	-205
260	-314	-296	-280	-264	-249	-235	-222
280	-338	-319	-301	-284	-268	-253	-239
300	-362	-341	-323	-305	-287	-271	-256
320	-386	-364	-344	-325	-306	-289	-273
340	-410	-387	-366	-345	-325	-307	-290
360	-434	-410	-387	-365	-344	-325	-307
380	-458	-432	-408	-385	-363	-343	-324
400	-481	-454	-429	-405	-382	-361	-341
420	-505	-477	-450	-425	-401	-379	-358
440	-528	-499	-471	-445	-420	-397	-375
460	-552	-521	-492	-465	-439	-415	-392
480	-575	-543	-513	-484	-457	-432	-409
500	-599	-566	-534	-504	-476	-450	-426

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table C.

TARGET ABOVE GUN - RANGE EFFECTS IN YARDS

Map Range-yards							Height of Target
19000	19500	20000	20500	21000	21500	22000	feet
-8	-8	-7	-7	-7	-6	-6	10
-16	-15	-14	-14	-13	-13	-12	20
-24	-23	-22	-21	-20	-19	-18	30
-32	-31	-29	-28	-27	-25	-24	40
-41	-39	-37	-35	-33	-31	-30	50
-49	-47	-44	-42	-40	-38	-36	60
-57	-54	-51	-49	-46	-44	-42	70
-65	-62	-58	-55	-53	-50	-48	80
-73	-69	-66	-62	-59	-56	-54	90
-81	-77	-73	-69	-66	-63	-60	100
-89	-84	-80	-76	-72	-69	-66	110
-97	-92	-87	-83	-79	-75	-72	120
-105	-99	-94	-89	-85	-81	-78	130
-113	-107	-101	-96	-92	-88	-84	140
-121	-115	-109	-103	-98	-94	-89	150
-130	-123	-116	-110	-105	-100	-95	160
-138	-131	-124	-117	-111	-106	-101	170
-146	-138	-131	-124	-118	-113	-107	180
-154	-146	-138	-131	-125	-119	-113	190
-162	-154	-146	-138	-131	-125	-119	200
-178	-169	-160	-152	-144	-137	-131	220
-194	-184	-174	-165	-157	-150	-143	240
-210	-199	-189	-179	-170	-162	-154	260
-226	-214	-203	-193	-184	-175	-166	280
-243	-230	-218	-207	-197	-187	-178	300
-259	-245	-232	-221	-210	-200	-190	320
-275	-261	-247	-234	-223	-212	-202	340
-291	-276	-262	-248	-236	-224	-213	360
-307	-291	-276	-262	-249	-237	-225	380
-323	-306	-290	-275	-262	-249	-237	400
-339	-321	-304	-289	-275	-261	-249	420
-355	-336	-319	-303	-288	-274	-261	440
-371	-352	-333	-316	-301	-286	-272	460
-387	-367	-348	-330	-314	-299	-284	480
-403	-382	-362	-344	-327	-311	-296	500

900 LB. A.P. PROJ.(SHELL) M.V.= 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table C.

TARGET ABOVE GUN - RANGE EFFECTS IN YARDS

Height of Target feet	Map Range-yards						
	22500	23000	23500	24000	24500	25000	25500
10	-6	-5	-5	-5	-5	-4	-4
20	-11	-11	-10	-10	-10	-9	-8
30	-17	-16	-16	-15	-14	-13	-12
40	-22	-21	-20	-19	-18	-17	-17
50	-28	-27	-26	-24	-23	-22	-21
60	-34	-33	-31	-29	-27	-26	-25
70	-40	-38	-36	-34	-32	-31	-29
80	-46	-44	-41	-39	-37	-35	-33
90	-51	-49	-46	-44	-42	-40	-38
100	-57	-54	-52	-49	-47	-44	-42
110	-63	-60	-57	-54	-51	-48	-46
120	-68	-65	-62	-59	-56	-53	-50
130	-74	-70	-67	-64	-61	-58	-55
140	-79	-75	-72	-69	-66	-62	-59
150	-84	-80	-77	-74	-70	-66	-63
160	-90	-86	-83	-79	-75	-71	-67
170	-96	-92	-88	-84	-80	-76	-72
180	-102	-97	-93	-88	-84	-80	-76
190	-107	-102	-98	-93	-89	-84	-80
200	-113	-108	-103	-98	-93	-88	-84
220	-125	-119	-114	-108	-102	-97	-92
240	-136	-130	-124	-118	-112	-106	-101
260	-147	-140	-134	-128	-121	-115	-109
280	-158	-151	-144	-138	-131	-124	-118
300	-169	-162	-154	-147	-140	-133	-126
320	-181	-173	-165	-157	-149	-142	-135
340	-192	-183	-175	-166	-158	-150	-143
360	-203	-194	-185	-176	-168	-159	-151
380	-215	-205	-195	-186	-177	-168	-160
400	-226	-216	-205	-195	-186	-177	-168
420	-237	-226	-215	-205	-195	-186	-177
440	-248	-236	-225	-214	-204	-194	-185
460	-259	-247	-235	-224	-213	-203	-193
480	-271	-258	-246	-234	-223	-212	-202
500	-282	-269	-256	-244	-232	-221	-211

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/s.   FUZE, BASE DET. MARK X

Part 2. Table C.

TARGET ABOVE GUN - RANGE EFFECTS IN YARDS

| Map Range - yards | | | | | | | Height of Target |
26000	26500	27000	27500	28000	28500	29000	feet
-4	-4	-4	-3	-3	-3	-3	10
-8	-7	-7	-7	-6	-6	-6	20
-12	-11	-11	-10	-10	-9	-9	30
-16	-15	-14	-13	-13	-12	-11	40
-20	-19	-18	-17	-16	-15	-14	50
-24	-23	-21	-20	-19	-18	-17	60
-28	-26	-25	-23	-22	-21	-20	70
-32	-30	-29	-27	-25	-24	-23	80
-36	-34	-32	-30	-28	-27	-26	90
-40	-38	-36	-34	-32	-30	-29	100
-44	-42	-39	-37	-35	-33	-31	110
-48	-46	-43	-41	-38	-36	-34	120
-52	-49	-46	-44	-41	-39	-37	130
-56	-53	-50	-47	-44	-42	-40	140
-60	-57	-53	-50	-47	-45	-42	150
-64	-61	-57	-54	-51	-48	-45	160
-68	-64	-61	-57	-54	-51	-48	170
-72	-68	-65	-61	-58	-54	-51	180
-76	-72	-68	-64	-61	-57	-54	190
-80	-76	-72	-68	-64	-60	-57	200
-88	-84	-79	-75	-70	-66	-62	220
-96	-91	-86	-82	-77	-72	-68	240
-104	-99	-94	-89	-83	-78	-73	260
-112	-106	-101	-95	-90	-84	-79	280
-120	-114	-108	-102	-96	-90	-85	300
-128	-122	-115	-109	-102	-96	-90	320
-136	-129	-122	-116	-109	-102	-96	340
-144	-137	-130	-123	-115	-108	-101	360
-152	-144	-137	-129	-122	-114	-107	380
-160	-152	-144	-136	-128	-120	-113	400
-168	-160	-151	-143	-134	-126	-118	420
-176	-167	-158	-150	-141	-132	-124	440
-184	-175	-166	-156	-147	-138	-130	460
-192	-182	-173	-163	-154	-144	-135	480
-200	-190	-180	-170	-160	-150	-141	500

900 LB. A.P. PROJ.(SHELL)   M.V.= 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table D.

WEIGHT OF PROJECTILE, EFFECTS IN YARDS OF RANGE DUE TO VARIATIONS IN.

Range yards	Variations in Weight of Projectile - per cent										
	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
1000	+26	+21	+16	+11	+4	0	-4	-11	-16	-21	-26
2000	+47	+38	+28	+19	+9	0	-9	-19	-28	-38	-47
3000	+65	+52	+39	+26	+13	0	-13	-26	-39	-52	-65
4000	+79	+64	+48	+32	+16	0	-16	-32	-48	-64	-79
5000	+91	+73	+55	+37	+18	0	-18	-37	-55	-73	-91
6000	+101	+81	+61	+41	+20	0	+20	-41	-61	-81	-101
7000	+109	+88	+66	+44	+22	0	-22	-44	-66	-88	-109
8000	+115	+92	+69	+46	+23	0	-23	-46	-69	-92	-115
9000	+119	+96	+72	+48	+24	0	-24	-48	-72	-96	-119
10000	+121	+97	+73	+49	+24	0	-24	-49	-73	-97	-121
11000	+121	+97	+73	+48	+24	0	-24	-48	-73	-97	-121
12000	+117	+94	+70	+47	+23	0	-23	-47	-70	-94	-117
13000	+111	+89	+67	+45	+22	0	-22	-45	-67	-89	-111
14000	+103	+82	+62	+41	+21	0	-21	-41	-62	-82	-103
15000	+92	+74	+55	+37	+18	0	-18	-37	-55	-74	-92
16000	+80	+64	+48	+32	+16	0	-16	-32	-48	-64	-80
17000	+67	+54	+40	+27	+13	0	-13	-27	-40	-54	-67
18000	+53	+43	+32	+21	+11	0	-11	-21	-32	-43	-53
19000	+39	+31	+23	+16	+8	0	-8	-16	-23	-31	-39
20000	+23	+19	+14	+9	+5	0	-5	-9	-14	-19	-23
21000	+7	+6	+4	+3	+1	0	-1	-3	-4	-6	-7
22000	-9	-8	-6	-4	-2	0	+2	+4	+6	+8	+9
23000	-26	-21	-16	-10	-5	0	+5	+10	+16	+21	+26
24000	-43	-34	-26	-17	-9	0	+9	+17	+26	+34	+43
25000	-60	-48	-36	-24	-12	0	+12	+24	+36	+48	+60
26000	-76	-61	-46	-31	-15	0	+15	+31	+46	+61	+76
27000	-91	-73	-55	-37	-18	0	+18	+37	+55	+73	+91
28000	-104	-84	-63	-42	-21	0	+21	+42	+63	+84	+104
29000	-114	-92	-69	-46	-23	0	+23	+46	+69	+92	+114
29200	-113	-91	-68	-45	-23	0	+23	+45	+68	+91	+113

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table E.

