

EARLY OBSERVATIONS OF EROS (433).

THE remarkable character of the orbit of the planet Eros (433) was recognized at the time of its discovery. It was soon found that at intervals of about thirty-seven years it would approach nearer the Earth than any other known member of the solar system, except the Moon, and that its last close approach had occurred in January, 1894, nearly five years before its discovery. The photographs taken at that time at the Harvard College Observatory cover a large part of the sky, and it was hoped that images of Eros might be found on them. Mr. S. C. Chandler courteously undertook to make the necessary computations, and the laborious examination of the plates was made by Mrs. Fleming, with results described in Circulars 36 and 37. The principal difficulty arose from the uncertainty in the mean daily motion. The value of this constant is about $2015''$, and an error of $1''$ would change the computed position of Eros in 1894 by about half an hour of right ascension. The positions in the intermediate opposition, in 1896, were much less uncertain, and a search was accordingly made on the photographs taken at that time. The examination of these plates was difficult, since it was not known how faint the object might be, and it did not seem safe to overlook the faintest objects visible. In all, Eros was found upon twenty-four plates, three of which showed its spectrum. Careful measurements were made of the remaining twenty-one plates with results given in Circular 51.

The present publication contains the details of the observations from which these positions were derived. As stated in Circular 51, two separate enlargements were made of each negative employed. Both enlargements were measured by Miss E. F. Leland, and the measurements were reduced by Miss A. Winlock, assisted by Miss I. E. Woods. The work was finally prepared for printing by Professor Searle. The general system of measurement was the same as that described in these Annals, Volume XXVI, page 237, and also Volume XLVIII, page 1.

The enlargements were so made as to place Eros near the centre of each; but on the original negatives its place is often three, four, or even more than five

degrees from the centre, and its image is consequently more or less distorted. The results, however, show that the positions thus obtained are fairly comparable with those derived from observations with meridian circles.

In addition to the stars to which the position of Eros was referred, various other stars appearing upon the negatives were included in the measurements. The rectangular coördinates representing the positions of these additional stars are given in the present publication. It was thought that, if the interest of the subject should hereafter appear to justify the required labor, special photographs might be taken of the regions containing these stars, so as to place them in more advantageous positions for measurement than those which they occupy upon the negatives here employed. It might thus be possible to determine their positions with precision, and then to employ these positions in determining those of Eros more exactly than is practicable at present. As yet, however, no such special photographs have been made.

Table I contains various data relating to the successive photographs. The first column gives a number for reference; the second gives the designation of the original negative in the records of the Observatory, and the third the designations of the enlargements. In the second column, the letters A, B, and I, signify negatives taken with the Bruce, Bache, and Draper photographic doublets; the apertures of these instruments are respectively 60, 20, and 20 cm., and their focal lengths such that 0.1 cm. in the focal plane corresponds to 60", 179", and 163". In the third column, the letter D signifies an enlargement; the number designating the first of each pair of enlargements is given in full, and only the last two figures of the second number are given. Thus, in the first line of Table I, the two enlargements are D 6441 and D 6442.

The fourth column contains the date of the negative, in years, months, and days; the figures in the first line, for example, signify the date, 1893, October 28. The fifth column gives the duration of the exposure in minutes. The sixth column gives the local sidereal time of the beginning of the exposure, and the seventh the Greenwich Mean Time of the middle of the exposure, which is converted in the eighth column into the corresponding fraction of the Julian Day, there given. The ninth and tenth columns give the right ascension and declination for 1875.0 of the point assumed as the centre of the plate. The eleventh column contains the number of measurements made upon the two enlargements; each measurement consists of four separate readings of a scale, shown in Volume XLVIII of these Annals, page 1. The four readings are designated as A, B, C, and D; of these, A denotes that made toward the left, B that made downward, C that made toward

the right, and D that made upward. In making these readings, the intersection of the vertical and horizontal scales is placed upon the image to be measured, and the objects observed are the sides of one of the squares of a reticule photographed on the enlargement. The sum of two opposite readings, such as A and C, or B and D, measures the diameter of the square in terms of the scale, and thus furnishes a factor by means of which the readings may be reduced to seconds of arc. In the present case, the diameter of each square is 0.1 cm., and as the reticule is placed against the negative when the enlargement is made, the values of the diameter, in seconds of arc, are respectively, 60", 179", and 163", for negatives denoted by the letters A, B, and I, in the second column of Table I.

The twelfth column gives the number of stars to which the position of the planet was referred. The places of these stars were derived from the Catalogues of the Astronomische Gesellschaft, except for the last six plates, Nos. 16 to 21, inclusive. For these, the Cordoba Catalogues were employed.

TABLE I.
DATA RELATING TO PLATES.

Plate.	Negative.	Enlargements.	Date 1800 +	Exp.	Sidereal Time.	G. M. T.	Julian Day. 2410000 +	Centre of Plate 1875.0.		No. of Meas.	No. of Cat. Stars.	Reduction to arc.	
								R. A.	Dec.			α	y
			y. m. d.	m.	h. m.	h. m.		h. m. s.	° ' "			" "	" "
1	I 9801	D 6441,42	93 10 28	14	7 35	21 55	2765.913	6 16 48	+ 58 10	65	9	3.97, 3.97	3.98, 3.98
2	I 9832	D 6377,78	93 10 30	10	6 8	20 18	2767.846	5 46 6	+ 58 12	124	9	3.97, 3.97	3.98, 3.98
3	I 9862	D 6391,92	93 10 31	15	7 12	21 21	2768.890	6 28 24	+ 53 26	94	7	3.97, 3.97	3.97, 3.97
4	I 10095	D 6390,89	93 11 26	17	7 59	20 26	2794.851	7 49 36	+ 56 57	48	7	3.97, 3.98	3.98, 3.98
5	I 10215	D 6375,76	93 12 19	14	7 25	18 21	2817.765	7 25 42	+ 53 16	56	4	3.98, 3.98	3.98, 3.98
6	I 10280	D 6416,17	93 12 23	13	9 11	19 49	2821.826	8 5 30	+ 53 15	44	4	3.97, 3.97	3.98, 3.97
7	I 10321	D 6383,82	93 12 27	10	7 10	17 32	2825.731	7 26 6	+ 48 8	60	7	3.98, 3.98	3.97, 3.98
8	I 10469	D 6408,09	94 1 19	10	8 5	16 57	2848.706	7 27 18	+ 33 8	40	7	3.98, 3.97	3.98, 3.98
9	I 10559	D 6393,94	94 1 25	13	7 47	16 16	2855.678	7 27 48	+ 18 3	132	9	3.98, 3.98	3.97, 3.98
10	A 222	D 6410,11	94 2 5	60	7 16	15 26	2865.643	7 28 30	+ 7 22	112	7	2.00, 2.00	1.99, 1.99
11	A 246	D 6414,15	94 2 16	12	7 46	14 49	2876.617	7 28 48	+ 2 18	72	8	2.00, 2.00	1.99, 2.00
12	I 10685	D 6436,37	94 2 16	13	7 56	14 59	2876.624	7 17 48	+ 3 16	84	11	3.98, 3.97	3.98, 3.98
13	B 10909	D 6371,74	94 4 16	10	11 4	14 13	2935.592	9 14 30	- 17 24	72	7	3.98, 3.98	3.98, 3.98
14	B 10951	D 6365,70	94 4 18	10	11 27	14 29	2937.603	9 12 6	- 17 12	72	9	3.98, 3.98	3.98, 3.98
15	B 11174	D 6344,46	94 5 19	10	13 15	14 16	2968.594	10 29 48	- 11 55	60	7	3.98, 3.98	3.98, 3.98
16	B 15531	D 6360,61	96 4 6	60	16 40	20 52	3656.869	18 48 18	- 37 32	100	7	3.98, 3.98	3.98, 3.98
17	B 16108	D 6350,51	96 6 4	70	16 15	16 40	3715.694	18 45 36	- 37 35	107	5	4.03, 3.98	4.00, 3.97
18	B 16157	D 6355,57	96 6 5	10	20 3	19 54	3716.829	18 5 48	- 42 34	68	5	3.98, 3.98	3.97, 3.98
19	B 16165	D 6353,54	96 6 5	11	22 13	22 4	3716.919	18 25 46	- 37 30	80	4	3.99, 3.98	3.98, 3.98
20	B 16518	D 6348,49	96 6 29	15	20 57	19 17	3740.803	17 51 9	- 37 33	92	9	3.98, 3.98	3.98, 3.98
21	A 1876	D 6413,12	96 6 30	60	15 8	13 46	3741.574	17 28 18	- 37 31	100	6	1.99, 2.00	1.99, 2.00

The thirteenth column contains four values of the reduction of scale readings to arc. Two of these values are derived from the opposite readings $A + C$, and two from $B + D$, as above explained. The method of applying this reduction is as follows: the difference, $C - A$, or $B - D$, is to be multiplied by the quantity here given, to obtain the distance of the measured image from the centre of the square, in seconds of arc. Since the difference thus multiplied is twice the distance required, the multiplier expresses half the number of seconds corresponding in the enlargement to one division of the scale. The fraction of the diameter of the square obtained by this process is of course to be added to or subtracted from the distance expressed by the entire number of squares, from any assumed origin, to one or the other side of that square measured by the scale. In the present series of measurements, the fractional portion resulting from the readings of the scale is ordinarily added to a number of entire squares, as will appear in Table IV.

In measuring each enlargement, the readings A and B were first taken for the entire series of objects to be observed, and the readings C and D were made subsequently for each, so that the readings A and C , and similarly B and D , might be wholly independent of each other, as described on page 247 of Volume XXVI. This appears to be preferable to the method first employed, which is described on page 238 of the same volume.

The data relating to the stars employed as standards are collected in Table II. The first column contains numbers referring to the first column of Table I, and thus indicating the plates measured and the times at which they were taken. The second column contains numbers designating the stars employed, separately for each date, and the third gives the designations of these stars in the *Durchmusterung*, including under that general name the similar works of Argelander, Schönfeld, and Thome. The fourth column gives the magnitudes of the stars according to the *Durchmusterung*; the fifth and sixth their places for 1875.0; and the seventh the rectangular coördinates computed from these places by Turner's formula. The eighth column contains the corresponding coördinates resulting from the measurement and discussion of the photographs, to be explained below. The ninth column exhibits the degree of agreement between the two enlargements of each negative in these coördinates, by means of residuals expressed in tenths of a second of arc, negative values being indicated by *Italics*. Thus, in the first line, the residual in x , from D 6441, is $0''.0$, and that from D 6442, is $-0''.1$. The corresponding measured values of x are $-12140''.2$, and $-12140''.3$.

The last column of Table II contains a letter showing the authority for the right ascension and declination given in the fifth and sixth columns. The letter A

TABLE II.
STANDARD STARS.

Plate.	Star.	DM.	Magn.	R. A. 1875.0.			Dec. 1875.0.			Computed Coördinates.		Measured Coördinates.		Residuals.		Place.
				<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>°</i>	<i>'</i>	<i>"</i>	<i>X</i>	<i>Y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	
1	1	+53° 985	8.5	5 54	9.55		+53	33	52.8	-12140.1	-16118.6	-12140.2	-16118.0	00,01 01,00		A
	2	+53° 986	9.0	5 54	35.42		+53	49	58.5	-11828.8	-15166.9	-11828.4	-15166.4	06,06 00,01		A
	3	+54° 980	9.3	5 54	58.19		+54	24	29.8	-11458.0	-13104.6	-11458.6	-13105.2	04,03 01,00		A
	4	+54° 989	8.8	5 57	55.42		+54	29	34.4	-9886.5	-12911.5	-9885.4	-12911.0	10,10 01,02		A
	5	+54° 992	8.9	6 0	19.52		+54	3	17.8	-8725.6	-14573.0	-8726.7	-14575.3	06,06 01,01		A
	6	+53° 993	9.0	6 0	46.36		+53	31	9.7	-8604.1	-16524.3	-8604.4	-16524.4	18,18 06,06		A
	7	+53° 994	8.0	6 0	54.29		+53	38	16.9	-8507.8	-16098.7	-8507.2	-16100.0	10,09 11,11		A
	8	+53° 997	8.2	6 1	42.26		+53	51	13.6	-8036.1	-15341.4	-8035.1	-15341.2	06,06 01,02		A
	9	+54° 997	8.9	6 2	39.13		+54	0	1.6	-7503.7	-14837.0	-7504.4	-14834.6	10,09 03,04		A
2	1	+54° 992	8.9	6 0	19.52		+54	3	17.8	+7534.7	-14758.4	+7535.2	-14758.6	07,06 01,00		A
	2	+53° 994	8.0	6 0	54.29		+53	38	16.9	+7924.6	-16251.0	+7924.0	-16251.8	00,01 03,02		A
	3	+53° 997	8.2	6 1	42.26		+53	51	13.6	+8307.2	-15447.4	+8308.0	-15448.3	04,05 12,12		A
	4	+54° 997	8.9	6 2	39.13		+54	0	1.6	+8779.2	-14888.3	+8776.6	-14885.8	05,05 12,11		A
	5	+54° 1000	9.0	6 3	38.05		+54	7	50.6	+9269.3	-14385.9	+9268.2	-14383.8	04,04 01,01		A
	6	+54° 1005	8.5	6 6	8.89		+54	4	28.8	+10613.1	-14499.8	+10614.4	-14503.2	03,02 04,05		A
	7	+53° 1000	9.3	6 6	10.76		+53	49	59.8	+10694.8	-15371.1	+10697.2	-15371.7	05,05 00,00		A
	8	+53° 1001	8.7	6 6	13.53		+53	31	13.1	+10804.1	-16501.5	+10801.4	-16497.8	00,01 05,06		A
	9	+53° 1003	7.5	6 7	56.75		+53	42	39.1	+11671.4	-15744.0	+11670.4	-15743.6	00,01 14,13		A
	10	+53° 1004	9.5	6 8	18.72		+53	31	51.5	+11920.8	-16379.4	+11925.8	-16378.4	14,14 47,47		A
	11	+53° 1005	9.0	6 8	19.99		+53	41	58.2	+11881.7	-15768.9	+11881.7	-15768.2	02,02 10,11		A
	12	+54° 1009	9.0	6 8	56.02		+54	12	44.7	+12045.1	-13890.2	+12046.8	-13893.2	06,07 10,10		A
3	1	+54° 1005	8.5	6 6	8.89		+54	4	28.8	-11751.9	+2771.3	-11753.0	+2770.6	01,02 02,01		A
	2	+53° 1000	9.3	6 6	10.76		+53	49	59.8	-11803.2	+1902.1	-11802.0	+1903.0	05,04 00,00		A
	3	+53° 1003	7.5	6 7	56.75		+53	42	39.2	-10896.4	+1391.4	-10896.8	+1390.2	02,03 05,04		A
	4	+53° 1005	9.0	6 8	19.99		+53	41	58.2	-10692.9	+1335.7	-10693.2	+1336.4	01,00 05,05		A
	5	+54° 1009	9.0	6 8	56.02		+54	12	44.7	-10246.7	+3158.1	-10246.2	+3158.0	05,04 03,02		A
	6	+54° 1012	8.9	6 9	44.77		+54	17	55.6	-9798.6	+3439.9	-9798.8	+3441.6	00,00 00,01		A
	7	+54° 1014	7.5	6 10	3.33		+54	17	57.8	-9636.0	+3431.4	-9635.8	+3430.0	04,04 02,02		A
4	1	+57° 1074	8.7	7 16	26.12		+57	22	58.4	...	...	-16079.2	+2539.8	03,03 04,05		A
	2	+57° 1075	8.4	7 18	3.52		+57	54	25.0	-15077.8	+4325.8	-15076.0	+4327.7	08,08 08,08		A
	3	+57° 1076	8.4	7 18	52.79		+57	54	23.6	-14685.8	+4279.1	-14686.7	+4280.0	00,00 09,08		A
	4	+57° 1077	9.3	7 18	59.48		+57	14	19.5	-14902.3	+1877.6	-14900.8	+1876.4	04,03 06,07		A
	5	+57° 1078	9.0	7 19	10.98		+57	48	49.0	-14578.3	+3929.3	-14581.0	+3927.0	09,09 11,12		A
	6	+57° 1080	8.4	7 19	27.56		+57	13	25.7	-14680.5	+1798.5	-14681.5	+1798.5	06,06 02,02		A
	7	+58° 1047	8.9	7 23	31.09		+57	57	45.6	-12450.5	+4247.3	-12449.3	+4246.7	01,01 12,12		A
	8	+57° 1083	7.6	7 23	37.73		+57	31	22.6	-12548.3	+2663.1	-12548.1	+2664.4	00,00 12,12		A
5	1	+55° 1230	7.0	7 44	18.42		+55	2	15.9	+9601.1	+6697.7	+9601.3	+6697.5	03,03 03,03		A
	2	+54° 1182	9.0	7 46	29.13		+54	4	34.7	+10977.4	+3318.3	+10977.2	+3318.6	03,02 03,02		A
	3	+55° 1235	8.2	7 47	55.20		+55	0	10.2	+11475.4	+6708.4	+11475.3	+6708.8	05,05 05,04		A
	4	+54° 1185	9.0	7 49	18.24		+54	23	45.4	+12371.0	+4584.4	+12371.2	+4584.0	05,05 05,05		A
6	1	+53° 1195	8.5	7 44	6.00		+53	5	53.8	-11565.9	-114.1	-11566.8	-114.7	02,03 00,00		A
	2	+53° 1197	9.2	7 44	43.78		+53	18	1.8	-11172.6	+588.0	-11171.6	+589.0	09,09 05,04		A
	3	+53° 1199	9.2	7 46	19.96		+53	19	6.7	-10305.8	+592.5	-10307.2	+591.5	11,10 05,05		A
	4	+53° 1200	8.8	7 48	30.88		+53	13	21.4	-9152.9	+173.2	-9151.6	+173.6	03,04 02,02		A
7	1	+50° 1475	8.6	7 40	58.99		+50	54	0.9	+8459.2	+10182.1	+8460.4	+10181.4	09,08 13,13		A
	2	+51° 1363	8.5	7 41	25.34		+51	26	4.7	+8612.7	+12123.4	+8613.0	+12123.4	04,04 08,08		A