*ROTATION OF THE EARTH, EFFECTS IN YARDS OF RANGE DUE TO

Latitude 0°

Range yards	Azimuth of Target - degrees						
	0 / 180	15 / 165	30 / 150	45 / 135	60 / 120	75 / 105	90 / 90
2000	0	+5-	+9-	+18-	+17-	+18-	+19-
4000	0	+9-	+18-	+25-	+31-	+34-	+36-
6000	0	+13-	+25-	+35-	+43-	+48-	+50-
8000	0	+16-	+31-	+45-	+55-	+61-	+63-
10000	0	+19-	+37-	+53-	+65-	+72-	+75-
12000	0	+22-	+42-	+60-	+74-	+82-	+85-
14000	0	+24-	+46-	+66-	+81-	+90-	+93-
16000	0	+26-	+49-	+70-	+86-	+96-	+99-
18000	0	+27-	+51-	+73-	+89-	+100-	+103-
20000	0	+27-	+53-	+75-	+92-	+102-	+106-
22000	0	+28-	+54-	+77-	+94-	+105-	+109-
24000	0	+29-	+55-	+78-	+96-	+107-	+111-
26000	0	+29-	+56-	+79-	+97-	+109-	+112-
28000	0	+28-	+55-	+77-	+94-	+105-	+109-
29200	0	+27-	+52-	+74-	+90-	+100-	+104-
	180 / 360	195 / 345	210 / 330	225 / 315	240 / 300	255 / 285	270 / 270
	Azimuth of Target - degrees						

Latitude 10° (North or South)

	Azimuth of Target - degrees							Range yards
	0 / 180	15 / 165	30 / 150	45 / 135	60 / 120	75 / 105	90 / 90	
	0	+5-	+9-	+13-	+16-	+18-	+19-	2000
	0	+9-	+18-	+25-	+30-	+34-	+35-	4000
	0	+13-	+25-	+35-	+43-	+48-	+49-	6000
	0	+16-	+31-	+44-	+54-	+60-	+62-	8000
	0	+19-	+37-	+52-	+64-	+71-	+74-	10000
	0	+22-	+42-	+59-	+72-	+81-	+84-	12000
	0	+24-	+46-	+65-	+79-	+88-	+92-	14000
	0	+25-	+49-	+69-	+84-	+94-	+97-	16000
	0	+26-	+51-	+72-	+88-	+98-	+101-	18000
	0	+27-	+52-	+74-	+91-	+101-	+104-	20000
	0	+28-	+54-	+76-	+93-	+104-	+107-	22000
	0	+28-	+55-	+77-	+95-	+106-	+109-	24000
	0	+29-	+55-	+78-	+96-	+107-	+110-	26000
	0	+28-	+54-	+76-	+93-	+104-	+107-	28000
	0	+27-	+51-	+72-	+89-	+99-	+102-	29200
	180 / 360	195 / 345	210 / 330	225 / 315	240 / 300	255 / 285	270 / 270	
	Azimuth of Target - degrees							

Latitude of 20° (North or South)

Range yards	Azimuth of Target - degrees						
	0 / 180	15 / 165	30 / 150	45 / 135	60 / 120	75 / 105	90 / 90
2000	0	+5-	+9-	+13-	+15-	+17-	+18-
4000	0	+9-	+17-	+24-	+29-	+32-	+34-
6000	0	+12-	+24-	+33-	+41-	+45-	+47-
8000	0	+15-	+30-	+42-	+51-	+57-	+59-
10000	0	+18-	+35-	+50-	+61-	+68-	+70-
12000	0	+21-	+40-	+56-	+69-	+77-	+79-
14000	0	+23-	+44-	+62-	+76-	+84-	+87-
16000	0	+24-	+46-	+66-	+81-	+90-	+93-
18000	0	+25-	+48-	+69-	+84-	+94-	+97-
20000	0	+26-	+50-	+71-	+87-	+96-	+100-
22000	0	+27-	+51-	+73-	+89-	+99-	+102-
24000	0	+27-	+52-	+74-	+90-	+101-	+104-
26000	0	+27-	+53-	+74-	+91-	+102-	+105-
28000	0	+27-	+51-	+72-	+89-	+99-	+102-
29200	0	+25-	+49-	+69-	+85-	+94-	+98-
	180 / 360	195 / 345	210 / 330	225 / 315	240 / 300	255 / 285	270 / 270
	Azimuth of Target - degrees						

Latitude of 30° (North or South)

	Azimuth of Target - degrees							Range yards
	0 / 180	15 / 165	30 / 150	45 / 135	60 / 120	75 / 105	90 / 90	
	0	+4-	+8-	+12-	+14-	+16-	+17-	2000
	0	+8-	+16-	+22-	+27-	+30-	+31-	4000
	0	+11-	+22-	+31-	+38-	+42-	+43-	6000
	0	+14-	+27-	+39-	+47-	+53-	+55-	8000
	0	+17-	+32-	+46-	+56-	+63-	+65-	10000
	0	+19-	+37-	+52-	+64-	+71-	+74-	12000
	0	+21-	+40-	+57-	+70-	+78-	+81-	14000
	0	+22-	+43-	+61-	+74-	+83-	+86-	16000
	0	+23-	+45-	+63-	+77-	+86-	+89-	18000
	0	+24-	+46-	+65-	+80-	+89-	+92-	20000
	0	+24-	+47-	+67-	+82-	+91-	+94-	22000
	0	+25-	+48-	+68-	+83-	+93-	+96-	24000
	0	+25-	+48-	+69-	+84-	+94-	+97-	26000
	0	+24-	+47-	+67-	+82-	+91-	+94-	28000
	0	+23-	+45-	+64-	+78-	+87-	+90-	29200
	180 / 360	195 / 345	210 / 330	225 / 315	240 / 300	255 / 285	270 / 270	
	Azimuth of Target - degrees							

*For argument at top of tables use the sign that is before the number.
*For argument at bottom of tables use the sign that follows the number.
*Azimuth measured clockwise from North.

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table E.

*ROTATION OF THE EARTH, EFFECTS IN YARDS OF RANGE DUE TO

Latitude of 40° (North or South)

Range yards	|	Azimuth of Target – degrees						
		0 / 180	15 / 165	30 / 150	45 / 135	60 / 120	75 / 105	90 / 90
2000		0	+4-	+7-	+10-	+13-	+14-	+14-
4000		0	+7-	+14-	+19-	+24-	+27-	+27-
6000		0	+10-	+19-	+27-	+33-	+37-	+38-
8000		0	+12-	+24-	+34-	+42-	+46-	+48-
10000		0	+15-	+29-	+40-	+50-	+55-	+57-
12000		0	+17-	+33-	+46-	+57-	+63-	+65-
14000		0	+19-	+36-	+50-	+62-	+69-	+71-
16000		0	+20-	+38-	+53-	+66-	+73-	+76-
18000		0	+20-	+39-	+55-	+68-	+76-	+79-
20000		0	+21-	+41-	+58-	+70-	+78-	+81-
22000		0	+22-	+42-	+59-	+72-	+80-	+83-
24000		0	+22-	+43-	+60-	+74-	+82-	+85-
26000		0	+22-	+43-	+61-	+74-	+83-	+86-
28000		0	+22-	+42-	+59-	+72-	+81-	+83-
29200		0	+21-	+40-	+56-	+69-	+77-	+80-
		180	195	210	225	240	255	270
		360	345	330	315	300	285	270

Azimuth of Target – degrees

Latitude of 50° (North or South)

	Azimuth of Target – degrees							Range yards
	0 / 180	15 / 165	30 / 150	45 / 135	60 / 120	75 / 105	90 / 90	
	0	+3-	+6-	+9-	+11-	+12-	+12-	2000
	0	+6-	+11-	+16-	+20-	+22-	+23-	4000
	0	+8-	+16-	+23-	+28-	+31-	+32-	6000
	0	+10-	+20-	+29-	+35-	+39-	+40-	8000
	0	+12-	+24-	+34-	+42-	+47-	+48-	10000
	0	+14-	+27-	+38-	+47-	+53-	+55-	12000
	0	+15-	+30-	+42-	+52-	+58-	+60-	14000
	0	+16-	+32-	+45-	+55-	+61-	+64-	16000
	0	+17-	+33-	+47-	+57-	+64-	+66-	18000
	0	+18-	+34-	+48-	+59-	+66-	+68-	20000
	0	+18-	+35-	+50-	+61-	+68-	+70-	22000
	0	+18-	+36-	+51-	+62-	+69-	+71-	24000
	0	+19-	+36-	+51-	+62-	+70-	+72-	26000
	0	+18-	+35-	+50-	+61-	+68-	+70-	28000
	0	+17-	+33-	+47-	+58-	+65-	+67-	29200
180	195	210	225	240	255	270		
360	345	330	315	300	285	270		

Azimuth of Target – degrees

Latitude of 60° (North or South)

Range yards	|	Azimuth of Target – degrees						
		0 / 180	15 / 165	30 / 150	45 / 135	60 / 120	75 / 105	90 / 90
2000		0	+3-	+5-	+7-	+8-	+9-	+9-
4000		0	+5-	+9-	+13-	+15-	+17-	+18-
6000		0	+7-	+13-	+18-	+21-	+24-	+25-
8000		0	+8-	+16-	+22-	+27-	+30-	+31-
10000		0	+10-	+19-	+26-	+32-	+36-	+37-
12000		0	+11-	+21-	+30-	+37-	+41-	+42-
14000		0	+12-	+23-	+33-	+40-	+45-	+46-
16000		0	+13-	+25-	+35-	+43-	+48-	+49-
18000		0	+13-	+26-	+36-	+45-	+50-	+51-
20000		0	+14-	+27-	+37-	+46-	+51-	+53-
22000		0	+14-	+27-	+38-	+47-	+53-	+54-
24000		0	+14-	+28-	+39-	+48-	+54-	+55-
26000		0	+14-	+28-	+40-	+48-	+54-	+56-
28000		0	+14-	+27-	+39-	+47-	+53-	+55-
29200		0	+13-	+26-	+37-	+45-	+50-	+52-
		180	195	210	225	240	255	270
		360	345	330	315	300	285	270

Azimuth of Target – degrees

Latitude of 70° (North or South)

	Azimuth of Target – degrees							Range yards
	0 / 180	15 / 165	30 / 150	45 / 135	60 / 120	75 / 105	90 / 90	
	0	+2-	+3-	+5-	+6-	+6-	+6-	2000
	0	+3-	+6-	+9-	+11-	+12-	+12-	4000
	0	+4-	+9-	+12-	+15-	+17-	+17-	6000
	0	+6-	+11-	+15-	+19-	+21-	+22-	8000
	0	+7-	+13-	+18-	+22-	+25-	+26-	10000
	0	+8-	+15-	+20-	+25-	+28-	+29-	12000
	0	+8-	+16-	+22-	+27-	+31-	+32-	14000
	0	+9-	+17-	+24-	+29-	+33-	+34-	16000
	0	+9-	+18-	+25-	+30-	+34-	+35-	18000
	0	+9-	+18-	+26-	+31-	+35-	+36-	20000
	0	+10-	+19-	+26-	+32-	+36-	+37-	22000
	0	+10-	+19-	+27-	+33-	+37-	+38-	24000
	0	+10-	+19-	+27-	+33-	+37-	+38-	26000
	0	+10-	+19-	+26-	+32-	+36-	+37-	28000
	0	+9-	+18-	+25-	+31-	+34-	+36-	29200
180	195	210	225	240	255	270		
360	345	330	315	300	285	270		

Azimuth of Target – degrees

*For argument at top of tables use the sign that is before the number.
*For argument at bottom of tables use the sign that follows the number.
*Azimuth measured clockwise from North.

900 LB. A.P. PROJ.(SHELL) M.V.= 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table Fa.

MUZZLE VELOCITY, EFFECT IN YARDS OF RANGE, DUE TO INCREASE IN

Range	Increase in Muzzle Velocity - feet per second							
yards	10	20	30	40	50	60	70	80
1000	8	16	25	33	41	49	57	66
2000	16	32	49	65	81	97	113	131
3000	24	48	73	97	121	145	169	195
4000	32	64	96	128	160	192	224	257
5000	49	79	119	158	198	238	278	318
6000	47	94	141	188	235	282	330	377
7000	54	108	163	217	271	325	380	435
8000	61	122	184	245	306	367	429	490
9000	68	135	203	271	339	407	475	543
10000	74	148	222	297	371	446	520	595
11000	80	161	241	322	403	484	565	646
12000	86	173	260	347	434	521	608	696
13000	92	185	278	371	464	557	650	744
14000	98	196	295	393	492	591	690	790
15000	104	208	312	416	520	625	730	835
16000	109	219	328	438	547	657	767	878
17000	114	229	344	459	573	688	804	920
18000	119	239	359	479	599	719	840	961
19000	124	249	374	499	624	749	875	1001
20000	129	259	388	518	648	778	909	1040
21000	134	269	403	538	673	808	944	1080
22000	139	279	418	558	698	838	979	1120
23000	144	289	433	578	723	868	1014	1160
24000	149	299	448	598	748	898	1049	1200
25000	154	309	463	618	773	928	1084	1240
26000	159	319	478	638	798	959	1120	1282
27000	164	329	494	659	824	990	1157	1324
28000	170	341	511	682	853	1025	1197	1370
29000	176	353	570	707	884	1062	1241	1421
29200	178	356	574	712	891	1071	1252	1433

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table Fa.

MUZZLE VELOCITY, EFFECT IN YARDS OF RANGE, DUE TO INCREASE IN

Range	Increase in Muzzle Velocity - feet per second						
yards	90	100	110	120	130	140	150
1000	74	82	90	99	107	116	124
2000	147	163	179	196	213	230	246
3000	219	243	267	292	317	342	366
4000	289	321	353	386	418	451	483
5000	358	398	438	478	518	558	598
6000	425	472	520	567	615	662	710
7000	490	544	599	653	708	763	818
8000	552	613	675	736	798	860	922
9000	612	680	748	816	885	953	1022
10000	670	745	819	894	969	1044	1119
11000	727	808	889	970	1052	1133	1215
12000	783	870	957	1045	1133	1221	1309
13000	837	930	1023	1117	1212	1306	1400
14000	889	988	1087	1187	1288	1388	1488
15000	939	1044	1149	1254	1360	1467	1573
16000	988	1099	1209	1320	1431	1543	1655
17000	1035	1151	1267	1383	1500	1617	1734
18000	1081	1202	1323	1444	1566	1688	1810
19000	1126	1252	1378	1504	1631	1758	1885
20000	1171	1302	1433	1565	1697	1829	1961
21000	1216	1352	1488	1625	1762	1899	2036
22000	1261	1402	1543	1685	1827	1969	2111
23000	1306	1452	1599	1745	1893	2040	2187
24000	1351	1503	1655	1807	1960	2112	2264
25000	1397	1554	1711	1869	2027	2185	2342
26000	1444	1606	1769	1932	2096	2260	2423
27000	1492	1660	1829	1998	2168	2337	2507
28000	1544	1718	1893	2068	2244	2420	2596
29000	1601	1782	1964	2146	2329	2512	2695
29200	1615	1798	1982	2166	2350	2535	2720

900 LB. A.P. PROJ. (SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table Fb.

MUZZLE VELOCITY, EFFECT IN YARDS OF RANGE, DUE TO DECREASE IN

Range	Decrease in Muzzle Velocity - feet per second							
yards	10	20	30	40	50	60	70	80
1000	−8	−16	−25	−33	−41	−49	−57	−65
2000	−16	−32	−49	−65	−81	−97	−113	−129
3000	−24	−48	−72	−96	−120	−144	−168	−191
4000	−32	−64	−95	−127	−159	−191	−222	−253
5000	−40	−79	−118	−158	−197	−236	−275	−314
6000	−47	−94	−140	−187	−234	−281	−327	−374
7000	−54	−108	−162	−216	−270	−324	−378	−432
8000	−61	−122	−182	−243	−304	−365	−426	−487
9000	−67	−135	−202	−269	−337	−405	−472	−539
10000	−74	−148	−221	−295	−369	−443	−517	−590
11000	−80	−160	−240	−321	−401	−481	−561	−640
12000	−86	−172	−258	−345	−431	−517	−603	−688
13000	−92	−184	−276	−368	−460	−552	−644	−735
14000	−98	−195	−293	−390	−488	−586	−683	−780
15000	−103	−206	−309	−412	−516	−619	−722	−824
16000	−108	−217	−325	−434	−543	−651	−760	−868
17000	−113	−227	−341	−455	−569	−682	−796	−910
18000	−119	−238	−357	−476	−595	−713	−831	−950
19000	−124	−248	−372	−496	−620	−743	−866	−989
20000	−129	−258	−387	−516	−645	−773	−901	−1028
21000	−134	−268	−401	−535	−669	−802	−935	−1067
22000	−139	−277	−416	−554	−693	−831	−968	−1105
23000	−144	−287	−430	−574	−717	−860	−1002	−1144
24000	−149	−297	−445	−594	−742	−890	−1037	−1183
25000	−154	−307	−460	−613	−766	−919	−1071	−1222
26000	−159	−317	−475	−633	−790	−947	−1104	−1260
27000	−164	−327	−490	−652	−814	−976	−1137	−1298
28000	−169	−337	−505	−672	−839	−1005	−1171	−1336
29000	−175	−349	−523	−696	−869	−1041	−1212	−1383
29200	−176	−352	−527	−702	−876	−1050	−1223	−1395

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table Fb.