Plate.	Star.	DM.	Magn.	R. A. 1875.0.			Dec. 1875.0.			Computed Coördinates.		Measured Coördinates.		Residuals.		Place.
				<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>°</i>	<i>'</i>	<i>"</i>	<i>X</i>	<i>Y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	
8	3	+50° 1481	8.9	7 43	8.38	+50 29	10.9	+	9768.2	+ 8756.2	+ 9767.4	+ 8757.1	03,04	03,03	A	
	4	+51° 1367	9.5	7 43	42.60	+51 15	55.4	+	9934.3	+11584.9	+ 9933.3	+11584.8	03,03	02,03	A	
	5	+50° 1482	8.5	7 43	53.88	+50 36	18.6	+	10178.4	+ 9210.0	+10178.0	+ 9209.6	03,04	08,09	A	
	6	+51° 1370	9.1	7 45	0.33	+51 3	49.8	+	10710.3	+10903.3	+10709.2	+10904.7	06,06	01,01	A	
	7	+50° 1489	8.4	7 46	43.04	+50 52	18.6	+	11727.2	+10276.1	+11728.8	+10275.0	02,01	06,06	A	
	1	+28° 1413	9.0	7 26	23.45	+28 56	29.9	-	718.0	-15116.4	- 718.4	-15115.2	22,21	05,04	A	
	2	+28° 1415	7.7	7 26	40.31	+28 40	42.7	-	497.5	-16069.4	- 497.2	-16067.6	00,00	14,14	A	
	3	+28° 1416	7.0	7 26	42.67	+28 57	16.8	-	464.9	-15069.6	- 463.9	-15070.1	07,07	01,01	A	
	4	+29° 1553	8.7	7 26	45.17	+29 0	2.6	-	431.8	-14903.0	- 432.2	-14903.3	15,14	05,05	A	
	5	+28° 1417	7.7	7 26	52.27	+28 46	18.9	-	339.3	-15731.3	- 339.6	-15735.0	09,08	20,21	A	
9	6	+28° 1419	7.3	7 27	35.55	+28 53	52.1	+	231.1	-15275.7	+ 230.8	-15273.9	00,01	11,11	A	
	7	+28° 1420	9.0	7 28	19.48	+28 54	11.2	+	809.5	-15255.6	+ 809.9	-15255.8	04,04	05,05	A	
	1	+21° 1610	8.0	7 21	47.19	+21 11	35.6	-	5054.7	+11351.0	- 5054.6	+11350.4	01,02	02,03	A	
	2	+21° 1614	8.1	7 22	51.39	+21 2	27.9	-	4158.7	+10793.8	- 4159.0	+10793.8	02,01	01,00	A	
	3	+21° 1616	9.1	7 23	6.72	+21 7	19.7	-	3941.9	+11084.9	- 3943.2	+11084.4	03,02	00,00	A	
	4	+20° 1823	7.3	7 23	16.51	+20 44	57.3	-	3812.9	+ 9737.8	- 3811.8	+ 9738.6	01,02	02,01	A	
	5	+20° 1825	8.5	7 23	39.02	+20 42	1.5	-	3497.7	+ 9559.5	- 3497.3	+ 9559.8	00,00	05,05	A	
	6	+21° 1618	9.3	7 23	40.59	+21 12	31.9	-	3465.4	+11394.7	- 3464.6	+11395.2	03,03	07,08	A	
	7	+20° 1830	8.7	7 24	28.08	+20 52	6.3	-	2805.6	+10161.8	- 2806.4	+10160.8	02,01	01,02	A	
	8	+21° 1629	8.5	7 24	58.65	+21 22	3.5	-	2369.7	+11962.2	- 2369.0	+11962.4	05,04	06,06	A	
10	9	+21° 1630	7.1	7 25	9.45	+21 40	19.7	-	2214.6	+13061.8	- 2214.2	+13063.8	01,01	12,12	A	
	10	+21° 1634	9.1	7 25	30.43	+21 41	45.3	-	1921.3	+13146.6	- 1921.8	+13144.8	04,03	12,11	A	
	1	+ 9° 1660	5.0	7 21	21.36	+ 9 10	36.0	-	6352.5	+ 6534.0	- 6355.6	+ 6536.6	08,08	01,00	A	
	2	+ 8° 1779	9.0	7 21	24.38	+ 8 41	6.6	-	6314.7	+ 4762.2	- 6315.4	+ 4760.8	04,03	02,03	A	
	3	+ 8° 1780	8.2	7 21	50.13	+ 8 45	37.2	-	5931.5	+ 5031.3	- 5929.6	+ 5031.2	05,05	03,04	A	
	4	+ 9° 1669	9.0	7 22	15.32	+ 9 1	59.4	-	5554.2	+ 6013.0	- 5552.6	+ 6011.2	06,05	01,00	A	
	5	+ 8° 1784	9.3	7 22	48.46	+ 8 38	16.2	-	5067.2	- 4586.4	- 5066.9	+ 4586.6	06,06	03,02	A	
	6	+ 8° 1791	7.8	7 24	8.89	+ 8 48	41.7	-	3872.1	+ 5208.4	- 3871.2	+ 5207.3	04,05	02,02	A	
	7	+ 8° 1795	8.8	7 24	50.62	+ 8 22	36.7	-	3256.4	+ 3640.9	- 3257.6	+ 3642.4	02,02	01,00	A	
	11	- 0° 1757	8.9	7 27	54.75	- 0 44	22.6	-	799.8	-10952.9	- 800.4	-10952.5	05,06	01,01	A	
11	2	+ 0° 1999	9.4	7 28	50.73	+ 0 7	20.4	+	41.0	- 7843.4	+ 40.4	- 7844.1	07,08	03,03	A	
	3	+ 0° 2011	9.0	7 29	47.87	+ 0 8	22.7	+	898.7	- 7781.0	+ 898.4	- 7781.4	02,01	06,05	A	
	4	- 0° 1765	9.0	7 29	47.98	- 0 15	19.7	+	900.6	- 9205.8	+ 903.1	- 9205.4	04,04	01,00	A	
	5	+ 0° 2016	9.0	7 29	58.34	+ 0 11	0.5	+	1055.8	- 7623.0	+ 1055.2	- 7623.1	02,03	03,03	A	
	6	+ 0° 2017	9.0	7 30	8.07	+ 0 10	36.3	+	1201.9	- 7647.2	+ 1202.8	- 7646.5	04,03	06,06	A	
	7	- 0° 1768	8.8	7 31	9.87	- 0 42	41.7	+	2130.9	-10851.8	+ 2130.8	-10852.4	05,04	01,01	A	
	8	- 0° 1769	8.8	7 31	19.98	- 0 9	32.1	+	2281.9	- 8857.6	+ 2280.5	- 8857.0	05,05	03,02	A	
	12	- 0° 1757	8.9	7 27	54.75	- 0 44	22.6	+	9128.7	-14448.8	+ 9128.1	-14449.1	09,09	05,05	A	
	2	+ 0° 1999	9.4	7 28	50.73	+ 0 7	20.4	+	9963.6	-11330.5	+ 9964.4	-11330.0	04,05	07,08	A	
	3	- 0° 1762	9.5	7 28	53.72	- 1 1	5.3	+	10020.0	-15458.4	+10020.4	-15459.5	11,10	00,00	A	
12	4	+ 0° 2009	8.9	7 29	43.83	+ 0 12	53.4	+	10762.3	-10995.9	+10763.8	-10997.4	03,04	16,15	A	
	5	+ 0° 2011	9.0	7 29	47.87	+ 0 8	22.7	+	10824.0	-11267.8	+10821.4	-11266.4	03,03	03,02	A	
	6	- 0° 1765	9.0	7 29	47.98	- 0 15	19.7	+	10829.9	-12697.0	+10830.6	-12695.4	05,04	10,11	A	
	7	+ 0° 2016	9.0	7 29	58.34	+ 0 11	0.5	+	10981.3	-11109.3	+10979.8	-11109.2	10,09	08,09	A	
	8	+ 0° 2017	9.0	7 30	8.07	+ 0 10	36.3	+	11127.9	-11133.6	+11129.2	-11133.4	04,03	00,01	A	
	9	- 0° 1766	8.3	7 30	51.47	- 0 55	12.8	+	11794.8	-15105.1	+11794.2	-15105.4	02,03	07,08	A	
	10	- 0° 1768	8.8	7 31	9.87	- 0 42	41.7	+	12069.9	-14349.1	+12071.1	-14347.4	03,03	08,09	A	
	11	- 0° 1769	8.8	7 31	19.98	- 0 9	32.1	+	12215.7	-12347.8	+12215.2	-12349.8	02,01	06,07	A	
	13	-13° 2825	9.0	9 14	47.86	-13 12	11.3	+	261.5	+15135.7	+ 262.3	+15134.0	07,07	03,02	H	
	2	-13° 2826	8.0	9 14	49.38	-13 16	48.2	+	283.7	+14857.4	+ 283.1	+14856.8	07,07	02,01	H	

Star.	DM.	Magn.	R. A. 1875.0.			Dec. 1875.0.			Computed Coördinates.		Measured Coördinates.		Residuals.		Place.
			<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>°</i>	<i>'</i>	<i>"</i>	<i>X</i>	<i>Y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	
3	3	-13° 2829	9.1	9	15	25.01	-13	19	40.9	+ 805.0	+14683.4	+ 805.6	+14685.6	00,01 06,05	H
	4	-13° 2835	8.3	9	16	55.78	-13	17	23.5	+ 2133.7	+14819.3	+ 2131.4	+14819.2	01,01 01,02	H
	5	-13° 2848	9.2	9	19	20.03	-13	31	30.8	+ 4240.1	+13960.0	+ 4241.5	+13960.0	00,00 03,03	H
14	6	-13° 2847	8.9	9	19	20.14	-13	30	31.1	+ 4242.0	+14020.0	+ 4242.4	+14020.3	03,02 04,04	H
	7	-14° 2846	9.0	9	19	27.00	-14	5	44.4	+ 4328.7	+11897.4	+ 4328.8	+11897.2	02,03 01,02	H
	1	-13° 2848	9.2	9	19	20.03	-13	31	30.8	+ 6344.8	+13223.9	+ 6345.3	+13222.8	08,08 07,07	H
	2	-13° 2847	8.9	9	19	20.14	-13	30	31.1	+ 6347.0	+13283.9	+ 6347.2	+13284.4	10,10 12,13	H
	3	-14° 2846	9.0	9	19	27.00	-14	5	44.4	+ 6427.2	+11161.4	+ 6425.8	+11161.0	03,03 06,07	H
	4	-14° 2850	8.9	9	19	43.48	-14	7	27.3	+ 6666.5	+11056.2	+ 6668.8	+11057.4	00,01 09,08	H
	5	-13° 2851	8.5	9	19	50.64	-13	59	30.0	+ 6775.7	+11534.4	+ 6775.1	+11535.0	01,01 02,02	H
	6	-13° 2852	8.8	9	20	40.39	-13	43	24.7	+ 7512.5	+12497.3	+ 7511.4	+12497.8	08,09 10,09	H
	7	-13° 2855	7.8	9	20	45.26	-13	56	47.0	+ 7574.7	+11691.1	+ 7572.8	+11689.4	07,07 07,07	H
	8	-13° 2857	9.0	9	21	10.96	-13	47	38.4	+ 7956.4	+12238.4	+ 7958.7	+12238.3	13,13 08,08	H
	9	-13° 2858	7.8	9	21	13.24	-13	21	35.1	+ 8008.2	+13808.7	+ 8008.0	+13809.2	01,01 02,03	H
15	1	-14° 3164	8.1	10	35	32.89	-15	1	34.2	+ 5004.8	-11221.5	+ 5006.4	-11220.8	00,01 02,01	W
	2	-14° 3165	8.7	10	35	56.86	-14	42	58.8	+ 5359.0	-10105.1	+ 5359.2	-10105.3	02,02 07,07	W
	3	-15° 3111	8.3	10	36	0.54	-15	26	18.5	+ 5397.9	-12714.0	+ 5397.8	-12714.6	03,02 03,04	W
	4	-15° 3115	9.0	10	37	13.40	-15	30	46.1	+ 6452.4	-12991.1	+ 6450.2	-12991.4	07,06 00,00	W
	5	-14° 3170	8.8	10	38	0.38	-14	31	32.1	+ 7159.9	- 9430.8	+ 7159.7	- 9430.0	02,02 08,08	W
	6	-14° 3171	9.0	10	38	2.97	-14	53	32.6	+ 7187.7	-10755.5	+ 7186.0	-10756.9	05,05 06,06	W
	7	-15° 3121	9.1	10	39	12.81	-15	31	16.5	+ 8183.6	-13038.7	+ 8186.0	-13037.9	04,05 01,01	W
16	1	-38° 13027	8.5	18	34	43.12	-38	33	56.5	- 9563.6	- 3893.7	- 9564.8	- 3892.6	05,06 06,06	G
	2	-38° 13029	8.3	18	34	45.55	-38	44	44.5	- 9511.7	- 4541.1	- 9511.4	- 4541.6	06,06 05,04	G
	3	-38° 13036	5.0	18	35	12.46	-38	26	27.1	- 9234.6	- 3431.4	- 9233.4	- 3432.8	03,02 17,17	G
	4	-38° 13045	8.0	18	36	6.80	-38	14	58.3	- 8617.6	- 2720.3	- 8618.0	- 2719.8	05,04 06,05	G
	5	-38° 13064	8.7	18	37	31.79	-38	50	29.3	- 7554.2	- 4821.5	- 7555.8	- 4821.2	05,05 10,09	G
	6	-38° 13073	8.5	18	37	50.66	-38	57	53.6	- 7321.1	- 5259.7	- 7319.9	- 5259.6	05,05 13,14	G
	7	-38° 13087	8.3	18	38	41.68	-38	57	1.1	- 6726.7	- 5190.8	- 6725.7	- 5190.9	00,00 04,04	G
17	1	-40° 12656	8.6	18	28	55.41	-40	35	27.8	-11421.2	-11108.6	-11421.0	-11108.6	02,02 02,01	G
	2	-39° 12781	8.0	18	30	15.90	-39	37	27.0	-10643.9	- 7577.5	-10643.0	- 7576.8	03,04 10,09	G
	3	-39° 12783	7.7	18	30	25.11	-39	48	8.0	-10511.2	- 8215.1	-10513.2	- 8215.2	03,03 13,14	G
	4	-40° 12679	8.0	18	30	34.35	-40	0	51.7	-10373.8	- 8975.9	-10372.9	- 8977.1	04,04 00,00	G
	5	-39° 12816	8.3	18	32	30.99	-39	48	40.0	- 9056.1	- 8189.7	- 9055.8	- 8189.0	01,02 02,01	G
	1	-39° 12728	7.5	18	26	34.44	-39	47	13.8	+14397.7	+ 9595.7	+14397.4	+ 9595.0	02,02 02,02	G
18	2	-40° 12656	8.6	18	28	55.41	-40	35	27.8	+15831.1	+ 6594.6	+15830.7	+ 6595.4	04,04 03,04	G
	3	-39° 12781	8.0	18	30	15.90	-39	37	27.0	+17004.8	+10022.2	+17003.2	+10024.6	06,06 11,12	G
	4	-39° 12783	7.7	18	30	25.11	-39	48	8.0	+17064.8	+ 9371.8	+17065.8	+ 9373.0	01,02 05,06	G
	5	-40° 12679	8.0	18	30	34.35	-40	0	51.7	+17115.6	+ 8598.4	+17117.0	+ 8595.1	09,08 07,07	G
19	1	-39° 12728	7.5	18	26	34.44	-39	47	13.8	+ 558.8	- 8238.8	+ 558.8	- 8238.8	01,00 00,01	G
	2	-39° 12781	8.0	18	30	15.90	-39	37	27.0	+ 3120.6	- 7670.0	+ 3121.1	- 7669.4	01,01 01,00	G
	3	-39° 12783	7.7	18	30	25.11	-39	48	8.0	+ 3219.2	- 8313.4	+ 3218.2	- 8314.4	01,01 02,01	G
	4	-40° 12679	8.0	18	30	34.35	-40	0	51.7	+ 3316.0	- 9079.9	+ 3316.6	- 9079.4	00,01 01,00	G
20	1	-36° 11828	8.3	17	35	35.72	-36	42	39.0	-11231.7	+ 2793.3	-11230.9	+ 2793.9	06,06 05,05	G
	2	-36° 11860	9.3	17	37	11.29	-36	38	49.9	-10088.7	+ 3066.8	-10089.2	+ 3065.9	10,10 10,10	G
	3	-36° 11867	8.2	17	37	37.64	-36	36	9.9	- 9776.8	+ 3238.3	- 9776.0	+ 3236.6	00,01 02,02	G
	4	-36° 11879	8.1	17	38	24.61	-36	29	37.3	- 9223.6	+ 3650.6	- 9221.4	+ 3648.8	01,01 03,03	G
	5	-36° 11882	8.2	17	38	43.78	-36	56	1.7	- 8939.6	+ 2072.8	- 8941.5	+ 2075.4	02,02 03,04	G
	6	-35° 11922	9.0	17	39	1.30	-35	55	34.9	- 8846.4	+ 5709.2	- 8850.5	+ 5712.2	02,02 02,03	G
	7	-35° 11928	8.7	17	39	15.12	-35	45	24.8	- 8697.6	+ 6325.3	- 8699.4	+ 6327.6	06,05 02,03	G
	8	-36° 11890	9.2	17	39	15.47	-36	1	35.9	- 8662.6	+ 5353.1	- 8663.8	+ 5353.8	04,03 03,03	G