MUZZLE VELOCITY, EFFECT IN YARDS OF RANGE, DUE TO DECREASE IN

Range	Decrease in Muzzle Velocity - feet per second						
yards	90	100	110	120	130	140	150
1000	-73	-81	-89	-97	-106	-114	-122
2000	-145	-161	-177	-193	-209	-225	-241
3000	-215	-239	-263	-287	-310	-334	-358
4000	-284	-316	-348	-379	-410	-442	-473
5000	-353	-392	-431	-470	-509	-548	-587
6000	-420	-467	-513	-560	-606	-653	-699
7000	-485	-539	-592	-646	-699	-753	-806
8000	-547	-607	-667	-728	-788	-849	-909
9000	-606	-673	-740	-807	-874	-941	-1008
10000	-664	-737	-810	-883	-957	-1030	-1103
11000	-720	-799	-878	-957	-1037	-1116	-1195
12000	-774	-859	-944	-1029	-1114	-1199	-1284
13000	-826	-917	-1008	-1099	-1189	-1280	-1371
14000	-877	-974	-1071	-1167	-1263	-1359	-1456
15000	-927	-1029	-1131	-1233	-1334	-1436	-1538
16000	-976	-1083	-1190	-1297	-1404	-1511	-1618
17000	-1023	-1135	-1247	-1359	-1472	-1584	-1696
18000	-1068	-1186	-1303	-1420	-1538	-1655	-1772
19000	-1112	-1235	-1357	-1479	-1602	-1724	-1846
20000	-1156	-1284	-1411	-1538	-1665	-1791	-1918
21000	-1199	-1332	-1464	-1596	-1727	-1858	-1990
22000	-1243	-1380	-1517	-1653	-1789	-1926	-2062
23000	-1286	-1428	-1570	-1711	-1852	-1993	-2134
24000	-1329	-1476	-1622	-1768	-1914	-2059	-2205
25000	-1373	-1524	-1674	-1825	-1975	-2125	-2275
26000	-1416	-1571	-1726	-1880	-2035	-2189	-2343
27000	-1458	-1617	-1776	-1934	-2093	-2251	-2409
28000	-1500	-1664	-1827	-1990	-2153	-2315	-2477
29000	-1553	-1722	-1890	-2058	-2226	-2393	-2560
29200	-1566	-1737	-1907	-2076	-2245	-2414	-2582

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table Ga.

AIR DENSITY, EFFECTS IN YARDS OF RANGE, DUE TO DECREASE IN (59° F. and 29.5 + in.)

Range	Decrease in Air Density — per cent							
yards	1	2	3	4	5	6	7	8
1000	1	1	2	2	3	3	4	4
2000	2	3	4	5	6	7	8	9
3000	3	4	6	8	10	12	14	16
4000	4	6	9	12	16	19	22	25
5000	5	9	14	18	23	27	32	36
6000	7	13	19	25	32	38	45	51
7000	9	18	26	34	43	51	60	68
8000	11	23	34	45	56	66	77	88
9000	14	28	42	56	70	83	97	110
10000	18	35	52	69	86	102	119	135
11000	22	43	63	83	104	124	143	163
12000	26	51	75	99	123	147	170	193
13000	30	59	88	117	144	172	199	226
14000	34	68	102	136	167	199	231	262
15000	39	78	117	157	193	229	265	301
16000	45	89	134	168	220	261	302	343
17000	51	101	151	200	248	295	342	389
18000	57	113	169	224	278	331	384	436
19000	63	125	187	248	308	367	426	483
20000	69	138	205	272	338	403	467	530
21000	75	150	223	296	368	439	509	578
22000	81	162	241	320	398	475	551	626
23000	87	174	260	345	429	512	595	676
24000	94	187	280	371	461	551	640	728
25000	101	201	299	397	493	589	684	778
26000	107	213	317	421	524	626	726	826
27000	113	225	335	445	554	662	768	874
28000	118	236	352	468	582	696	808	920
29000	125	248	370	492	612	731	849	966

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/s. FUZE, BASE DET. MARK X

Part 2. Table Ga.

AIR DENSITY, EFFECTS IN YARDS OF RANGE, DUE TO DECREASE IN (59° F. and 29.5 + in.)

Range	Decrease in Air Density – per cent							
yards	9	10	11	12	13	14	15	16
1000	5	6	6	6	7	7	8	8
2000	11	12	13	14	15	16	17	18
3000	18	20	22	24	26	28	30	31
4000	28	31	34	37	40	43	46	48
5000	41	45	49	53	58	62	66	70
6000	57	63	69	74	80	86	92	97
7000	76	84	92	99	107	114	122	129
8000	98	108	118	128	138	147	157	166
9000	123	135	148	160	173	184	196	208
10000	150	165	181	196	211	225	239	254
11000	181	199	217	235	253	270	287	304
12000	215	236	257	278	299	319	339	358
13000	252	277	302	326	351	374	397	419
14000	292	322	351	379	407	434	461	487
15000	335	370	404	436	468	500	531	562
16000	383	422	461	499	536	573	609	645
17000	434	479	523	567	609	651	693	734
18000	487	538	588	638	686	733	779	826
19000	540	597	652	707	761	814	866	918
20000	593	655	716	776	835	894	952	1009
21000	646	714	780	846	911	976	1039	1101
22000	700	774	846	918	989	1059	1128	1196
23000	756	836	915	993	1070	1146	1221	1295
24000	815	901	985	1069	1152	1234	1315	1396
25000	871	963	1054	1144	1233	1321	1408	1495
26000	925	1023	1119	1215	1310	1404	1496	1588
27000	978	1082	1184	1286	1386	1486	1584	1682
28000	1030	1139	1248	1357	1465	1569	1673	1776
29000	1082	1196	1309	1422	1533	1644	1753	1861

$$\frac{6\,\mu}{19.2}$$

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table G^b.

AIR DENSITY, EFFECTS IN YARDS OF RANGE, DUE TO INCREASE IN (59° F. and 29.5 + in.)

Range	Increase in Air Density - per cent							
yards	1	2	3	4	5	6	7	8
1000	-0	-1	-1	-2	-3	-4	-5	-5
2000	-1	-2	-3	-5	-6	-8	-10	-11
3000	-2	-4	-6	-9	-11	-14	-16	-18
4000	-3	-7	-10	-14	-17	-21	-24	-28
5000	-5	-10	-15	-20	-25	-30	-35	-40
6000	-7	-14	-20	-27	-34	-41	-48	-55
7000	-9	-18	-27	-36	-45	-54	-64	-73
8000	-12	-23	-35	-47	-59	-71	-83	-96
9000	-15	-30	-45	-60	-75	-91	-106	-122
10000	-18	-37	-55	-74	-93	-113	-132	-152
11000	-22	-44	-66	-89	-112	-136	-160	-184
12000	-26	-52	-79	-106	-133	-161	-190	-219
13000	-30	-61	-92	-124	-156	-189	-223	-257
14000	-35	-71	-107	-143	-181	-219	-258	-297
15000	-40	-81	-122	-164	-207	-251	-295	-339
16000	-46	-92	-139	-187	-235	-285	-334	-384
17000	-52	-104	-157	-210	-265	-321	-376	-432
18000	-58	-116	-175	-235	-296	-357	-419	-482
19000	-64	-128	-194	-260	-327	-394	-463	-532
20000	-70	-141	-213	-285	-358	-432	-507	-583
21000	-76	-153	-231	-309	-389	-470	-551	-633
22000	-82	-165	-249	-334	-420	-507	-594	-682
23000	-89	-178	-268	-359	-452	-544	-638	-733
24000	-95	-191	-288	-386	-485	-584	-685	-786
25000	-102	-204	-307	-412	-518	-624	-731	-839
26000	-108	-216	-326	-437	-549	-662	-775	-890
27000	-114	-229	-345	-462	-580	-699	-819	-940
28000	-118	-238	-359	-481	-605	-731	-858	-986
29000	-125	-252	-380	-509	-638	-769	-901	-1034

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table Gb.

AIR DENSITY, EFFECTS IN YARDS OF RANGE, DUE TO INCREASE IN (59° F. and 29.5 + in.)

Range	Increase in Air Density – per cent							
yards	9	10	11	12	13	14	15	16
1000	-6	-7	-7	-8	-9	-9	-10	-11
2000	-13	-14	-15	-17	-19	-20	-22	-23
3000	-21	-23	-25	-28	-31	-34	-36	-38
4000	-32	-35	-39	-43	-47	-51	-54	-58
5000	-45	-50	-55	-61	-66	-72	-77	-83
6000	-62	-69	-76	-84	-91	-99	-106	-114
7000	-83	-92	-102	-112	-122	-132	-142	-153
8000	-108	-121	-134	-147	-160	-173	-186	-200
9000	-138	-155	-171	-188	-205	-222	-239	-256
10000	-172	-192	-213	-234	-255	-277	-298	-320
11000	-208	-233	-258	-284	-310	-337	-363	-390
12000	-248	-277	-307	-338	-369	-401	-433	-466
13000	-291	-326	-361	-397	-433	-470	-508	-546
14000	-336	-377	-418	-459	-501	-543	-586	-630
15000	-384	-430	-477	-524	-572	-620	-668	-718
16000	-435	-487	-540	-593	-647	-701	-756	-812
17000	-489	-547	-606	-666	-726	-786	-848	-910
18000	-545	-610	-675	-741	-807	-874	-942	-1011
19000	-602	-673	-745	-817	-890	-964	-1038	-1113
20000	-659	-736	-815	-893	-973	-1054	-1135	-1216
21000	-716	-799	-884	-969	-1056	-1143	-1231	-1319
22000	-772	-862	-953	-1045	-1138	-1232	-1327	-1422
23000	-829	-926	-1023	-1122	-1221	-1322	-1424	-1526
24000	-889	-992	-1096	-1201	-1307	-1414	-1522	-1632
25000	-948	-1057	-1168	-1280	-1394	-1508	-1622	-1739
26000	-1006	-1122	-1240	-1359	-1479	-1600	-1722	-1845
27000	-1062	-1185	-1309	-1435	-1561	-1688	-1816	-1946
28000	-1114	-1242	-1372	-1503	-1637	-1767	-1901	-2036
29000	-1168	-1304	-1440	-1578	-1716	-1856	-1997	-2139

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 f/s.   FUZE, BASE DET. MARK X

Part 2. Table H.

TEMPERATURE (ELASTICITY)EFFECTS IN YARDS OF RANGE (59° F.)

Range yards	Temperature of Air – degrees Fahrenheit											
	0	10	20	30	40	50	59	60	70	80	90	100
1000	+2	+2	+2	+1	+1	0	0	0	0	-1	-1	-2
2000	+5	+4	+4	+3	+2	+1	0	0	-1	-2	-3	-4
3000	+9	+7	+6	+4	+3	+1	0	0	-2	-3	-5	-6
4000	+12	+10	+8	+6	+4	+2	0	0	-2	-4	-6	-9
5000	+17	+14	+11	+8	+5	+3	0	0	-3	-6	-9	-11
6000	+21	+18	+14	+10	+7	+3	0	0	-4	-8	-11	-15
7000	+27	+22	+18	+13	+9	+4	0	0	-5	-9	-14	-18
8000	+32	+27	+21	+16	+10	+5	0	-1	-6	-12	-17	-23
9000	+39	+32	+26	+19	+13	+6	0	-1	-7	-14	-20	-27
10000	+46	+38	+30	+23	+15	+7	0	-1	-9	-16	-24	-32
11000	+54	+45	+35	+26	+17	+8	0	-1	-10	-19	-28	-37
12000	+63	+52	+41	+31	+20	+10	0	-1	-12	-22	-33	-43
13000	+72	+60	+48	+35	+23	+11	0	-1	-13	-26	-38	-50
14000	+82	+68	+54	+40	+26	+13	0	-1	-15	-29	-43	-57
15000	+91	+76	+60	+45	+29	+14	0	-2	-17	-33	-48	-64
16000	+100	+83	+66	+49	+32	+15	0	-2	-19	-36	-53	-70
17000	+109	+90	+72	+53	+35	+17	0	-2	-20	-39	-57	-75
18000	+116	+96	+77	+57	+37	+18	0	-2	-22	-41	-61	-80
19000	+122	+101	+80	+60	+39	+19	0	-2	-23	-43	-64	-84
20000	+126	+105	+83	+62	+41	+19	0	-2	-24	-45	-66	-88
21000	+129	+107	+85	+63	+41	+20	0	-2	-24	-46	-68	-89
22000	+129	+107	+85	+64	+42	+20	0	-2	-24	-46	-68	-90
23000	+128	+106	+84	+63	+41	+19	0	-2	-24	-45	-67	-88
24000	+122	+101	+81	+60	+39	+19	0	-2	-23	-43	-64	-85
25000	+113	+94	+74	+55	+36	+17	0	-2	-21	-40	-59	-78
26000	+98	+81	+65	+48	+32	+15	0	-2	-18	-35	-41	-68
27000	+76	+63	+50	+37	+25	+12	0	-1	-14	-27	-40	-53
28000	+41	+34	+27	+20	+13	+6	0	-1	-8	-15	-22	-28
29000	-16	-13	-10	-8	-5	-2	0	0	+3	+6	+8	+11
29200	-32	-27	-21	-16	-10	-5	0	0	+6	+12	+17	+23

900 LB. A.P. PROJ.(SHELL) M.V. = 2325 F/S. FUZE, BASE DET. MARK X

Part 2. Table I.

REAR WIND, EFFECT IN YARDS OF RANGE, DUE TO

Range	Rear Wind - miles per hour									
yards	5	10	15	20	25	30	35	40	45	50
1000	0	0	0	1	1	1	1	1	1	1
2000	0	1	1	2	2	3	3	3	4	4
3000	1	2	2	3	4	5	6	6	7	8
4000	1	3	4	5	7	8	9	10	12	13
5000	2	4	6	8	10	11	13	15	17	19
6000	3	5	8	11	14	16	19	22	24	27
7000	4	7	11	15	19	22	26	30	33	37
8000	5	10	15	20	25	29	34	39	44	49
9000	6	13	19	25	32	38	44	50	57	63
10000	8	16	24	32	40	47	55	63	71	79
11000	10	19	29	39	48	57	67	77	86	96
12000	11	23	34	46	57	68	80	92	103	114
13000	13	27	40	54	67	81	94	108	121	135
14000	16	32	47	63	79	95	110	126	142	158
15000	18	37	55	73	92	110	128	146	165	183
16000	21	42	64	84	106	127	148	169	190	211
17000	24	48	73	97	121	145	169	194	218	242
18000	28	55	83	111	138	166	193	221	249	276
19000	32	63	94	126	157	189	220	251	283	314
20000	36	71	107	142	178	214	249	284	320	356
21000	40	80	120	160	201	241	281	320	361	401
22000	45	90	135	180	225	270	315	359	405	450
23000	50	101	151	201	251	302	352	402	453	503
24000	56	112	168	224	280	336	392	448	505	560
25000	62	124	187	249	311	373	435	498	561	622
26000	69	138	207	276	345	414	483	552	622	690
27000	76	153	229	306	382	459	535	612	689	765
28000	85	170	255	340	425	510	595	680	765	850
29000	95	190	284	379	474	569	664	758	853	948
29200	96	193	289	385	481	578	674	770	867	963

NOTE: The range effects due to a head wind are so nearly identical in numerical value to those for a rear wind that the above table with signs changed should be used for head wind effects.

900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/S. FUZE, BASE DET. MARK X

Part 2. Table J.

CROSS WIND EFFECTS

Range	in mils					in degrees				
	Cross Wind — miles per hour									
yards	10	20	30	40	50	10	20	30	40	50
1000	0.1	0.2	0.2	0.3	0.4	0.00	0.01	0.01	0.02	0.02
2000	0.2	0.3	0.5	0.6	0.8	0.01	0.02	0.03	0.04	0.05
3000	0.2	0.5	0.7	1.0	1.2	0.01	0.03	0.04	0.06	0.07
4000	0.3	0.7	1.0	1.4	1.7	0.02	0.04	0.06	0.08	0.10
5000	0.5	0.9	1.4	1.8	2.3	0.03	0.05	0.08	0.10	0.13
6000	0.6	1.1	1.7	2.2	2.8	0.03	0.06	0.09	0.13	0.16
7000	0.7	1.3	2.0	2.6	3.3	0.04	0.07	0.11	0.15	0.19
8000	0.8	1.6	2.3	3.1	3.9	0.04	0.09	0.13	0.18	0.22
9000	0.9	1.8	2.6	3.5	4.4	0.05	0.10	0.15	0.20	0.25
10000	1.0	2.0	3.0	4.0	5.0	0.06	0.11	0.17	0.22	0.28
11000	1.1	2.2	3.4	4.5	5.6	0.06	0.13	0.19	0.25	0.32
12000	1.2	2.5	3.7	5.0	6.2	0.07	0.14	0.21	0.28	0.35
13000	1.4	2.7	4.1	5.4	6.8	0.08	0.15	0.23	0.30	0.38
14000	1.5	3.0	4.5	5.9	7.4	0.08	0.17	0.25	0.33	0.42
15000	1.6	3.3	4.9	6.5	8.1	0.09	0.18	0.27	0.36	0.46
16000	1.8	3.6	5.4	7.1	8.9	0.10	0.20	0.30	0.40	0.50
17000	2.0	3.9	5.9	7.8	9.8	0.11	0.22	0.33	0.44	0.55
18000	2.1	4.3	6.4	8.6	10.7	0.12	0.24	0.36	0.48	0.60
19000	2.3	4.6	6.9	9.3	11.6	0.13	0.26	0.39	0.52	0.65
20000	2.5	5.0	7.4	9.9	12.4	0.14	0.28	0.42	0.56	0.70
21000	2.6	5.3	7.9	10.6	13.2	0.15	0.30	0.45	0.59	0.74
22000	2.8	5.6	8.4	11.2	14.0	0.16	0.32	0.47	0.63	0.79
23000	3.0	6.0	8.9	11.9	14.9	0.17	0.34	0.50	0.67	0.84
24000	3.2	6.3	9.5	12.6	15.8	0.18	0.36	0.53	0.71	0.89
25000	3.3	6.7	10.0	13.4	16.7	0.19	0.38	0.56	0.75	0.94
26000	3.5	7.0	10.6	14.1	17.6	0.20	0.40	0.59	0.79	0.99
27000	3.7	7.4	11.2	14.9	18.6	0.21	0.42	0.63	0.84	1.05
28000	3.9	7.9	11.9	15.8	19.7	0.22	0.44	0.67	0.89	1.11
29000	4.2	8.4	12.6	16.8	21.0	0.24	0.47	0.71	0.94	1.18
29200	4.3	8.6	12.8	17.1	21.4	0.24	0.48	0.72	0.96	1.20

900 LB. A.P. PROJ.(SHELL)   M.V. = 2325 F/S.   FUZE, BASE DET. MARK X

Part 2. Table K.