Plate.	Star.	DM.	Magn.	R. A. 1875.0.			Dec. 1875.0.			Computed Coördinates.		Measured Coördinates.		Residuals.		Place.
				<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>°</i>	<i>'</i>	<i>"</i>	<i>X</i>	<i>Y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	
20	9	-35° 11934	7.7	17	39	50.44	-35	50	45.0	- 8257.3 + 6017.4	- 8251.9 + 6013.0	03,03	01,00			G
21	1	-36° 11800	9.3	17	34	9.46	-36	3	59.6	+ 4263.2 + 5189.4	+ 4263.2 + 5190.8	02,02	02,01			G
	2	-36° 11807	9.0	17	34	36.10	-36	2	48.9	+ 4587.7 + 5255.1	+ 4587.5 + 5253.4	01,01	02,02			G
	3	-36° 11828	8.3	17	35	35.72	-36	42	39.0	+ 5264.9 + 2851.1	+ 5265.2 + 2851.0	02,02	03,02			G
	4	-36° 11860	9.3	17	37	11.29	-36	38	49.9	+ 6420.3 + 3056.0	+ 6419.6 + 3055.0	02,03	02,02			G
	5	-36° 11867	8.2	17	37	37.64	-36	36	9.9	+ 6741.6 + 3208.5	+ 6742.3 + 3209.4	01,01	05,04			G
	6	-36° 11879	8.1	17	38	24.61	-36	29	37.3	+ 7318.3 + 3587.1	+ 7318.4 + 3587.4	01,01	05,04			G

signifies the published catalogue of the Astronomische Gesellschaft in which the star occurs, as shown by its declination; the letter G signifies Gould's Argentine General Catalogue and Zone Catalogue; the letter H, the provisional results from the zone $-9^{\circ} 50'$ to $-14^{\circ} 10'$ observed at the Harvard College Observatory; and the letter W the similar results from the zone $-13^{\circ} 50'$ to $-18^{\circ} 10'$ observed at the U. S. Naval Observatory at Washington, kindly communicated by Professor Harkness. These last declinations were expressed in hundredths of a second of arc, and were used without change in the computation of X and Y .

When several observations of the same star were found, as sometimes occurred, particularly in the observations of Gould at Cordoba, the mean of all was taken, giving equal weights to the separate observations.

Several stars occurring in Table II were not actually employed in determining the constants of reduction for the measurements of Eros, because their images were unfavorably situated for measurement. These stars are as follows: in Plate 2, Nos. 8, 10, 12; in Plate 4, No. 1; in Plate 9, No. 5.

In computing the rectangular coördinates of star 8, in Plate 2, the seconds of declination employed were $39''.1$, from a manuscript correction to the printed catalogue, which gives $39''.2$. But in the corresponding computation for the same star in Plate 3, the printed catalogue was followed.

Table III gives the rectangular coördinates resulting from the measurement of additional stars shown by the plates, which may be more accurately determined hereafter, as above stated. The first column contains numbers designating the plates, and referring to Table I; the second gives letters for convenience in designating the stars; the third gives the coördinates, and the fourth the residuals, expressed in tenths of a second, on the same system as that employed in Table II. The letter A in place of a residual, signifies that as only one enlargement was measured, no residuals could be given.

TABLE III.
ADDITIONAL STARS.

Plate.	Star.	Measured Coördinates, 1875.0.		Residuals.		Plate.	Star.	Measured Coördinates, 1875.0.		Residuals.	
		<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>
1	a	-11119.2	-14490.8	17,18	13,14	6	c	-11264.1	+ 52.6	07,07	05,05
	b	-10170.0	-15793.4	07,07	06,06		d	-10533.0	- 296.6	07,08	10,09
	c	-10034.4	-15981.6	00,01	03,03	7	a	+10867.4	+10347.8	02,01	08,08
	d	- 8916.3	-15851.4	00,00	08,09		b	+10913.4	+11120.0	06,07	01,02
2	a	+ 7489.8	-16048.0	08,07	11,10		c	+11037.0	+10513.8	09,09	02,01
	b	+ 9498.0	-14503.8	11,12	06,05		d	+11078.8	+10500.6	04,04	16,15
	c	+ 9760.3	-15195.0	08,08	01,01		e	+12354.4	+ 9780.8	01,00	06,07
	d	+ 9901.6	-13942.6	01,01	07,07	9	a	- 5058.6	+11249.4	02,01	14,13
	e	+ 9979.9	-13146.8	02,02	01,00		b	- 3599.3	+11531.5	31,31	15,15
	f	+10752.4	-13303.6	21,22	02,03		c	- 3525.6	+11674.2	09,10	07,07
	g	+11111.4	-15884.4	01,00	03,03		d	- 3484.1	+11562.0	05,05	03,02
	h	+11087.6	-13310.4	09,08	03,04		e	- 3438.2	+10895.6	01,02	01,02
	i	+11150.0	-13385.1	08,08	01,01		f	- 3323.4	+11803.9	04,03	01,01
	j	+11271.2	-13775.4	01,00	13,12		g	- 2989.6	+12326.4	07,07	01,00
	k	+11420.6	-13127.4	23,22	31,32		h	- 2513.4	+10987.6	04,05	06,07
	l	+11760.4	-15203.2	06,06	10,09		i	- 2199.0	+12833.8	10,11	04,04
3	a	-12854.4	+ 2924.9	A ..	A ..		j	- 2211.2	+10831.6	05,06	07,07
	b	-12703.5	+ 2212.7	A ..	A ..	10	k	- 1981.4	+10326.0	03,04	08,08
	b'	-12440.3	+ 2038.5	.. A	.. A		a	- 4970.6	+ 6194.0	06,06	02,01
	c	-12373.8	+ 3427.6	17,16	28,27		b	- 4907.2	+ 5071.8	01,02	05,04
	d	-12325.6	+ 3215.8	08,07	31,31		c	- 4819.8	+ 4925.1	01,02	04,04
	e	-11604.2	+ 5156.1	33,32	27,27		d	- 4717.0	+ 4827.1	01,00	07,07
	f	-11474.0	+ 1336.8	09,10	19,20		e	- 4689.5	+ 5325.0	01,01	05,06
	g	-11431.8	+ 3931.2	22,21	10,09		f	- 4651.0	+ 4148.8	01,02	03,04
	h	-11107.6	+ 3875.6	11,12	15,14		g	- 4662.0	+ 5025.0	01,02	03,04
	i	-11052.0	+ 3790.2	09,10	09,08		h	- 4598.4	+ 5014.4	01,02	00,00
	j	-10990.6	+ 3388.6	02,02	03,02		i	- 4537.7	+ 4821.4	11,11	03,03
	k	-10749.4	+ 4004.0	22,23	16,15		j	- 4492.2	+ 4149.1	03,03	04,04
	l	-10747.0	+ 5053.8	28,28	22,22		k	- 4478.6	+ 5081.0	07,07	03,02
	m	-10727.8	+ 1912.9	04,05	08,08		l	- 4476.0	+ 5015.7	04,04	03,03
	n	- 9873.3	+ 3429.0	06,06	05,06		m	- 4441.7	+ 4599.2	03,03	08,08
4	a	-12550.6	+ 5326.6	14,14	09,10		n	- 4144.4	+ 5625.2	04,04	00,01
5	a	+10193.4	+ 5151.9	00,00	05,05		o	- 3054.0	+ 3778.8	02,01	11,10
	b	+10286.8	+ 4748.2	00,00	02,01	11	a	- 627.6	-10754.1	14,14	05,05
	c	+10314.8	+ 5696.6	00,00	20,21		b	+ 100.0	-10611.0	01,00	12,13
	d	+10316.2	+ 6321.0	02,03	02,03		c	+ 596.2	- 9663.1	05,06	07,07
	e	+10446.5	+ 6406.8	06,06	17,16		d	+ 1005.8	-10214.0	03,03	02,03
	f	+10858.4	+ 4952.2	17,17	16,15		e	+ 1193.2	- 9778.8	07,06	09,10
	g	+11634.6	+ 5826.2	09,09	08,08		f	+ 1255.8	- 9404.5	06,06	08,08
6	a	-11833.2	- 1041.0	08,09	32,31		g	+ 1271.2	- 9648.2	03,02	01,00
	b	-11699.5	- 1968.8	32,32	31,30	12	a	+ 9297.9	-14250.5	.. A	.. A

Plate.	Star.	Measured Coördinates, 1875.0.		Residuals.		Plate.	Star.	Measured Coördinates, 1875.0.		Residuals.	
		<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>
12	b	+10031.8	-14107.7	04,04	02,02	17	g	-11568.4	-8915.9	01,02	07,07
	c	+10525.9	-13156.0	10,10	13,12		h	-10895.3	-9096.0	14,14	10,11
	d	+10936.8	-13706.0	02,03	09,10		i	-10709.7	-8496.8	11,11	08,07
	e	+11189.2	-12891.8	51,50	32,33		j	-10624.0	-9306.9	04,05	50,50
	f	+12528.2	-14930.0	05,06	18,19		k	-10584.4	-9081.4	11,10	09,08
							l	-10441.6	-9207.8	02,03	01,02
13	a	+653.8	+15075.2	04,04	10,09	18	m	-10103.4	-7104.2	07,06	02,02
	b	+1852.9	+12715.1	21,21	14,14		n	-10018.4	-8444.2	03,04	14,13
	c	+2287.0	+13290.0	23,24	19,19		o	-9644.6	-8381.3	11,11	11,11
	d	+2325.6	+13657.1	13,14	08,08		p	-9372.4	-7034.2	16,16	20,20
	e	+2405.6	+12927.5	15,15	05,05		q	-9307.0	-10641.0	01,02	21,21
	f	+2549.0	+13792.6	07,07	06,07		a	+13940.4	+8679.2	04,05	01,01
14	g	+3026.6	+14811.0	11,12	01,00	19	b	+14793.6	+8058.6	17,17	02,02
	h	+3173.0	+14222.2	02,02	03,02		c	+14879.6	+8708.0	01,02	03,04
	a	+7510.0	+12220.6	02,02	05,05		d	+15044.6	+8757.2	00,01	05,06
	b	+8034.0	+12788.2	02,03	10,10		e	+15293.6	+8176.6	01,01	02,01
	c	+8611.6	+11816.2	33,32	14,14		f	+15363.6	+9385.4	10,10	11,10
	d	+8719.8	+12876.8	10,09	10,10		g	+15929.0	+8790.6	01,02	09,09
15	e	+8750.0	+11683.5	16,16	30,30	20	h	+16586.8	+8538.4	08,09	04,03
	f	+9325.6	+10968.5	14,15	20,20		i	+16833.0	+9113.5	09,10	01,01
	a	+6490.5	-9847.8	10,10	03,03		a	+157.4	-9174.3	04,05	16,16
	b	+6817.6	-10914.4	01,01	00,01		b	+1040.3	-9743.3	17,17	12,12
	c	+7022.6	-10717.4	08,08	07,07		c	+1085.8	-9094.6	03,03	10,11
	d	+7102.2	-10969.2	03,03	04,04		d	+1244.4	-9039.4	04,05	09,09
16	e	+7362.2	-11219.3	06,06	01,01	21	e	+1275.0	-8743.2	08,09	08,07
	a	-8559.2	-3696.6	13,13	09,09		f	+1530.3	-8395.4	04,04	08,08
	b	-8347.6	-3339.0	08,07	05,06		g	+1529.8	-9599.2	14,13	02,01
	c	-8177.4	-4310.2	02,03	08,07		h	+2126.0	-8951.4	08,08	06,06
	d	-8102.8	-3758.2	02,02	09,09		i	+2789.1	-9169.0	07,07	03,02
	e	-8019.2	-3736.6	05,04	03,03		j	+3003.8	-8580.6	06,06	02,02
17	f	-7982.5	-3660.4	06,06	05,04	21	k	+3051.0	-9397.1	10,09	04,04
	g	-7938.0	-3811.4	16,16	16,15		l	+3102.5	-9170.2	14,14	02,02
	h	-7923.5	-3711.8	28,28	02,01		m	+3237.6	-9305.0	25,25	05,05
	i	-7689.2	-2468.8	07,08	08,08		a	-11642.3	+4862.9	11,11	02,02
	j	-7420.1	-3828.5	01,01	05,05		b	-11150.6	+6694.2	05,06	08,08
	k	-7412.8	-3732.6	18,18	08,07		c	-10680.1	+4663.6	06,06	08,07
17	l	-7346.2	-4211.7	09,09	13,13	21	d	-10642.6	+4500.8	12,13	06,06
	m	-6830.8	-3140.0	17,17	08,07		e	-10167.8	+4562.5	10,09	06,06
	n	-6583.0	-2801.9	14,14	05,05		f	-9990.0	+4634.2	04,03	05,04
	o	-6257.2	-3162.5	01,00	06,06		g	-9902.4	+3977.0	04,05	05,04
	a	-12616.9	-9769.6	23,23	15,15		h	-9772.8	+4010.2	06,07	01,01
	b	-12602.2	-9116.2	21,22	14,13		i	-9642.0	+4160.8	04,05	09,10
17	c	-12449.1	-9052.6	02,02	17,18	21	j	-9366.7	+4125.6	01,01	03,03
	d	-12433.6	-8754.6	23,22	25,24		k	-9368.7	+4338.6	04,04	06,05
	e	-12199.4	-8390.4	15,15	13,13		a	+4982.4	+4940.3	01,00	01,01
	f	-12131.0	-9600.4	02,03	18,17						