*ROTATION OF THE EARTH, DEFLECTION EFFECTS IN MILS DUE TO

Latitude 0°

Range yards	0 / 360	30 / 330	60 / 300	90 / 270	120 / 240	150 / 210	180 / 180
2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10000	+0.1-	+0.1-	0.0	0.0	0.0	-0.1+	-0.1+
12000	+0.1-	+0.1-	0.0	0.0	0.0	-0.1+	-0.1+
14000	+0.1-	+0.1-	+0.1-	0.0	-0.1+	-0.1+	-0.1+
16000	+0.1-	+0.1-	+0.1-	0.0	-0.1+	-0.1+	-0.1+
18000	+0.2-	+0.1-	+0.1-	0.0	-0.1+	-0.1+	-0.2+
20000	+0.2-	+0.2-	+0.1-	0.0	-0.1+	-0.2+	-0.2+
22000	+0.3-	+0.3-	+0.2-	0.0	-0.2+	-0.3+	-0.3+
24000	+0.5-	+0.4-	+0.2-	0.0	-0.2+	-0.4+	-0.5+
26000	+0.7-	+0.6-	+0.3-	0.0	-0.3+	-0.6+	-0.7+
28000	+1.0-	+0.8-	+0.5-	0.0	-0.5+	-0.8+	-1.0+
29200	+1.2-	+1.0-	+0.6-	0.0	-0.6+	-1.0+	-1.2+

Bottom argument: 180 / 180 · 150 / 210 · 120 / 240 · 90 / 270 · 60 / 300 · 30 / 330 · 0 / 360
Azimuth of Target – degrees
Latitude 0

Latitude 10° (North)

Range yards	0 / 360	30 / 330	60 / 300	90 / 270	120 / 240	150 / 210	180 / 180
2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4000	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+
6000	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+
8000	-0.1+	-0.1+	-0.1+	-0.2+	-0.2+	-0.2+	-0.2+
10000	-0.1+	-0.1+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+
12000	-0.2+	-0.2+	-0.2+	-0.2+	-0.3+	-0.3+	-0.3+
14000	-0.2+	-0.2+	-0.2+	-0.3+	-0.3+	-0.4+	-0.4+
16000	-0.2+	-0.2+	-0.2+	-0.3+	-0.4+	-0.4+	-0.4+
18000	-0.2+	-0.2+	-0.3+	-0.4+	-0.4+	-0.5+	-0.5+
20000	-0.2+	-0.2+	-0.3+	-0.4+	-0.5+	-0.6+	-0.6+
22000	-0.2+	-0.2+	-0.3+	-0.5+	-0.7+	-0.8+	-0.8+
24000	-0.1+	-0.2+	-0.3+	-0.6+	-0.8+	-1.0+	-1.0+
26000	0.0	-0.1+	-0.3+	-0.6+	-1.0+	-1.2+	-1.3+
28000	+0.2-	-0.1+	-0.3+	-0.7+	-1.2+	-1.5+	-1.7+
29200	+0.4-	+0.2-	-0.2+	-0.8+	-1.4+	-1.8+	-2.0+

Bottom argument: 180 / 180 · 150 / 210 · 120 / 240 · 90 / 270 · 60 / 300 · 30 / 330 · 0 / 360
Azimuth of Target – degrees
Latitude 10° (South)

Latitude 20° (North)

Range yards	0 / 360	30 / 330	60 / 300	90 / 270	120 / 240	150 / 210	180 / 180
2000	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+
4000	-0.1+	-0.1+	-0.1+	-0.1+	-0.2+	-0.2+	-0.2+
6000	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+
8000	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+
10000	-0.3+	-0.3+	-0.3+	-0.4+	-0.4+	-0.4+	-0.4+
12000	-0.4+	-0.4+	-0.4+	-0.4+	-0.5+	-0.5+	-0.5+
14000	-0.4+	-0.4+	-0.5+	-0.5+	-0.6+	-0.6+	-0.6+
16000	-0.5+	-0.5+	-0.6+	-0.6+	-0.7+	-0.7+	-0.7+
18000	-0.6+	-0.6+	-0.6+	-0.7+	-0.8+	-0.9+	-0.9+
20000	-0.6+	-0.6+	-0.7+	-0.8+	-0.9+	-1.0+	-1.1+
22000	-0.7+	-0.7+	-0.8+	-1.0+	-1.1+	-1.2+	-1.3+
24000	-0.7+	-0.7+	-0.9+	-1.1+	-1.3+	-1.5+	-1.5+
26000	-0.6+	-0.7+	-0.9+	-1.3+	-1.6+	-1.8+	-1.9+
28000	-0.6+	-0.7+	-1.0+	-1.5+	-1.9+	-2.2+	-2.4+
29200	-0.5+	-0.7+	-1.1+	-1.5+	-2.2+	-2.6+	-2.8+

Bottom argument: 180 / 180 · 150 / 210 · 120 / 240 · 90 / 270 · 60 / 300 · 30 / 330 · 0 / 360
Azimuth of Target – degrees
Latitude 20° (South)

Latitude 30° (North)

Range yards	0 / 360	30 / 330	60 / 300	90 / 270	120 / 240	150 / 210	180 / 180
2000	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+
4000	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+
6000	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+
8000	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	-0.5+	-0.5+
10000	-0.5+	-0.5+	-0.5+	-0.5+	-0.6+	-0.6+	-0.6+
12000	-0.6+	-0.6+	-0.6+	-0.7+	-0.7+	-0.7+	-0.7+
14000	-0.7+	-0.7+	-0.7+	-0.8+	-0.8+	-0.9+	-0.9+
16000	-0.8+	-0.8+	-0.8+	-0.9+	-1.0+	-1.0+	-1.0+
18000	-0.9+	-0.9+	-1.0+	-1.1+	-1.1+	-1.2+	-1.2+
20000	-1.0+	-1.0+	-1.1+	-1.2+	-1.3+	-1.4+	-1.4+
22000	-1.1+	-1.2+	-1.3+	-1.4+	-1.5+	-1.6+	-1.7+
24000	-1.2+	-1.3+	-1.4+	-1.6+	-1.8+	-1.9+	-2.0+
26000	-1.3+	-1.4+	-1.6+	-1.9+	-2.1+	-2.3+	-2.4+
28000	-1.3+	-1.4+	-1.7+	-2.1+	-2.5+	-2.8+	-2.9+
29200	-1.4+	-1.5+	-1.9+	-2.4+	-2.9+	-3.3+	-3.4+

Bottom argument: 180 / 180 · 150 / 210 · 120 / 240 · 90 / 270 · 60 / 300 · 30 / 330 · 0 / 360
Azimuth of Target – degrees
Latitude 30° (South)

*Negative sign means the effect is to the right. *Positive sign means the effect is to the left.
*For argument at top of table use sign that is before the number.] *Azimuth measured clockwise
*For argument at bottom of table use sign that follows the number.] from North.