Plate.	Star.	Measured Coördinates, 1875.0.		Residuals.		Plate.	Star.	Measured Coördinates, 1875.0.		Residuals.	
		<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>
21	b	+ 5811.6	+ 4669.8	02,02	01,02	21	h	+ 6615.2	+ 4613.2	00,00	05,04
	c	+ 5859.4	+ 4756.0	01,02	03,02		i	+ 6661.8	+ 3950.7	03,02	03,03
	d	+ 5928.2	+ 4682.8	07,07	00,01		j	+ 6794.4	+ 3976.9	02,01	08,08
	e	+ 5956.5	+ 4519.8	02,02	01,01		k	+ 6932.3	+ 4119.7	00,00	10,10
	f	+ 5960.0	+ 4766.2	07,08	06,05		l	+ 7207.1	+ 4066.7	02,02	10,10
	g	+ 6434.6	+ 4552.0	03,03	04,05		m	+ 7217.8	+ 4280.3	01,00	09,09

Table IV contains the original readings of the scale, with estimates, by means of which the total number of squares between the origin of measurements and the measured image may be determined, as shown immediately below. The first column designates the plate, as in Tables I, II, and III; the second designates the star, as in Tables II and III. The planet Eros is denoted by E. The third and fourth columns give, for each of the two enlargements of the plate, the corresponding estimates of position, expressed in terms of entire squares; thus, in the first line, 0.6 signifies that the star was estimated in *x* to be six tenths of a square from the adopted origin of measurements. The fifth column gives the readings of the scale, and the sixth and seventh the values of *x* and *y* immediately resulting from them, in Italics when negative, and to be found as follows: in the first line, which gives readings from the first enlargement, D 6441, the value of C—A is +2.5; this is to be multiplied by 3".97, from the last column of Table I, with the result, in seconds of arc, +9".9; to this nothing is added, since no entire number of squares appears in the corresponding estimate 0.6. The value of B—D is —16".2, to be multiplied by 3".98, from the last column of Table I, with the result —64".5. The estimate gives the number of entire squares as 4; this is to be multiplied by 163, since the plate, according to Table I, is I 9801, and therefore taken with the Draper telescope. The product is 652".0, from which we subtract 64".5, with the result +587".5. The second line gives the readings obtained by a second measurement of the same enlargement, and the results, computed as above, are +10".7 and +587".5. The third and fourth lines give measurements of the same star from the second enlargement, D 6442, with the estimates 0.3 and 4.1, and the results —26".2, +578".4, and —25".8, +578".8; the values of *x* are negative, as the reading A is larger than C.

It must be noticed that there may be an ambiguity in an estimate giving an exact number of squares; thus, in the first line of the readings for Plate 1, star 9,

we have the estimate in y , 12.0. But as the reading B considerably exceeds D, we must understand that this estimate signifies nearly 12, not a little more than 12. Hence, in making the computation, we are to assume the entire number of squares to be 11.

Two measurements were usually made on each enlargement; in cases of doubt or discordance, a third was added. A complete series of observations of Eros occupies twelve lines, six for each enlargement; but shorter series occasionally occur.

When the image of a star is near one of the edges of the enlargement, one side of the square enclosing the image may not appear. In such cases, the distance of the image from the opposite side of the square, combined with the dimensions of the square derived from the measurements of other images on the same enlargement, enables the missing measurement to be supplied by computation. Its place is filled, in Table IV, by the letter R, and its computed value is given in the subsequent Remarks on Tables III and IV.

When the image of a star was nearly bisected by a line of the reticule, its distance from the opposite sides of the squares on each side of the line was often measured. The method of reducing such measurements is obvious; they occur in Plate 1, star a; Plate 2, star 3; Plate 3, star 7; Plate 5, star 1; Plate 7, stars 5 and a; Plate 8, star 2; Plate 9, stars 6 and e; Plate 10, star e; Plate 11, star 2; Plate 12, stars 3 and 5; Plate 18, star 3; Plate 19, stars f and g; Plate 20, star 8, and Eros; Plate 21, star a.

TABLE IV.
ORIGINAL MEASURES.

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>
1	1	0.6	4.2	9.0	2.1	11.5	18.3	9.9	587.5	1	5	21.2	13.5	16.5	10.1	4.0	10.5	3373.4	2117.4
				8.9	2.1	11.6	18.3	10.7	587.5					16.5	10.5	4.0	10.0	3373.4	2121.0
		0.3	4.1	13.6	1.0	7.0	19.5	26.2	578.4					16.4	10.5	4.1	10.0	3374.2	2121.0
	13.5			1.0	7.0	19.4	25.8	578.8	6		22.2	1.6	16.6	13.0	4.0	7.5	3536.0	184.9	
	2	2.5	9.9	11.1	19.0	9.2	1.5	318.5					1536.6	16.5	13.0	4.0	7.5	3536.4	184.9
				11.0	19.0	9.6	1.5	320.4					1536.6	21.9	1.4	0.9	12.0	19.6	8.5
	2.2	9.8	15.5	17.9	5.0	2.6	284.3	1527.9	1.0		12.0	19.5	8.5			3496.4	176.9		
			15.5	17.9	5.0	2.6	284.3	1527.9	7		22.8	4.3	4.5			5.0	16.0	15.5	3631.7
	3	4.7	22.6	6.0	11.0	14.5	9.4	685.7					3592.4	5.0	4.9	15.5	15.6	3627.7	609.4
				6.0	10.9	14.5	9.7	685.7					3590.8	22.5	4.3	9.0	3.5	11.5	17.0
		4.5	22.5	10.5	9.9	10.0	10.6	650.0	3583.2		9.0	3.6	11.5			17.0	3595.9	598.7	
	10.5			10.0	10.0	10.5	650.0	3584.0	8		25.7	8.8	7.1			18.0	13.3	2.6	4099.6
	4	14.3	23.7	13.6	15.0	6.9	5.5	2255.6					3786.8	7.1	18.0	13.4	2.5	4100.0	1365.7
				13.8	15.0	6.7	5.5	2253.8					3786.8	25.4	8.8	11.5	16.9	9.0	3.6
		14.1	23.7	18.5	13.9	2.0	6.6	2216.5	3778.1		11.5	16.9	9.0			3.6	4065.1	1356.9	
	18.5			14.0	2.0	6.5	2216.5	3778.8	9		28.8	12.0	2.0			20.0	18.6	0.6	4629.9
	5	21.4	13.6	11.8	11.4	8.8	9.1	3411.1					2128.2	2.5	20.1	18.0	0.4	4625.5	1871.4
				11.8	11.5	8.7	9.0	3410.7					2129.0	28.7	11.9	6.5	19.0	14.0	1.4

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Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>	
1	9			6.5	19.0	14.0	1.5	4593.8	1862.6	2	6	20.3	12.6	15.0	12.0	5.4	8.5	3221.9	1969.9	
	a	6.8	14.1	4.0	1.4	16.5	19.1	1027.6	2211.6						15.0	12.0	5.5	8.4	3222.3	1970.3
				4.0	1.5	16.5	19.0	1027.6	2212.4				21.2	12.8	17.0	16.6	3.5	4.0	3369.4	2006.1
		6.6	14.0	9.0	20.5	11.5	20.4	987.9	2200.9						17.0	16.5	3.5	4.0	3369.4	2005.8
				9.0	20.5	11.5	20.5	987.9	2200.5		7	20.6	7.3	6.1	5.5	14.4	15.0	3293.0	1103.2	
	b	12.6	6.1	8.0	2.0	12.6	18.5	1974.3	912.3						6.1	5.4	14.5	15.0	3293.3	1102.8
				8.0	2.0	12.5	18.5	1973.9	912.3				21.6	7.5	8.0	9.9	12.5	10.7	3440.9	1137.8
		12.4	6.1	12.9	1.0	7.7	19.4	1935.4	904.8						8.0	9.9	12.5	10.6	3440.9	1138.2
				12.6	1.0	8.0	19.5	1937.7	904.4		8	21.3	0.3	15.5	7.5	5.0	R	3381.3	21.9	
	c	13.4	4.9	11.6	19.5	8.9	1.0	2108.3	725.6						15.5	7.4	5.0	R	3381.3	22.7
				11.5	19.4	9.0	1.1	2109.1	724.8				22.2	0.6	17.1	12.0	3.4	8.5	3531.6	13.9
		13.2	4.8	16.1	18.4	4.3	2.4	2072.2	715.7						17.1	12.0	3.4	8.5	3531.6	13.9
				16.0	18.5	4.5	2.0	2073.3	717.7		9	26.6	4.9	7.8	18.9	12.9	1.7	4258.2	720.5	
	d	20.3	5.7	15.0	15.5	5.6	5.0	3222.7	856.8						7.9	19.0	12.7	1.5	4257.1	721.6
				15.0	15.6	5.6	5.0	3222.7	857.2				27.5	5.2	9.5	2.7	11.0	17.8	4407.0	754.9
		20.1	5.6	19.4	14.2	1.1	6.2	3187.3	846.8						9.5	2.5	11.0	18.0	4407.0	753.3
				19.5	14.1	1.0	6.4	3186.6	845.6		10	28.1	1.1	18.5	0.0	2.0	20.0	4498.5	83.4	
	E	15.9	5.2	1.5	4.0	19.0	16.3	2514.5	766.0						16.5	R	4.0	19.0	4514.4	93.4
				1.6	4.0	19.0	16.5	2514.1	765.2						18.0	R	2.5	19.9	4502.5	86.2
				1.6	4.0	19.0	16.3	2514.1	766.0				29.1	1.2	19.8	4.0	0.7	16.5	4651.2	113.2
				1.5	4.0	19.0	16.4	2514.5	765.6						19.5	4.3	1.0	16.2	4653.6	115.6
				1.5	4.1	19.1	16.0	2514.9	767.6		11	27.8	4.7	2.0	15.0	18.6	5.5	4466.9	689.8	
				1.5	4.0	19.0	16.1	2514.5	766.8						2.0	15.4	19.0	5.1	4468.5	693.0
		15.6	5.2	6.0	3.0	14.5	17.6	2478.7	756.9				28.8	4.9	3.5	20.0	17.0	0.6	4617.6	729.2
				6.1	3.0	14.4	17.5	2478.0	757.3						3.5	20.0	17.0	0.5	4617.6	729.6
				6.0	3.0	14.5	17.5	2478.7	757.3		12	29.1	16.2	R	4.0	1.1	16.0	4654.3	2560.2	
				6.0	2.9	14.5	17.5	2478.7	756.9						R	4.0	2.0	16.1	4662.3	2559.8
				6.0	3.0	14.5	17.5	2478.7	757.3				29.9	16.4	0.5	9.0	20.0	11.5	4804.4	2598.0
				5.9	2.9	14.6	17.6	2479.5	756.5						0.5	9.0	20.0	11.5	4804.4	2598.0
2	1	1.4	11.3	11.9	5.4	8.8	15.0	150.7	1754.8	a	1.1	3.3	20.0	7.6	0.5	13.0		85.6	467.5	
				12.0	5.5	8.6	15.0	149.5	1755.2					20.0	7.8	0.6	12.7		86.0	469.5
		2.3	11.5	14.0	9.6	6.5	10.9	296.2	1787.8					20.0	7.5	0.6	13.0		86.0	467.1
				14.0	9.5	6.5	11.0	296.2	1787.0			1.9	3.6	1.0	12.0	19.5	8.5	236.4	502.9	
	2	3.6	2.1	6.6	2.0	13.9	18.4	518.0	260.7					1.0	11.9	19.5	8.6	236.4	502.1	
				6.9	2.0	13.6	18.5	515.6	260.3		b	13.4	12.7	11.4	14.0	8.1	6.6	2105.9	1985.5	
		4.6	2.3	8.5	6.1	12.0	14.4	665.9	293.0					11.5	13.8	9.0	6.7	2109.1	1984.3	
				8.5	6.0	12.0	14.4	665.9	292.6					11.5	13.8	9.0	6.6	2109.1	1984.7	
	3	6.1	6.9	18.8	20.1	1.6	0.5	909.7	1056.0			14.3	12.8	13.5	18.0	7.0	2.5	2256.2	2017.7	
				18.8	20.0	1.7	0.5	910.1	1055.6					13.1	18.0	7.4	2.5	2259.4	2017.7	
		7.0	7.2	20.5	4.0	20.4	16.5	1059.1	1091.2		c	14.9	8.4	0.5	8.8	20.0	11.7	2359.4	1292.5	
				20.5	4.0	20.5	16.5	1059.5	1091.2					0.2	8.5	20.2	12.0	2361.4	1290.1	
	4	8.9	10.4	0.1	9.0	20.3	12.5	1384.2	1616.1			15.9	8.7	2.0	13.0	18.5	7.6	2510.5	1325.5	
				0.1	8.0	20.4	12.5	1384.6	1612.1					2.0	12.9	18.5	7.6	2510.5	1325.1	
				0.1	8.0	20.4	12.5	1384.6	1612.1		d	15.9	16.1	1.0	1.5	19.6	19.0	2518.8	2538.4	
		9.9	10.6	1.9	12.1	18.6	8.4	1533.3	1644.7					1.0	1.5	19.6	19.1	2518.8	2538.0	
				1.9	12.1	18.6	8.5	1533.3	1644.3			16.8	16.3	2.9	6.0	17.6	14.5	2666.4	2574.2	
	5	12.1	13.4	19.5	8.6	1.0	12.0	1882.6	2105.5					3.0	6.0	17.5	14.6	2665.6	2573.8	
				19.8	8.9	0.7	11.6	1880.2	2108.3		e	16.4	14.8	11.9	17.0	8.6	3.5	2594.9	2335.7	
		12.9	13.6	1.0	12.9	19.5	7.6	2029.4	2140.1					12.1	16.6	8.4	3.9	2593.3	2332.5	
				1.0	13.0	19.5	7.5	2029.4	2140.9			17.3	15.1	14.0	0.8	6.6	19.7	2741.6	2369.8	

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>
2	e			14.0	0.5	6.6	20.0	2741.6	2367.4	2	E			1.0	5.0	19.5	15.5	2518.4	2077.2
	f	21.2	19.9	16.5	18.9	4.0	1.7	3373.4	3165.5					1.0	5.0	19.5	15.5	2518.4	2077.2
				16.5	19.0	4.0	1.6	3373.4	3166.3					0.9	5.1	19.6	15.4	2519.2	2078.0
		22.1	20.2	18.0	2.6	2.5	18.0	3524.5	3198.7	3	1	7.4	8.9	10.6	20.0	9.9	0.6	1138.2	1381.0
				18.1	3.0	2.4	17.6	3523.7	3201.9					10.6	19.9	9.9	0.7	1138.2	1380.2
	g	23.2	4.1	16.7	2.0	3.8	18.5	3697.8	586.3			6.6	9.1	8.5	2.1	12.0	18.4	991.9	1402.3
				16.5	1.9	4.0	18.6	3699.4	585.5					8.5	2.0	12.0	18.4	991.9	1401.9
		24.1	4.3	18.1	6.4	2.4	14.1	3849.7	621.4	2		7.2	3.6	16.5	14.0	4.0	7.0	1091.4	516.8
				18.5	6.5	2.0	14.0	3846.5	622.2					16.5	13.9	4.0	7.1	1091.4	516.0
	h	23.3	19.8	15.1	17.5	5.3	3.0	3710.1	3154.7			6.3	3.7	14.1	16.5	6.4	4.0	947.4	538.6
				15.5	17.4	5.0	3.1	3707.3	3153.9					14.5	16.5	6.0	4.0	944.3	538.6
		24.2	20.1	17.4	1.4	3.1	19.0	3855.2	3190.0	3		12.6	0.6	5.8	11.0	14.9	9.5	1992.1	6.0
				17.0	1.5	3.5	19.0	3858.4	3190.4					5.5	11.0	15.0	9.5	1993.7	6.0
	i	23.6	19.4	7.6	8.0	13.0	12.5	3770.4	3079.1			11.8	0.6	3.0	14.1	17.5	6.4	1850.6	30.6
				7.7	8.0	12.9	12.5	3769.6	3079.1					3.0	14.0	17.5	6.5	1850.6	29.8
		24.5	19.6	9.5	12.4	11.0	8.1	3918.0	3114.1	4		13.9	0.2	0.6	4.0	20.0	16.5	2196.0	49.6
				9.5	12.6	11.0	8.0	3918.0	3115.3					0.5	4.1	19.9	16.1	2196.0	47.6
	j	24.3	17.0	13.5	20.5	7.1	0.0	3886.6	2689.6			13.1	0.3	18.5	7.5	2.0	13.0	2053.5	21.8
				13.6	20.5	7.0	0.0	3885.8	2689.6					18.5	7.5	2.0	13.0	2053.5	21.8
		25.2	17.2	15.5	4.1	5.0	16.1	4033.3	2723.2	5		16.6	11.4	6.5	7.0	14.0	13.5	2637.8	1767.2
				15.5	4.1	5.0	16.4	4033.3	2722.0					6.6	7.0	13.9	13.5	2637.0	1767.2
	k	25.3	20.9	14.4	19.8	6.1	0.7	4042.0	3336.0			15.7	11.5	4.1	10.0	16.4	10.4	2493.8	1791.4
				14.5	19.8	6.0	0.7	4041.3	3336.0					4.4	10.0	16.1	10.5	2491.4	1791.0
		26.2	21.2	16.0	2.9	4.5	17.5	4192.3	3364.9	6		19.4	13.1	12.0	1.5	8.5	19.0	3083.1	2049.5
				16.0	3.0	4.5	17.4	4192.3	3365.7					12.0	1.5	8.4	19.0	3082.7	2049.5
	l	27.3	8.2	16.1	4.4	4.5	16.3	4354.9	1256.6			18.5	13.3	9.8	4.9	10.7	15.7	2937.6	2076.1
				16.0	4.5	4.5	16.4	4355.3	1256.6					10.0	4.5	10.6	16.0	2936.4	2073.3
		28.1	8.4	17.9	9.0	2.6	11.5	4503.3	1294.0	7		20.4	13.0	12.0	0.0	8.5	20.5	3246.1	2037.6
				18.0	9.1	2.5	11.4	4502.5	1294.8					12.1	20.6	8.4	0.0	3245.3	2037.8
	E	15.0	13.0	20.1	20.0	0.3	0.5	2366.4	2196.6			19.5	13.3	10.0	3.5	10.5	17.0	3099.0	2065.4
				20.0	20.1	0.5	0.3	2367.6	2197.8					10.0	3.1	10.6	17.4	3099.4	2062.2
				20.0	20.0	0.5	0.4	2367.6	2197.0	a		0.7	9.9	5.0	20.0	R	0.5	41.7	1544.4
				20.0	20.5	0.5	0.0	2367.6	2200.6					5.1	20.0	R	0.5	40.9	1544.4
				20.0	20.1	0.5	0.4	2367.6	2197.4	b		1.6	5.6	6.5	11.5	14.0	9.0	192.8	824.9
				20.0	20.1	0.5	0.4	2367.6	2197.4					6.5	11.5	14.0	9.0	192.8	824.9
		15.9	13.3	1.5	4.0	19.0	16.5	2514.5	2069.2	b'		2.4	4.6	12.2	12.5	8.3	8.0	310.5	669.9
				2.0	4.0	18.5	16.5	2510.5	2069.2					12.5	13.0	8.0	7.5	308.1	673.8
				1.5	4.0	19.0	16.5	2514.5	2069.2	c		3.6	12.9	6.8	20.0	13.8	0.6	516.8	2033.0
				1.6	4.0	19.0	16.5	2514.1	2069.2					6.6	19.9	13.9	0.7	518.0	2032.2
				2.0	4.0	18.6	16.5	2510.9	2069.2			2.7	13.1	4.5	2.4	16.0	18.1	371.7	2056.7
				2.0	3.9	18.5	16.5	2510.5	2068.9					4.4	2.5	16.1	18.1	372.4	2057.1
		15.1	13.1	19.4	0.8	1.1	19.6	2372.3	2044.2	d		3.9	11.6	0.5	14.0	20.0	6.6	566.4	1822.4
				19.6	0.9	1.0	19.6	2371.2	2044.6					0.5	13.8	20.1	7.0	566.8	1820.0
				19.5	0.9	1.0	19.6	2371.6	2044.6			3.1	11.8	18.9	17.0	1.6	3.5	420.3	1846.6
				19.5	0.8	1.0	19.5	2371.6	2044.6					19.0	17.0	1.5	3.5	419.5	1846.6
				19.6	0.9	1.0	19.5	2371.2	2045.0	e		8.4	23.5	13.5	11.0	7.0	9.5	1278.2	3755.0
				19.6	0.8	0.9	19.7	2370.8	2043.8					13.2	11.0	7.2	9.5	1280.2	3755.0
		15.9	13.2	0.5	5.0	20.0	15.4	2522.4	2077.6			7.4	23.6	11.1	14.0	9.3	6.5	1133.9	3778.8
				1.0	5.0	19.5	15.5	2518.4	2077.2					11.1	14.0	9.4	6.5	1134.3	3778.8
				1.0	5.0	19.5	15.5	2518.4	2077.2	f		9.3	0.2	16.5	4.9	4.0	15.6	1417.4	42.5

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		
		x	y	A	B	C	D	x	y			x	y	A	B	C	D	x	y	
3905A Mar. 53..187P	f			16.5	4.0	4.1	16.4	1417.8	"	4	1			7.5	16.5	R	4.0	1417.1	1190.8	
		8.3	0.4	13.5	7.5	7.0	13.0	1278.2	21.8		2	6.3	20.1	13.5	1.0	7.0	19.5	952.2	3186.4	
				14.0	7.5	6.5	13.1	1274.2	22.2					13.5	1.0	7.0	19.6	952.2	3186.0	
	g	9.4	16.1	12.0	1.0	8.5	19.4	1453.1	2535.0			5.6	18.7	8.0	17.0	12.5	3.5	832.9	2987.7	
				12.0	1.4	8.9	19.2	1454.7	2537.3					8.0	17.0	12.5	3.5	832.9	2987.7	
		8.5	16.2	9.5	4.0	10.9	16.5	1309.6	2558.4		3	8.7	19.7	5.5	16.0	15.0	4.5	1341.7	3142.8	
				9.6	4.0	11.0	16.4	1309.6	2558.8					5.5	16.0	15.0	4.5	1341.7	3142.8	
	h	11.4	15.6	12.1	14.9	8.3	5.6	1777.9	2481.9			7.9	18.6	0.2	12.0	20.2	8.5	1220.6	2947.9	
				12.1	14.5	8.3	6.0	1777.9	2478.7					0.3	12.0	20.2	8.5	1220.2	2947.9	
		10.5	15.8	10.0	17.6	10.5	2.9	1632.0	2503.4		4	7.6	5.1	7.6	1.1	13.0	19.2	1162.4	743.0	
				10.0	17.9	10.5	2.6	1632.0	2505.7					7.5	1.1	13.3	19.4	1164.0	742.2	
	i	11.7	15.2	5.0	4.1	15.5	16.4	1834.7	2396.2			6.8	3.8	2.2	17.5	18.2	3.0	1041.7	546.7	
				5.2	4.0	15.2	16.5	1832.7	2395.4					2.2	17.5	18.3	3.0	1042.1	546.7	
		10.8	15.4	3.0	7.0	17.5	13.5	1687.6	2419.2		5	9.4	17.6	12.0	13.0	8.5	8.0	1453.1	2790.9	
				3.0	7.0	17.5	13.5	1687.6	2419.2					12.0	13.0	8.5	7.5	1453.1	2792.9	
	j	12.1	12.7	17.8	15.6	2.7	5.0	1896.1	1998.1			8.6	16.4	7.0	9.0	13.5	11.5	1329.9	2598.0	
				17.8	15.1	2.7	5.4	1896.1	1994.5					7.0	9.0	13.5	11.5	1329.9	2598.0	
		11.3	12.9	15.5	18.0	5.0	2.5	1751.3	2017.5		6	8.9	4.6	0.4	12.4	20.1	8.0	1382.2	669.5	
				16.0	18.4	4.6	2.1	1747.7	2020.7					0.5	12.0	20.1	8.5	1381.8	665.9	
	k	13.5	16.5	8.5	10.4	12.0	10.1	2132.9	2609.2			8.3	3.4	15.5	8.4	5.0	12.1	1262.2	474.3	
				8.4	10.1	12.1	10.3	2133.7	2607.2					15.5	8.1	5.0	12.4	1262.2	471.9	
		12.6	16.6	6.0	13.4	14.5	7.1	1989.7	2633.0		7	22.4	19.7	12.0	16.2	8.5	4.2	3572.1	3144.8	
				6.0	13.5	14.5	7.0	1989.7	2633.8					12.0	16.5	8.6	4.0	3572.5	3146.8	
	l	13.6	22.9	8.4	19.0	12.1	1.5	2133.7	3655.5			21.6	18.6	7.0	12.0	13.4	8.5	3448.5	2947.9	
				8.5	18.5	12.0	2.0	2132.9	3651.5					7.0	12.0	13.5	8.5	3448.9	2947.9	
		12.6	23.1	6.1	1.4	14.4	19.1	1989.0	3678.7		8	21.9	10.2	1.0	1.9	19.5	18.6	3496.4	1563.5	
				6.2	1.4	14.3	19.1	1988.2	3678.7					1.0	1.5	19.6	18.5	3496.8	1562.3	
	m	13.7	3.7	5.1	15.1	15.4	5.4	2159.9	527.5			21.3	8.8	16.5	18.9	4.0	1.6	3373.2	1372.9	
				5.1	15.0	15.5	5.5	2160.3	526.7					16.5	18.5	4.0	2.0	3373.2	1369.7	
		12.8	3.8	2.6	18.0	18.0	2.5	2017.1	550.5		a	21.6	26.3	6.1	7.9	14.3	12.5	3455.6	4219.7	
				2.5	18.0	18.0	2.5	2017.5	550.5					6.4	8.0	14.1	12.6	3453.6	4219.7	
	n	18.9	13.0	1.0	20.5	19.9	0.0	3009.0	2200.4			20.9	25.2	1.0	4.0	19.5	16.5	3333.6	4025.2	
				1.0	20.5	19.5	0.0	3007.4	2200.4					1.0	4.0	19.4	16.5	3333.2	4025.2	
		18.1	13.2	19.1	3.0	1.4	17.5	2863.7	2061.4		E	4.6	18.4	8.5	8.5	12.0	12.1	665.9	2919.7	
				19.1	3.0	1.3	17.5	2863.3	2061.4					8.6	8.5	11.9	12.0	665.1	2920.1	
	E	12.6	14.4	6.9	7.5	13.8	13.0	1983.4	2260.2					8.5	8.5	12.1	12.0	666.3	2920.1	
				7.0	7.5	13.5	13.0	1981.8	2260.2					8.6	8.6	11.9	12.0	665.1	2920.5	
				7.0	7.9	13.6	12.6	1982.2	2263.3					8.6	8.5	12.0	12.1	665.5	2919.7	
				7.0	8.0	13.5	12.5	1981.8	2264.1					8.6	8.5	11.9	12.0	665.1	2920.1	
				6.9	7.5	13.6	13.5	1982.6	2258.2			3.7	17.3	3.5	4.1	17.0	16.5	542.7	2721.6	
				6.9	7.5	13.6	14.0	1982.6	2256.2					3.5	4.2	17.0	16.3	542.7	2722.8	
		11.7	14.6	4.6	10.5	16.0	10.1	1838.3	2283.6					3.5	4.2	17.0	16.3	542.7	2722.8	
				4.6	10.6	16.0	10.0	1838.3	2284.4					3.5	4.1	17.0	16.4	542.7	2722.0	
				4.5	10.6	16.0	10.0	1838.7	2284.4					3.5	4.2	17.0	16.2	542.7	2723.2	
				4.5	10.7	16.0	10.0	1838.7	2284.8					3.6	4.2	16.9	16.3	541.9	2722.8	
				4.6	10.7	16.0	9.9	1838.3	2285.2		5	1	5.0	23.3	20.5	8.0	20.5	12.5	733.5	3731.1
				4.5	10.6	16.0	10.0	1838.7	2284.4					20.4	8.0	20.5	12.5	733.9	3731.1	
4	1	0.5	9.0	12.8	20.5	R	0.0	20.2	1385.6			6.1	23.2	19.5	4.0	1.0	16.5	904.4	3699.2	
				13.0	20.5	R	0.0	21.8	1385.6					19.5	4.0	1.0	16.5	904.4	3699.2	
		0.4	7.7	7.5	16.5	R	4.0	141.1	1190.8		2	13.3	2.7	13.7	14.5	6.8	6.0	2091.5	359.8	