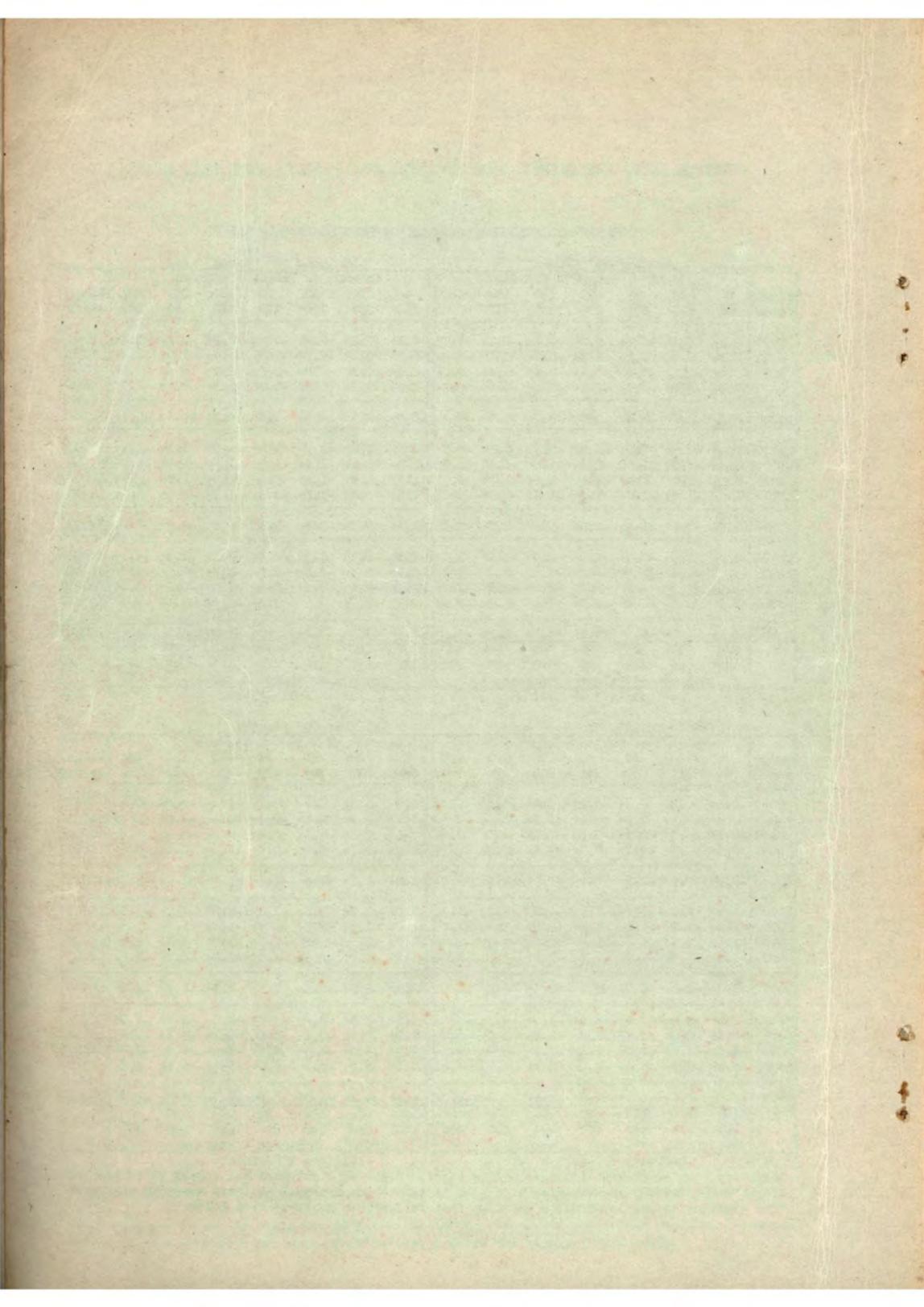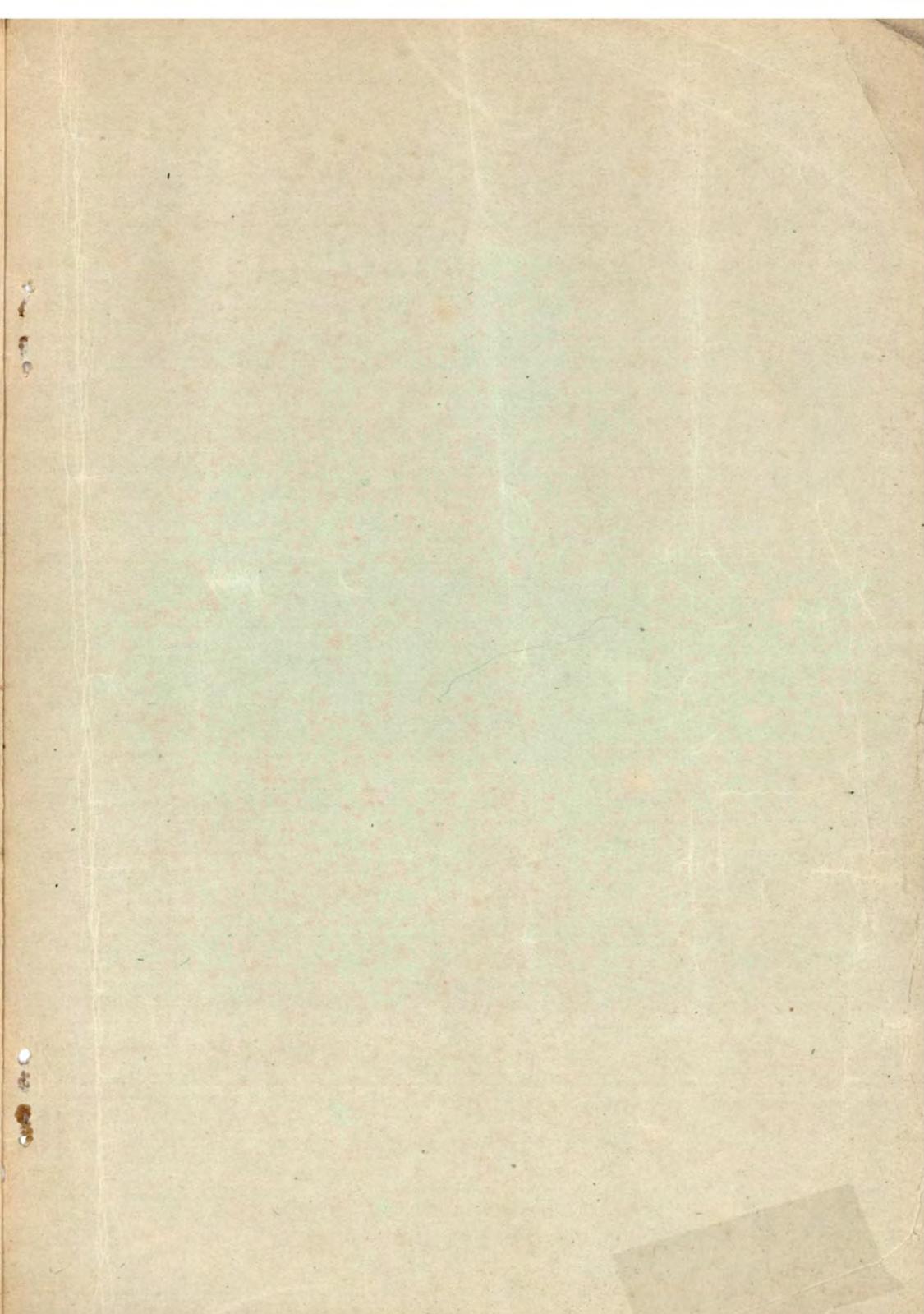## 900 LB. A.P. PROJ. (SHELL) M.V. = 2325 F/S. FUZE, BASE DET. MARK X

Part 2. Table K.
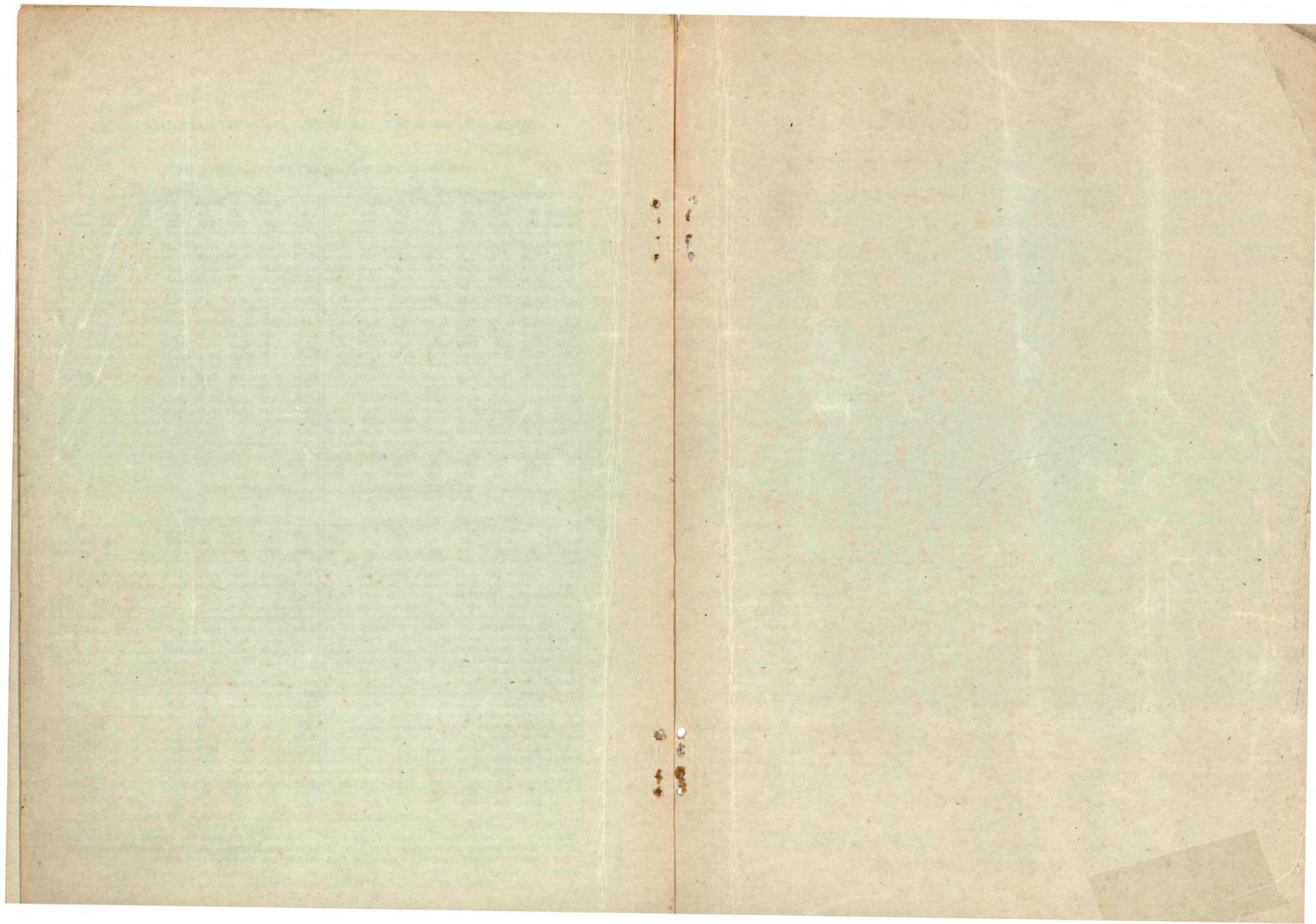
*ROTATION OF THE EARTH, DEFLECTION EFFECTS IN MILS DUE TO