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.			
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>		
5	2			13.6	14.5	6.9	6.0	2092.3	359.8	6	E			4.1	18.0	16.4	2.5	1842.0	2343.7		
		14.4	2.5	12.6	10.0	7.9	10.6	2263.3	323.6			1	5.6	18.2	6.5	3.1	14.2	17.3	845.6	2877.5	
				12.5	10.5	8.0	10.0	2264.1	328.0						6.5	3.0	14.0	17.5	844.8	2876.3	
	3	16.4	23.4	11.1	8.5	9.4	12.1	2601.2	3734.7				5.4	18.4	12.0	6.6	8.5	14.0	801.1	2904.6	
				11.1	8.5	9.5	12.0	2601.6	3735.1							12.0	6.5	8.5	14.0	801.1	2904.2
		17.5	23.3	10.0	5.0	10.4	15.5	2772.6	3707.2		2	8.0		22.5	20.1	11.0	0.4	9.5	1225.8	3592.0	
			10.0	4.9	10.5	15.6	2773.0	3706.4					20.0	11.0	0.5	9.5	1226.6	3592.0			
	4	21.8	10.4	2.5	8.5	18.0	12.0	3484.7	1616.1			7.7	22.7	5.5	14.0	15.0	6.4	1178.7	3616.2		
				2.5	8.5	18.0	12.0	3484.7	1616.1						5.5	14.0	15.0	6.6	1178.7	3615.4	
		22.9	10.3	1.0	4.5	19.5	16.0	3659.6	1584.2		3		13.3	22.6	14.5	13.9	6.0	6.7	2085.3	3614.7	
			1.0	4.5	19.5	16.0	3659.6	1584.2					14.5	13.9	6.0	6.6	2085.3	3615.1			
	a	8.6	13.9	8.5	19.0	12.0	1.5	1317.9	2188.6			13.1	22.8	19.9	17.1	0.6	3.4	2042.4	3640.4		
				8.5	19.0	12.0	1.5	1317.9	2188.6						19.9	17.0	0.6	3.5	2042.4	3639.6	
		9.6	13.7	7.5	15.0	13.0	5.5	1488.9	2156.8		4		20.4	20.3	12.0	6.0	8.5	14.6	3246.1	3225.8	
			7.5	15.0	13.0	5.5	1488.9	2156.8					12.0	5.9	8.5	14.6	3246.1	3225.4			
	b	9.2	11.5	17.5	9.4	3.0	11.0	1409.3	1786.6			20.2	20.4	17.5	9.0	3.0	11.5	3202.4	3250.1		
				17.5	9.5	3.0	11.0	1409.3	1787.0						17.5	9.0	3.0	11.5	3202.4	3250.1	
		10.2	11.3	16.4	5.0	4.1	15.5	1581.0	1751.2		a		4.2	12.4	17.0	9.0	3.5	11.6	598.4	1945.7	
			16.5	5.5	4.0	15.0	1580.2	1755.2					16.9	9.0	3.6	11.5	599.2	1946.0			
	c	9.3	17.3	13.6	5.0	7.0	15.5	1440.7	2729.2			3.8	12.6	2.0	12.1	18.5	8.4	554.5	1970.7		
				13.5	5.0	7.0	15.5	1441.1	2729.2						2.0	12.0	18.5	8.5	554.5	1969.9	
		10.4	17.1	12.5	1.5	8.0	19.0	1612.1	2701.4		b		5.1	6.7	18.1	15.5	2.4	5.0	752.7	1019.8	
			12.5	1.5	8.0	19.0	1612.1	2701.4					18.1	15.5	2.3	5.0	752.3	1019.8			
	d	9.3	21.1	13.1	1.5	7.4	19.0	1444.3	3353.4			4.7	6.9	3.5	19.0	17.0	1.5	705.6	1047.5		
				13.0	1.5	7.4	19.0	1444.7	3353.4						3.5	19.0	17.0	1.5	705.6	1047.5	
		10.4	20.9	12.0	18.0	8.5	2.4	1616.1	3322.1		c		7.5	19.2	10.0	4.6	10.5	15.9	1143.0	3052.0	
			12.0	18.0	8.5	2.5	1616.1	3321.7					10.0	4.5	10.5	16.1	1143.0	3050.8			
	e	10.2	21.6	17.5	1.5	3.0	19.0	1572.3	3353.4			7.3	19.4	15.4	8.0	5.1	12.5	1100.1	3079.1		
				17.0	1.5	3.5	19.0	1576.3	3353.4						15.5	8.0	5.0	12.5	1099.3	3079.1	
		11.3	21.4	16.1	8.5	4.4	12.0	1746.4	3409.1		d		12.1	17.2	19.9	4.0	0.7	16.4	1879.8	2721.6	
			16.0	8.5	4.4	12.0	1746.8	3409.1					20.0	4.0	0.6	16.5	1879.0	2721.2			
	f	12.6	12.7	7.5	14.4	13.0	6.1	1977.9	1989.0			11.7	17.4	5.0	7.0	15.5	13.5	1834.7	2745.2		
				7.5	14.5	13.0	6.0	1977.9	1989.8						5.0	7.4	15.5	13.1	1834.7	2748.4	
		13.6	12.5	5.9	10.0	14.6	10.5	2153.6	1954.0		E		11.6	15.1	6.0	1.0	14.5	19.5	1826.7	2371.4	
			6.0	10.0	14.5	10.5	2152.8	1954.0					5.9	1.0	14.5	19.5	1827.1	2371.4			
	g	17.3	18.1	12.0	0.5	8.5	20.0	2757.1	2856.4					6.0	1.0	14.5	19.4	1826.7	2371.8		
				12.0	0.5	8.5	20.0	2757.1	2856.4					6.0	1.1	14.5	19.3	1826.7	2372.6		
		18.5	17.8	11.0	17.0	9.5	3.5	2928.0	2824.7		11.4	15.3	6.0	1.0	14.6	19.5	1827.1	2371.4			
			11.0	17.0	9.5	3.5	2928.0	2824.7					5.9	1.1	14.6	19.1	1827.5	2373.4			
	E	10.7	15.1	5.4	1.6	15.1	19.0	1668.6	2375.7					11.6	4.4	8.9	16.1	1782.3	2398.6		
				5.3	1.5	15.2	19.0	1669.4	2375.4					11.5	4.5	9.0	16.0	1783.1	2399.3		
				5.5	1.5	15.0	19.0	1667.8	2375.4				11.6	4.5	9.0	16.0	1782.7	2399.3			
			5.4	1.5	15.0	19.0	1668.2	2375.4				11.6	4.5	8.9	16.0	1782.3	2399.3				
			5.4	1.5	15.0	19.0	1668.2	2375.4				11.6	4.5	8.9	16.1	1782.3	2398.9				
			5.5	1.5	15.0	18.9	1667.8	2375.7				11.5	4.4	9.0	16.1	1783.1	2398.6				
	7	1	11.7	14.8	4.0	18.0	16.5	2.5	1842.8		2343.7	0.6	10.7	6.1	16.0	14.3	4.5	32.6	1675.7		
					4.1	18.0	16.4	2.5	1842.0		2343.7				6.1	16.2	14.3	4.5	32.6	1676.4	
					4.1	18.0	16.4	2.5	1842.0		2343.7		1.3	10.9	15.0	19.9	5.5	0.6	125.2	1706.8	
					4.2	17.9	16.3	2.6	1841.2		2342.9					15.0	19.9	5.5	0.6	125.2	1706.8
					4.0	18.0	16.4	2.5	1842.4		2343.7			2	1.6	22.6	7.5	14.0	13.0	6.6	184.9

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.					
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>				
7	2			7.5	14.0	13.0	6.5	184.9	3615.8	7	E			15.4	1.0	5.0	19.5	2240.6	1882.4				
		2.3	22.7	16.1	17.1	4.4	3.3	279.4	3640.9					15.5	1.0	5.0	19.5	2240.2	1882.4				
				16.1	17.1	4.4	3.4	279.4	3640.5					15.4	1.0	5.0	19.5	2240.6	1882.4				
	3	8.6	2.1	6.6	1.2	14.0	19.2	1333.5	254.5					15.5	1.0	5.0	19.5	2240.2	1882.4				
				6.5	1.2	14.0	19.3	1333.8	254.1					15.4	1.0	5.1	19.5	2241.0	1882.4				
		9.3	2.3	15.0	4.9	5.5	15.6	1429.2	283.4		8	1	13.7	14.8	6.0	16.9	14.5	3.6	2152.8	2334.9			
			15.0	4.9	5.5	15.6	1429.2	283.4	6.0						16.9	14.5	3.6	2152.8	2334.9				
	4	9.6	19.4	6.0	7.5	14.6	13.1	1501.2	3074.8								13.5	14.8	10.0	16.9	10.5	3.6	2121.0
				6.0	7.5	14.5	13.0	1500.8	3075.2							10.0	17.0	10.6	3.5	2121.4	2335.7		
		10.4	19.5	14.6	11.0	5.9	9.5	1595.4	3103.0		2	15.1	9.1	18.0	0.5	2.5	20.0	2383.3	1389.4				
			14.5	11.0	6.0	9.5	1596.2	3103.0	18.4					0.5	2.1	20.0	2380.1	1389.4					
	5	11.2	4.8	16.5	17.0	4.0	3.5	1743.2	705.6							14.9	9.0	1.0	20.5	19.6	20.5	2355.8	1385.5
				16.5	17.0	4.0	3.5	1743.2	705.6						1.0	20.5	19.5	20.4	2355.4	1385.9			
		11.7	5.0	4.5	20.5	16.0	20.5	1838.8	733.5		3	15.2	15.2	15.5	2.5	4.9	18.0	2402.8	2383.3				
			4.5	20.5	16.0	20.5	1838.8	733.5							15.5	2.5	5.0	18.0	2403.2	2383.3			
	6	14.4	15.2	11.1	4.0	9.4	16.5	2275.2	2395.4							15.1	15.2	18.8	2.5	1.7	18.0	2377.1	2383.3
				11.1	4.0	9.3	16.5	2274.8	2395.4						18.8	2.5	1.7	18.0	2377.1	2383.3			
		15.1	15.4	19.9	7.6	0.6	12.9	2368.2	2423.9		4	15.4	16.1	12.0	3.0	8.5	17.4	2431.1	2550.7				
			19.9	7.5	0.6	13.0	2368.2	2423.1							11.8	3.0	8.7	17.5	2432.7	2550.3			
	7	20.6	11.3	6.1	6.5	14.1	14.0	3291.8	1763.2							15.3	16.2	15.0	2.9	5.5	17.6	2407.3	2549.5
				6.5	6.9	14.0	13.6	3289.8	1766.4						15.0	3.0	5.5	17.5	2407.3	2550.3			
		21.4	11.5	15.0	10.5	5.5	10.0	3385.2	1795.0		5	16.1	11.1	19.5	1.0	0.9	19.5	2534.0	1719.4				
			15.0	10.5	5.5	10.0	3385.2	1795.0							19.5	1.0	1.0	19.4	2534.4	1719.8			
	a	15.4	11.7	11.9	16.0	8.6	4.5	2431.9	1838.7							15.9	11.1	2.1	1.5	18.4	19.0	2509.7	1723.4
				12.0	16.0	8.5	4.5	2431.1	1838.7						2.2	1.5	18.3	19.0	2508.9	1723.4			
		16.0	11.9	20.5	19.8	20.5	0.7	2526.5	1869.0		6	19.5	13.9	10.2	19.1	10.3	1.3	3097.4	2189.8				
			20.5	19.8	20.5	0.7	2526.5	1869.0							10.0	19.0	10.5	1.5	3099.0	2188.6			
	b	15.6	16.6	6.0	10.5	14.5	10.0	2478.8	2610.0							19.4	13.8	13.5	18.9	7.0	1.6	3071.2	2187.9
				6.0	10.5	14.5	10.0	2478.8	2610.0						13.5	19.0	7.0	1.5	3071.2	2188.6			
		16.4	16.6	14.8	14.0	5.7	6.5	2571.8	2637.8		7	23.1	14.1	19.5	1.5	1.0	19.0	3675.4	2212.4				
			14.8	14.0	5.7	6.5	2571.8	2637.8							19.5	1.5	1.0	19.0	3675.4	2212.4			
	c	16.4	12.8	11.0	16.2	9.5	4.3	2602.0	2003.2							22.9	14.1	2.5	1.9	18.0	18.6	3647.5	2215.5
				11.1	16.6	9.5	4.0	2601.6	2006.0						2.5	1.9	18.1	18.6	3647.9	2215.5			
		17.1	12.9	19.9	20.0	0.6	0.5	2694.2	2033.6		E	14.1	18.0	17.8	18.0	2.6	2.5	2221.5	1691.7				
			19.8	20.0	0.7	0.5	2695.0	2033.6							17.6	17.9	3.0	2.5	2223.9	1691.3			
	d	16.6	12.7	5.9	14.5	14.6	6.0	2642.6	1989.7									17.8	18.0	2.7	2.5	2221.9	1691.7
				6.0	14.6	14.5	6.0	2641.8	1990.1						17.9	18.0	2.6	2.6	2221.1	1691.3			
		17.4	12.8	14.4	18.5	6.1	2.0	2738.0	2021.7						17.8	17.9	2.7	2.6	2221.9	1690.9			
	e			14.5	18.5	6.0	2.0	2737.2	2021.7						17.9	18.0	2.6	2.5	2221.1	1691.7			
		24.5	8.3	10.0	6.1	10.5	14.4	3914.0	1271.0		13.9	10.8			1.0	17.9	19.5	2.6	2192.4	1690.9			
				10.0	6.0	10.5	14.5	3914.0	1270.3						1.0	18.0	19.6	2.5	2192.8	1691.7			
	25.1	8.5	18.6	10.0	1.9	10.5	4008.5	1302.0						1.0	17.9	19.5	2.6	2192.4	1690.9				
	E	13.6	11.8	18.5	9.9	2.0	10.6	4009.3	1301.2						0.9	18.0	19.7	2.5	2193.6	1691.7			
				6.9	18.0	13.6	2.5	2145.7	1854.5				0.9	17.9	19.7	2.6	2193.6	1690.9					
				7.0	18.0	13.6	2.5	2145.3	1854.5				1.0	18.0	19.5	2.5	2192.4	1691.7					
				7.0	18.0	13.5	2.5	2144.9	1854.5		9	1	5.2	11.6	18.5	11.0	2.0	9.4	749.3	1799.4			
				7.0	18.0	13.6	2.5	2145.3	1854.5						18.5	11.0	2.0	9.4	749.3	1799.4			
				7.0	18.0	13.6	2.5	2145.3	1854.5						15.0	9.5	5.5	11.0	777.2	1787.0			
						6.9	17.9	13.6	2.5		2145.7	1854.1			5.3	11.4	15.0	9.5	5.5	11.0	777.2	1787.0	
				14.3	12.1	15.5	1.0	5.0	19.5		2240.2	1882.4			2	10.6	8.2	8.4	3.0	12.1	17.5	1644.7	1246.4