Latitude 40° (North)

Range yards	Azimuth of Target – degrees							
	0 / 360	30 / 330	60 / 300	90 / 270	120 / 240	150 / 210	180 / 180	
2000	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.1+	-0.2+	2000
4000	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	4000
6000	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	6000
8000	-0.5+	-0.5+	-0.5+	-0.6+	-0.6+	-0.6+	-0.6+	8000
10000	-0.6+	-0.7+	-0.7+	-0.7+	-0.7+	-0.7+	-0.7+	10000
12000	-0.8+	-0.8+	-0.8+	-0.8+	-0.9+	-0.9+	-0.9+	12000
14000	-0.9+	-0.9+	-1.0+	-1.0+	-1.0+	-1.1+	-1.1+	14000
16000	-1.1+	-1.1+	-1.1+	-1.2+	-1.2+	-1.3+	-1.3+	16000
18000	-1.2+	-1.2+	-1.3+	-1.4+	-1.4+	-1.5+	-1.5+	18000
20000	-1.4+	-1.4+	-1.5+	-1.6+	-1.6+	-1.7+	-1.7+	20000
22000	-1.5+	-1.6+	-1.7+	-1.8+	-1.9+	-2.0+	-2.0+	22000
24000	-1.7+	-1.8+	-1.9+	-2.1+	-2.2+	-2.4+	-2.4+	24000
26000	-1.9+	-1.9+	-2.1+	-2.4+	-2.6+	-2.8+	-2.9+	26000
28000	-2.0+	-2.1+	-2.4+	-2.7+	-3.1+	-3.4+	-3.5+	28000
29200	-2.2+	-2.3+	-2.6+	-3.1+	-3.5+	-3.9+	-4.0+	29200
	180 / 180	150 / 210	120 / 240	90 / 270	60 / 300	30 / 330	0 / 360	

Azimuth of Target – degrees
Latitude 40° (South)

Latitude 50° (North)

	Azimuth of Target – degrees							Range yards
	0 / 360	30 / 330	60 / 300	90 / 270	120 / 240	150 / 210	180 / 180	
	-0.1+	-0.1+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	2000
	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	-0.3+	4000
	-0.5+	-0.5+	-0.5+	-0.5+	-0.5+	-0.5+	-0.5+	6000
	-0.6+	-0.6+	-0.7+	-0.7+	-0.7+	-0.7+	-0.7+	8000
	-0.8+	-0.8+	-0.8+	-0.8+	-0.8+	-0.9+	-0.9+	10000
	-1.0+	-1.0+	-1.0+	-1.0+	-1.0+	-1.1+	-1.1+	12000
	-1.1+	-1.1+	-1.2+	-1.2+	-1.2+	-1.3+	-1.3+	14000
	-1.3+	-1.3+	-1.4+	-1.4+	-1.4+	-1.5+	-1.5+	16000
	-1.5+	-1.5+	-1.6+	-1.6+	-1.7+	-1.7+	-1.7+	18000
	-1.7+	-1.7+	-1.8+	-1.9+	-1.9+	-2.0+	-2.0+	20000
	-1.9+	-2.0+	-2.1+	-2.2+	-2.2+	-2.3+	-2.4+	22000
	-2.2+	-2.2+	-2.3+	-2.5+	-2.6+	-2.7+	-2.8+	24000
	-2.4+	-2.5+	-2.6+	-2.8+	-3.1+	-3.2+	-3.3+	26000
	-2.6+	-2.7+	-3.0+	-3.3+	-3.6+	-3.8+	-3.9+	28000
	-2.9+	-3.0+	-3.3+	-3.7+	-4.0+	-4.3+	-4.4+	29200
	180 / 180	150 / 210	120 / 240	90 / 270	60 / 300	30 / 330	0 / 360	

Azimuth of Target – degrees
Latitude 50° (South)

Latitude 60° (North)

Range yards	Azimuth of Target – degrees							
	0 / 360	30 / 330	60 / 300	90 / 270	120 / 240	150 / 210	180 / 180	
2000	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	2000
4000	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	4000
6000	-0.5+	-0.5+	-0.5+	-0.6+	-0.6+	-0.6+	-0.6+	6000
8000	-0.7+	-0.7+	-0.7+	-0.7+	-0.8+	-0.8+	-0.8+	8000
10000	-0.9+	-0.9+	-0.9+	-0.9+	-1.0+	-1.0+	-1.0+	10000
12000	-1.1+	-1.1+	-1.1+	-1.1+	-1.2+	-1.2+	-1.2+	12000
14000	-1.3+	-1.3+	-1.3+	-1.3+	-1.4+	-1.4+	-1.4+	14000
16000	-1.5+	-1.5+	-1.5+	-1.6+	-1.6+	-1.6+	-1.6+	16000
18000	-1.7+	-1.7+	-1.8+	-1.8+	-1.9+	-1.9+	-1.9+	18000
20000	-2.0+	-2.0+	-2.0+	-2.1+	-2.2+	-2.2+	-2.2+	20000
22000	-2.3+	-2.3+	-2.3+	-2.4+	-2.5+	-2.6+	-2.6+	22000
24000	-2.6+	-2.6+	-2.7+	-2.8+	-2.9+	-3.0+	-3.0+	24000
26000	-2.9+	-2.9+	-3.0+	-3.2+	-3.4+	-3.5+	-3.5+	26000
28000	-3.2+	-3.3+	-3.4+	-3.7+	-3.9+	-4.1+	-4.2+	28000
29200	-3.6+	-3.7+	-3.9+	-4.2+	-4.5+	-4.7+	-4.8+	29200
	180 / 180	150 / 210	120 / 240	90 / 270	60 / 300	30 / 330	0 / 360	

Azimuth of Target – degrees
Latitude 60° (South)

Latitude 70° (North)

	Azimuth of Target – degrees							Range yards
	0 / 360	30 / 330	60 / 300	90 / 270	120 / 240	150 / 210	180 / 180	
	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	-0.2+	2000
	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	-0.4+	4000
	-0.6+	-0.6+	-0.6+	-0.6+	-0.6+	-0.6+	-0.6+	6000
	-0.8+	-0.8+	-0.8+	-0.8+	-0.8+	-0.8+	-0.8+	8000
	-1.0+	-1.0+	-1.0+	-1.0+	-1.0+	-1.0+	-1.0+	10000
	-1.2+	-1.2+	-1.2+	-1.2+	-1.2+	-1.3+	-1.3+	12000
	-1.4+	-1.4+	-1.4+	-1.5+	-1.5+	-1.5+	-1.5+	14000
	-1.7+	-1.7+	-1.7+	-1.7+	-1.7+	-1.7+	-1.7+	16000
	-1.9+	-1.9+	-1.9+	-2.0+	-2.0+	-2.0+	-2.0+	18000
	-2.2+	-2.2+	-2.2+	-2.3+	-2.3+	-2.3+	-2.4+	20000
	-2.5+	-2.5+	-2.6+	-2.6+	-2.7+	-2.7+	-2.8+	22000
	-2.9+	-2.9+	-3.0+	-3.0+	-3.1+	-3.2+	-3.2+	24000
	-3.3+	-3.3+	-3.4+	-3.5+	-3.6+	-3.7+	-3.7+	26000
	-3.7+	-3.7+	-3.8+	-4.0+	-4.2+	-4.3+	-4.3+	28000
	-4.1+	-4.2+	-4.3+	-4.5+	-4.7+	-4.8+	-4.9+	29200
	180 / 180	150 / 210	120 / 240	90 / 270	60 / 300	30 / 330	0 / 360	

Azimuth of Target – degrees
Latitude 70° (South)

*Negative sign means the effect is to the right. *Positive sign means the effect is to the left
*For argument at top of table use sign that is before the number.) *Azimuth measured clockwise
*For argument at bottom of table use sign that follows the number.) from North.

CONFIDENTIAL

FIRING TABLES
FOR
12 INCH S. C. GUN, MODELS OF 1895 AND 1895 MI
MOUNTED ON
12 INCH BARBETTE CARRIAGE, MODEL OF 1917
FIRING
900 LB. A. P. SHELL

PREPARED BY THE
ORDNANCE DEPARTMENT, U. S. A.
AUGUST 1923