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>	
9	2			8.4	3.0	12.1	17.5	1644.7	1246.4	9	d			2.5	16.0	18.0	4.5	2343.7	2001.8	
		10.7	8.1	5.0	1.6	15.6	18.9	1672.2	1235.1			e	15.0	8.7	20.5	16.0	20.5	4.6	2363.5	1349.3
				5.0	1.5	15.5	19.0	1671.8	1234.4						20.5	16.0	20.5	4.5	2363.5	1349.7
	3	11.9	9.9	2.0	19.0	18.6	1.5	1859.1	1536.5				15.2	8.7	17.0	14.5	3.4	6.0	2390.9	1337.8
				1.9	19.0	18.7	1.5	1859.9	1536.5					17.0	14.5	3.5	6.0	2391.3	1337.8	
		12.1	9.8	19.0	17.6	1.5	3.0	1886.4	1525.1			f	15.6	14.4	6.4	6.9	14.1	13.6	2475.6	2255.4
			19.0	17.5	1.5	3.0	1886.4	1524.7					6.4	6.9	14.1	13.6	2475.6	2255.4		
	4	12.6	1.6	5.6	14.5	14.9	6.0	1993.0	196.7				15.8	14.3	2.9	5.3	17.6	15.2	2503.5	2242.6
				5.5	14.1	15.0	6.4	1993.8	193.6					3.0	5.5	17.5	15.0	2502.7	2244.2	
		12.8	1.6	2.0	12.9	18.5	7.7	2021.7	183.7			g	17.6	17.6	5.6	11.0	15.0	9.4	2808.4	2777.4
			2.0	12.9	18.5	7.6	2021.7	184.1					5.5	11.0	15.0	9.6	2808.8	2776.6		
	5	14.6	0.6	7.0	R	13.5	8.0	2307.9	17.9				17.8	17.4	2.5	9.5	18.0	11.0	2832.7	2765.0
				7.0	R	13.5	8.0	2307.9	17.9					2.2	9.5	18.2	11.0	2834.7	2765.0	
		14.8	0.5	3.5	11.0	17.0	9.5	2335.7	6.0			h	20.6	9.4	7.0	7.1	13.5	13.3	3285.9	1442.4
			3.5	11.0	17.0	9.5	2335.7	6.0					7.0	7.5	13.5	13.0	3285.9	1445.2		
	6	14.8	11.8	3.5	17.1	17.0	3.5	2335.7	1847.0				20.8	9.3	3.5	5.6	17.0	14.9	3313.7	1430.0
				3.5	17.0	17.0	3.5	2335.7	1846.6					3.5	5.9	17.0	14.6	3313.7	1432.4	
		15.0	11.7	20.5	15.9	20.5	4.6	2363.5	1838.0			i	22.6	20.6	8.9	13.4	11.6	7.1	3596.7	3285.0
			20.5	15.6	20.5	5.0	2363.5	1835.2					8.9	13.2	11.6	7.3	3596.7	3283.4		
	7	18.8	4.3	2.5	6.0	18.0	14.5	2995.7	618.3				22.7	20.6	5.9	11.9	14.6	8.6	3620.6	3273.1
				2.5	6.0	18.0	14.5	2995.7	618.3					5.9	11.9	14.6	8.6	3620.6	3273.1	
		19.1	4.3	19.5	4.6	1.0	15.9	3023.4	607.0			j	22.5	8.4	10.0	8.0	10.4	12.5	3587.6	1286.1
			19.5	4.6	1.0	15.9	3023.4	607.0					10.0	8.4	10.5	12.1	3588.0	1289.3		
	8	21.5	15.3	9.6	6.7	10.9	13.9	3428.2	2416.4				22.6	8.4	6.5	7.0	14.0	13.5	3615.8	1278.1
				9.5	6.6	11.0	14.0	3429.0	2415.6					6.5	7.0	14.0	13.6	3615.8	1277.7	
		21.6	15.3	6.1	5.0	14.3	15.5	3455.6	2403.2			k	23.9	5.3	1.5	6.5	19.0	13.9	3818.6	785.6
			6.5	5.0	14.0	15.5	3452.8	2403.2					1.5	6.5	19.0	13.9	3818.6	785.6		
	9	22.5	22.1	11.0	1.2	9.5	19.3	3580.0	3514.1				24.1	5.3	18.5	5.0	2.0	15.6	3846.3	772.8
				11.0	1.5	9.5	19.1	3580.0	3516.1					18.5	5.0	2.0	15.5	3846.3	773.2	
		22.6	21.9	7.9	20.0	12.6	0.5	3604.7	3500.6			E	14.2	12.8	18.1	17.5	2.5	3.0	2219.9	2013.6
		7.6	20.0	12.9	0.5	3607.1	3500.6			18.0	17.3		2.5	3.2	2220.3	2012.0				
10	24.2	22.6	15.2	11.1	5.2	9.4	3872.2	3592.7			18.0		17.5	2.5	3.1	2220.3	2013.2			
			15.5	11.5	5.0	9.1	3870.2	3595.5			18.0	17.4	2.5	3.1	2220.3	2012.8				
	24.4	22.5	12.1	10.1	8.4	10.4	3897.3	3584.8			18.0	17.4	2.5	3.1	2220.3	2012.8				
		12.0	10.0	8.5	10.5	3898.1	3584.0			18.1	17.6	2.4	3.0	2219.5	2014.0					
a	5.2	10.8	18.9	19.0	1.6	1.5	746.1	1699.5		14.3	12.7	14.6	16.0	5.9	4.5	2247.4	2001.8			
			19.0	19.1	1.5	1.4	745.4	1700.3				14.6	16.0	5.9	4.5	2247.4	2001.8			
	5.3	10.8	15.5	17.2	5.0	3.2	773.2	1685.7				14.5	16.0	6.0	4.5	2248.2	2001.8			
		15.5	17.1	5.0	3.3	773.2	1684.9			14.6	15.9	5.9	4.6	2247.4	2001.0					
b	14.1	12.7	20.0	13.8	0.5	6.8	2204.4	1983.8				14.6	16.0	6.0	4.5	2247.8	2001.8			
			20.0	14.0	0.5	6.6	2204.4	1985.4				14.6	16.0	5.9	4.5	2247.4	2001.8			
	14.2	12.6	17.5	12.0	3.0	8.5	2224.3	1969.9		14.2	12.6	18.0	11.0	2.5	9.6	2220.3	1961.6			
		17.2	12.0	3.2	8.5	2226.3	1969.9				18.0	11.0	2.5	9.5	2220.3	1962.0				
c	14.4	13.6	11.0	10.9	9.4	9.5	2275.6	2124.6				18.1	11.0	2.4	9.5	2219.5	1962.0			
			11.1	11.0	9.4	9.5	2275.2	2125.0			18.1	11.0	2.4	9.5	2219.5	1962.0				
	14.6	13.5	8.0	9.5	12.6	11.0	2300.3	2113.0			18.1	11.0	2.4	9.4	2219.5	1962.4				
		7.9	9.9	12.6	10.7	2300.7	2115.8			18.0	11.0	2.5	9.5	2220.3	1962.0					
d	14.6	12.8	6.0	17.6	14.5	2.9	2315.8	2014.4	14.3	12.5	14.9	9.4	5.6	11.1	2245.0	1949.2				
			6.0	17.5	14.5	3.0	2315.8	2013.6				14.9	9.5	5.6	11.0	2245.0	1950.0			
	14.8	12.7	2.5	16.0	18.0	4.5	2343.7	2001.8				14.9	9.4	5.6	11.1	2245.0	1949.2			

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>
9	E			15.0	9.5	5.6	11.0	2244.6	1950.0	10	6			4.5	8.0	10.6	7.1	2832.2	1861.8
				14.9	9.4	5.6	11.1	2245.0	1949.2		7	56.8	6.0	3.0	0.9	12.0	14.1	3378.0	333.7
				15.0	9.5	5.5	11.0	2244.2	1950.0					3.0	0.5	12.0	14.6	3378.0	331.9
		14.4	12.8	14.1	18.2	6.4	2.3	2251.4	2019.1			57.7	5.2	4.6	3.0	10.5	12.1	3431.8	281.9
				14.0	18.5	6.5	2.0	2252.2	2021.5					5.0	3.0	10.1	12.0	3430.2	282.1
				14.0	18.5	6.5	2.0	2252.2	2021.5		a	28.7	49.1	6.0	1.0	9.1	14.0	1686.2	2914.1
				14.1	19.0	6.5	1.5	2251.8	2025.5					6.0	1.0	9.0	14.0	1686.0	2914.1
				14.0	19.0	6.5	1.5	2252.2	2025.5			29.4	48.3	8.0	4.0	7.0	11.0	1738.0	2866.1
				14.0	19.0	6.5	1.6	2252.2	2025.1					8.0	4.0	7.0	11.1	1738.0	2865.9
		14.5	12.7	10.6	17.0	9.9	3.5	2279.2	2009.7		b	29.3	30.3	8.5	4.0	6.5	11.0	1736.0	1786.1
				10.6	17.0	9.9	3.5	2279.2	2009.7					8.5	4.0	6.6	11.0	1736.2	1786.1
				10.6	17.0	9.9	3.5	2279.2	2009.7			20.3	29.5	10.5	7.0	4.5	8.1	1788.0	1737.8
				10.5	17.0	10.0	3.5	2280.0	2009.7					10.9	7.0	4.2	8.1	1786.6	1737.8
				10.6	17.1	9.9	3.3	2279.2	2010.9		c	30.8	27.8	2.0	12.0	13.0	3.0	1822.0	1637.9
				10.6	17.0	9.9	3.5	2279.2	2009.7					2.0	12.0	13.0	3.0	1822.0	1637.9
		14.4	12.6	14.0	13.0	6.4	7.5	2251.8	1977.8			31.7	27.0	4.1	14.9	11.0	0.2	1873.8	1589.3
				13.9	13.0	6.6	7.5	2252.9	1977.8					4.0	14.9	11.0	0.1	1874.0	1589.5
				13.9	12.5	6.7	8.0	2253.3	1973.9		d	32.5	26.2	6.5	2.0	8.5	13.0	1924.0	1538.1
				14.0	12.9	6.6	7.6	2252.5	1977.0					6.3	2.0	8.7	13.0	1924.8	1538.1
				14.0	12.7	6.5	7.9	2252.2	1975.1			33.5	25.3	8.5	5.0	6.5	10.0	1976.0	1490.0
				14.0	12.6	6.4	7.9	2251.8	1974.7					8.5	5.0	6.5	10.1	1976.0	1489.9
		14.5	12.5	10.5	11.0	10.0	9.5	2280.0	1962.0		e	33.1	34.5	12.9	7.0	2.1	8.0	1958.4	2038.0
				10.5	11.0	10.0	9.4	2280.0	1962.4					13.0	7.0	2.1	8.0	1958.2	2038.0
				10.5	11.0	10.0	9.5	2280.0	1962.0			34.0	33.7	15.0	10.0	15.0	5.1	2010.0	1989.8
				10.5	11.0	10.0	9.4	2280.0	1962.4					15.0	10.0	15.0	5.0	2010.0	1990.0
				10.5	11.0	10.0	9.5	2280.0	1962.0		f	33.5	14.7	7.0	11.9	8.0	3.2	1982.0	857.3
				10.5	11.0	10.1	9.5	2280.4	1962.0					7.0	11.5	8.0	3.6	1982.0	855.7
10	1	5.4	55.1	8.0	1.0	7.0	14.1	298.0	3273.9			34.4	13.9	9.0	14.5	6.0	1.0	2034.0	806.9
				8.0	1.0	7.0	14.0	298.0	3274.1					9.0	14.5	6.0	0.6	2034.0	807.7
		6.2	54.3	11.0	4.0	4.0	11.0	346.0	3226.1		g	33.5	29.4	7.0	6.9	8.0	8.2	1982.0	1737.4
	2			11.0	4.0	4.0	11.0	346.0	3226.1					7.0	6.5	8.0	8.6	1982.0	1735.8
		5.6	25.4	3.9	5.0	11.1	10.1	314.4	1489.9			34.4	28.6	9.0	9.6	6.0	5.5	2034.0	1688.2
				3.9	5.0	11.1	10.1	314.4	1489.9					9.0	9.5	6.0	5.6	2034.0	1687.8
	3	6.6	24.5	6.1	7.8	9.0	7.2	365.8	1441.2		h	34.6	29.3	6.0	3.8	9.0	11.2	2046.0	1725.3
				6.1	7.9	9.0	7.2	365.8	1441.4					6.0	3.9	9.0	11.1	2046.0	1725.7
		12.2	29.7	11.0	12.0	4.0	3.1	706.0	1757.7			35.5	28.4	8.0	6.6	7.0	8.5	2098.0	1676.2
	4			11.0	12.0	4.0	3.1	706.0	1757.7					8.0	6.5	7.0	8.5	2098.0	1676.0
		13.1	28.9	13.1	14.5	2.0	0.5	757.8	1707.9		i	35.4	26.1	6.0	0.2	9.0	14.9	2106.0	1530.7
				13.0	14.5	2.0	0.5	758.0	1707.9					6.1	0.2	8.9	14.9	2105.6	1530.7
	5	18.8	46.2	3.0	1.5	12.0	13.5	1098.0	2736.1			36.4	25.2	8.9	2.9	6.2	12.1	2154.6	1481.7
				3.0	2.0	12.0	13.0	1098.0	2738.1					8.5	3.0	6.6	12.0	2156.2	1482.1
		19.6	45.3	5.2	4.9	9.8	10.2	1149.2	2689.5		j	36.2	14.8	12.0	11.5	3.0	3.6	2142.0	855.7
	6			5.1	4.5	10.0	10.5	1149.8	2688.1					12.0	11.1	3.0	4.0	2142.0	854.1
		26.6	22.2	5.1	2.5	10.0	12.5	1569.8	1300.1			37.1	13.9	14.1	14.0	1.0	1.0	2193.8	805.9
				5.1	2.9	9.9	12.1	1569.6	1301.7					14.0	14.0	1.0	1.1	2194.0	805.7
	7	27.5	21.3	7.5	5.5	7.6	9.6	1620.2	1251.8		k	36.6	30.4	5.5	5.4	9.6	9.7	2168.2	1791.4
				7.5	5.5	7.5	9.6	1620.0	1251.8					5.5	5.1	9.6	10.0	2168.2	1790.2
		46.8	32.5	2.5	5.1	12.5	10.0	2780.0	1910.2			37.5	29.6	7.9	8.0	7.1	7.0	2218.4	1742.0
	8			2.5	5.5	12.6	9.7	2780.2	1911.6					7.8	8.0	7.2	7.0	2218.8	1742.0
		47.6	31.5	4.1	8.0	11.0	7.0	2833.8	1862.0		l	36.7	29.3	5.1	3.9	10.0	11.1	2169.8	1725.7

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>
10	l			5.1	3.9	9.9	11.1	2169.6	1725.7	11	3			8.1	0.5	6.9	14.5	1977.6	3212.0
		37.5	28.4	7.5	6.5	7.6	8.6	2220.2	1675.8					14.1	1.5	0.9	13.6	1953.6	1775.9
	m			7.2	6.5	7.8	8.6	2221.2	1675.8		4	33.1	30.1	14.0	1.5	1.0	13.6	1954.0	1775.9
		37.1	22.3	13.0	4.0	2.0	11.1	2198.0	1305.9					7.5	2.5	7.5	12.5	1980.0	1780.0
				13.0	4.0	2.1	11.0	2198.2	1306.1			33.5	30.2	7.5	2.5	7.5	12.6	1980.0	1779.8
		38.1	21.5	14.8	7.0	0.2	8.0	2250.8	1258.0		5	35.7	56.6	5.0	8.9	10.0	6.1	2110.0	3365.6
	n			14.8	7.0	0.2	8.1	2250.8	1257.8					5.0	9.0	10.0	6.1	2110.0	3365.8
		42.3	39.4	9.5	6.0	5.6	9.1	2512.2	2333.8			36.1	56.7	13.8	10.0	1.3	5.0	2135.0	3370.0
				9.9	6.0	5.1	9.1	2510.4	2333.8					13.5	10.0	1.6	5.0	2136.2	3370.0
	o	43.2	38.6	12.0	8.9	3.0	6.1	2562.0	2285.6		6	38.1	56.2	13.0	3.0	2.0	12.0	2258.0	3342.1
				12.0	8.5	3.0	6.5	2562.0	2284.0					13.0	3.0	2.1	12.0	2258.2	3342.1
		60.2	8.3	11.5	4.1	3.6	11.0	3584.2	466.3			38.6	56.3	6.5	4.0	8.5	11.0	2284.0	3346.0
				11.5	4.1	3.6	11.0	3584.2	466.3					6.5	4.0	8.5	11.0	2284.0	3346.0
	E	61.1	7.4	13.0	7.0	2.0	8.1	3638.0	417.8		7	53.5	2.4	6.5	6.9	8.5	8.1	3184.0	117.6
				12.9	7.0	2.0	8.1	3638.2	417.8					6.5	6.9	8.5	8.1	3184.0	117.6
		34.1	30.5	14.0	6.1	1.0	9.0	2014.0	1794.2			54.1	2.5	14.5	8.0	0.6	7.0	3212.2	122.0
				14.0	6.0	1.0	9.0	2014.0	1794.0					14.5	8.0	0.5	7.0	3212.0	122.0
	a			14.0	6.2	1.0	8.8	2014.0	1794.8		8	56.1	35.8	12.9	13.0	2.1	2.1	3338.4	2121.7
				14.0	6.2	1.0	8.8	2014.0	1794.8					12.9	13.0	2.1	2.1	3338.4	2121.7
				14.0	6.2	1.0	8.9	2014.0	1794.6			56.7	35.8	6.0	14.5	9.0	0.5	3366.0	2128.0
				14.0	6.2	1.1	8.9	2014.2	1794.6					6.0	14.5	9.0	0.5	3366.0	2128.0
		34.9	29.7	1.5	9.5	13.6	5.6	2064.2	1747.8		b	7.3	4.2	9.5	3.5	5.6	11.6	412.2	223.9
				1.5	9.4	13.6	5.6	2064.2	1747.6					9.5	3.5	5.6	11.5	412.2	224.1
				1.5	9.4	13.6	5.6	2064.2	1747.6			7.7	4.3	3.0	4.0	12.1	11.0	438.2	226.0
				1.5	9.5	13.5	5.5	2064.0	1748.0					3.0	4.0	12.0	11.0	438.0	226.0
				1.4	9.5	13.7	5.5	2064.6	1748.0		c	19.5	6.5	6.9	9.0	8.1	6.1	1142.4	365.8
				1.5	9.5	13.5	5.6	2064.0	1747.8					6.9	8.5	8.1	6.5	1142.4	364.0
		34.1	28.1	14.0	0.5	1.0	14.6	2014.0	1651.9			20.1	6.6	14.9	9.9	0.1	5.5	1170.4	368.8
				13.9	0.5	1.1	14.5	2014.4	1652.1					14.5	10.0	0.5	5.0	1172.0	370.0
	d			13.9	0.5	1.1	14.5	2014.4	1652.1		d	27.9	22.4	1.5	6.6	13.6	8.5	1644.2	1316.2
				13.9	0.5	1.1	14.6	2014.4	1651.9					1.5	6.6	13.6	8.4	1644.2	1316.4
				13.9	0.5	1.1	14.5	2014.4	1652.1			28.3	22.5	9.8	7.9	5.2	7.1	1670.8	1321.6
				14.0	0.5	1.1	14.5	2014.2	1652.1					9.9	7.6	5.1	7.5	1670.4	1320.2
		34.9	27.3	1.0	3.5	14.1	11.6	2066.2	1603.9		e	34.7	13.2	3.9	3.0	11.1	12.0	2054.4	762.1
				1.0	3.4	14.0	11.6	2066.0	1603.7					3.9	3.0	11.1	12.0	2054.4	762.1
				1.0	3.5	14.0	11.6	2066.0	1603.9			35.2	13.3	12.0	4.0	3.0	11.0	2082.0	766.0
				1.0	3.4	14.1	11.6	2066.2	1603.7					12.0	4.0	3.0	11.0	2082.0	766.0
				1.0	3.5	14.0	11.5	2066.0	1604.1		f	37.9	20.5	1.5	7.1	13.6	8.0	2244.2	1198.2
				1.0	3.5	14.0	11.6	2066.0	1603.9					1.5	7.1	13.6	8.0	2244.2	1198.2
	E	4.5	0.9	8.5	14.0	6.5	1.0	236.0	25.9			38.4	20.6	9.9	8.5	5.1	6.5	2270.4	1204.0
				8.5	13.9	6.5	1.1	236.0	25.5					9.8	8.5	5.2	6.6	2270.8	1203.8
		4.9	0.9	1.0	14.1	14.0	0.9	266.0	26.4		g	38.9	26.7	0.5	11.1	14.6	4.0	2308.2	1574.1
				1.0	14.0	14.1	1.0	266.2	26.0					0.5	11.1	14.5	4.0	2308.0	1574.1
		18.7	52.9	5.0	14.0	10.0	1.0	1090.0	3145.9			39.4	26.8	9.0	12.5	6.0	2.6	2334.0	1579.8
				5.0	14.0	10.1	1.0	1090.2	3145.9					9.0	12.5	6.0	2.5	2334.0	1580.0
		19.1	52.9	14.0	15.1	1.0	15.0	1114.0	3150.2		E	39.1	22.7	12.0	10.0	3.0	5.0	2322.0	1330.0
				14.0	15.1	1.0	15.0	1114.0	3150.2					12.0	10.1	3.0	5.0	2322.0	1330.1
		33.1	53.9	14.5	14.1	0.5	1.0	1952.0	3206.1			39.6	22.7	5.0	11.0	10.0	4.0	2350.0	1334.0
				14.5	14.1	0.5	1.0	1952.0	3206.1					5.0	11.1	10.0	4.0	2350.0	1334.2
		33.4	54.1	8.1	0.5	6.9	14.5	1977.6	3212.0			35.6	23.6	5.1	10.0	9.9	5.1	2109.6	1389.8

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.					
		x	y	A	B	C	D	x	y			x	y	A	B	C	D	x	y				
11	E			5.2	10.0	9.9	5.1	2109.4	1389.8	12	10			11.0	18.0	9.5	2.5	3091.0	1365.5				
				5.2	10.0	9.9	5.1	2109.4	1389.8					9.1	9.0	11.4	11.5	3106.2	3413.0				
				5.1	10.0	10.0	5.1	2109.8	1389.8					9.0	8.9	11.5	11.6	3107.0	3412.3				
				5.2	9.9	9.8	5.1	2109.2	1389.6					15.0	2.5	5.5	18.0	3222.3	3361.5				
				5.2	10.0	9.9	5.0	2109.4	1390.0					15.2	2.1	5.2	18.4	3220.3	3358.3				
		36.1	23.7	13.5	11.0	1.5	4.0	2136.0	1394.0			a	2.5	9.3	10.5	7.5	10.0	13.0	324.0	1445.2			
				13.6	11.0	1.5	4.1	2135.8	1393.8					10.6	7.4	10.0	13.0	323.6	1444.8				
				13.5	11.0	1.5	4.0	2136.0	1394.0			b	6.3	10.6	14.8	12.0	5.7	8.5	941.8	1643.9			
				13.6	11.0	1.4	4.0	2135.6	1394.0					14.6	12.0	5.9	8.5	943.4	1643.9				
				13.6	11.0	1.4	4.0	2135.6	1394.0					6.9	10.3	0.5	5.6	20.0	15.0	1055.4	1592.7		
		13.5	10.9	1.5	4.1	2136.0	1393.6					0.5	5.5	20.0	15.0	1055.4	1592.3						
12	1	0.6	8.5	4.9	9.4	15.7	11.1	43.0	1297.2	c	9.3	16.4	15.0	9.0	5.5	11.5	1429.2	2598.0					
				4.8	9.2	15.7	11.3	43.4	1295.6				15.0	9.0	5.4	11.5	1428.8	2598.0					
		1.4	8.2	11.1	3.0	9.4	17.5	156.3	1246.4					9.9	16.1	1.0	2.1	19.5	18.3	1540.4	2543.7		
				11.0	3.0	9.5	17.5	157.0	1246.4				1.0			2.0	19.5	18.5	1540.4	2542.5			
	2	5.7	27.6	5.4	11.8	15.1	8.7	853.6	4413.3	d	11.7	13.1	4.0	1.9	16.5	18.7	1842.8	2052.1					
				5.5	11.9	15.0	8.6	852.8	4414.1				4.0	1.9	16.5	18.6	1842.8	2052.5					
	6.4	27.3	11.5	5.1	9.0	15.4	968.1	4360.1		12.5	12.7	10.3	15.5	10.2	5.0	1955.6	1997.7						
			11.5	5.1	9.0	15.4	968.1	4360.1	10.5			15.5	10.0	5.0	1954.0	1997.7							
	3	6.3	2.4	14.6	6.5	5.9	14.0	943.4	296.2	e	13.3	18.1	13.5	2.0	7.0	18.5	2093.1	2868.3					
				14.5	6.5	6.0	14.0	944.2	296.2				13.6	2.0	6.9	18.5	2092.3	2868.3					
	6.9	1.9	0.9	20.5	19.5	20.5	1051.8	244.5		13.9	17.7	0.5	15.0	20.0	5.5	2196.4	2808.7						
			0.9	20.5	19.6	20.5	1052.2	244.5	0.5			15.0	20.0	5.5	2196.4	2808.7							
	4	10.6	29.6	8.0	13.0	12.5	7.5	1647.9	4748.9	f	21.6	5.6	8.0	14.0	12.5	6.5	3440.9	844.8					
				8.0	13.0	12.5	7.5	1647.9	4748.9				8.0	14.0	12.5	6.5	3440.9	844.8					
		11.4	29.3	14.0	7.0	6.5	13.5	1763.2	4701.2			22.3	5.4	14.5	7.0	6.0	13.5	3552.3	789.2				
				14.0	6.5	6.6	14.0	1763.6	4697.2		14.9			6.5	5.6	14.0	3549.1	785.2					
	5	10.9	28.0	0.5	20.5	20.0	20.5	1707.6	4482.5	E	12.2	16.8	17.5	17.0	3.0	3.5	1898.3	2661.7					
				0.5	20.5	20.0	20.5	1707.6	4482.5				17.6	17.0	2.9	3.5	1897.5	2661.7					
		11.7	27.6	6.5	14.0	14.0	6.6	1822.8	4430.4			12.7	16.5	17.5	17.0	3.0	3.5	1898.3	2661.7				
				6.5	13.9	14.0	6.6	1822.8	4430.0		17.5			17.0	3.0	3.5	1898.3	2661.7					
	6	11.1	19.3	18.5	5.5	2.0	15.0	1727.3	3059.2		12.7	16.5	17.6	17.0	2.9	3.5	1897.5	2661.7					
				18.4	5.5	2.1	15.0	1728.1	3059.2	17.5			17.0	3.0	3.5	1898.3	2661.7						
		11.7	18.9	4.0	19.2	16.5	1.3	1842.6	3005.1		12.7	16.5	3.9	10.0	16.6	10.5	2006.4	2606.0					
				4.0	19.0	16.5	1.5	1842.6	3003.5	3.8			10.0	16.8	10.5	2007.6	2606.0						
	7	11.9	28.9	1.4	20.0	19.1	0.5	1863.4	4641.6		12.2	16.7	4.0	10.0	16.5	10.6	2005.6	2605.6					
				1.5	20.0	19.0	0.5	1862.6	4641.6	3.9			9.9	16.6	10.6	2006.4	2605.2						
		12.6	28.6	7.0	13.1	13.5	7.3	1981.8	4587.0		12.2	16.7	3.9	10.0	16.6	10.5	2006.4	2606.0					
				7.2	13.1	13.3	7.4	1980.2	4586.6	3.9			10.0	16.7	10.6	2006.8	2605.6						
	8	12.7	28.8	3.0	17.0	17.5	3.5	2013.7	4617.7		12.2	16.7	17.5	17.4	2.9	3.1	1897.9	2664.9					
				3.0	17.0	17.5	3.5	2013.7	4617.7	17.6			17.2	2.9	3.3	1897.5	2663.3						
		13.5	28.5	9.0	10.1	11.5	10.4	2128.9	4562.8		12.7	16.5	17.6	17.0	3.0	3.6	1897.9	2661.3					
				9.0	10.5	11.5	10.0	2128.9	4566.0	3.8			10.0	16.8	10.5	2007.6	2606.0						
	9	17.2	4.6	18.0	11.5	2.5	9.0	2709.3	662.0		12.7	16.5	3.9	10.0	16.6	10.5	2006.4	2606.0					
				18.0	11.5	2.5	9.0	2709.3	662.0	3.9			10.0	16.6	10.5	2006.4	2606.0						
		17.7	4.3	4.0	5.0	16.5	15.5	2820.6	610.3	13	1	3.3	18.4	19.5	8.0	3.0	14.4	471.3	3196.5				
				4.0	5.0	16.5	15.6	2820.6	609.9					19.5	8.0	3.0	14.4	471.3	3196.5				
	18.7	9.3	4.5	4.5	16.0	16.0	2979.8	1421.2			2	3.4	16.7	16.0	17.1	6.5	5.4	320.2	3268.6				
			4.5	4.5	16.0	16.0	2979.8	1421.2	16.0					17.1	6.5	5.4	320.2	3268.6					
	19.5	8.8	11.0	18.1	9.5	2.4	3091.0	1366.3					16.5	18.2	6.0	4.2	495.2	2919.7					

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>	
13	2			16.5	18.5	6.0	4.0	495.2	2921.7	13	g h			7.1	3.5	15.4	19.0	3076.0	2981.3	
		2.4	17.3	13.2	5.0	9.3	17.5	342.5	2993.2			19.4	13.5	14.1	10.0	8.4	12.5	3378.3	2317.0	
				13.2	5.0	9.3	17.5	342.5	2993.2					14.1	10.0	8.4	12.5	3378.3	2317.0	
	3	6.2	15.8	18.5	20.0	4.0	2.5	1016.3	2754.6		E	18.5	13.9	10.6	20.0	11.9	2.5	3227.2	2396.6	
				18.5	20.0	4.0	2.5	1016.3	2754.6					10.5	20.0	12.0	2.5	3228.0	2396.6	
		5.4	16.3	15.0	6.9	7.5	15.6	865.2	2829.4			13.9	11.2	0.5	3.9	22.0	18.6	2412.6	1910.5	
	4			15.0	7.0	7.5	15.5	865.2	2830.2						0.5	3.9	22.0	18.6	2412.6	1910.5
		13.6	16.6	10.0	15.9	12.5	6.6	2337.0	2901.0						0.5	4.0	22.0	18.5	2412.6	1911.3
				10.0	15.9	12.4	6.6	2336.6	2901.0						0.5	3.9	22.0	18.6	2412.6	1910.5
	5	12.6	17.2	7.0	3.1	15.5	19.4	2181.8	2978.1						0.5	3.9	21.9	18.6	2412.2	1910.5
				6.5	3.1	16.0	19.4	2185.8	2978.1						0.5	4.0	22.0	18.5	2412.6	1911.3
		25.3	12.1	15.0	1.0	7.4	21.5	4444.8	2066.4		13.2	11.6	19.5	13.9	3.0	8.6	2261.3	1990.1		
	6			15.0	1.0	7.5	21.5	4445.2	2066.4						19.4	14.0	3.1	8.5	2262.1	1990.9
		24.5	12.5	11.5	11.1	11.0	11.3	4294.0	2147.2						19.0	14.0	3.5	8.5	2265.3	1990.9
				11.5	11.5	11.0	11.0	4294.0	2150.0						19.2	13.9	3.3	8.6	2263.7	1990.1
	7	25.3	12.4	15.0	8.4	7.5	14.1	4445.2	2125.3		14	1	4.4	15.7	15.5	18.5	7.0	4.0	682.2	2742.7
				15.0	8.5	7.5	14.0	4445.2	2126.1				4.3	15.7	15.5	18.5	7.0	4.0	682.2	2742.7
		24.5	12.8	11.4	18.9	11.1	3.6	4294.8	2208.9				4.3	15.7	14.5	16.0	8.0	6.5	690.1	2722.8
	a	25.8	0.6	2.5	13.0	20.0	9.5	4544.6	13.9						14.5	16.0	8.0	6.5	690.1	2722.8
				2.5	13.0	20.0	9.5	4544.6	13.9		2	4.4	16.3	15.5	4.0	7.0	18.5	682.2	2806.3	
		25.1	1.2	20.0	1.0	2.5	21.5	4405.4	97.4						15.4	3.9	7.1	18.6	683.0	2805.5
	b			20.5	1.0	2.0	21.5	4401.4	97.4				4.3	16.1	14.0	1.0	8.5	21.6	694.1	2782.0
		5.3	18.1	15.2	1.0	7.1	21.5	862.8	3140.4						14.0	1.0	8.5	21.5	694.1	2782.4
				15.2	1.0	7.2	21.5	863.2	3140.4		3	4.6	4.4	7.0	8.0	15.5	14.5	749.8	690.1	
	c	4.5	18.4	12.0	10.5	10.5	12.0	710.0	3216.0						7.0	8.0	15.5	14.5	749.8	690.1
				12.1	10.5	10.4	12.0	709.2	3216.0				4.7	4.3	5.5	5.0	17.0	17.5	761.8	666.2
		12.1	4.9	20.5	22.1	2.0	0.3	2074.4	802.8						5.5	5.0	17.0	17.5	761.8	666.2
	d			20.5	22.1	2.0	0.4	2074.4	802.4		4	6.1	3.7	21.6	17.3	0.9	5.2	991.6	585.2	
		11.3	5.4	16.5	9.6	6.0	12.9	1927.2	881.9						21.7	17.1	0.9	5.4	991.2	583.6
				16.5	9.8	6.0	12.7	1927.2	883.5				6.1	3.6	20.1	14.6	2.3	7.9	1003.2	563.7
e	14.5	8.3	11.6	4.5	10.9	18.0	2503.2	1378.3					20.1	14.5	2.4	8.0	1003.6	562.9		
			11.5	4.6	11.0	18.0	2504.0	1378.7	5	6.6	6.4	8.0	9.5	14.5	13.0	1099.9	1060.1			
	13.6	8.6	8.0	14.9	14.5	7.6	2352.9	1461.1					8.0	9.5	14.5	13.0	1099.9	1060.1		
f			8.0	14.8	14.5	7.8	2352.9	1459.9			6.7	6.3	6.5	7.0	16.0	15.5	1111.8	1040.2		
	14.6	10.3	7.1	5.8	15.4	16.7	2539.0	1746.6					6.5	6.5	16.0	16.0	1111.8	1036.2		
			7.1	5.5	15.3	17.0	2538.6	1744.2	6	10.7	11.7	5.1	17.0	17.4	5.5	1839.0	2014.8			
g	13.8	10.7	3.5	15.5	19.0	7.0	2388.7	1823.8					5.0	17.0	17.5	5.5	1839.8	2014.8		
			3.6	15.8	18.9	6.6	2387.9	1826.6			10.8	11.7	3.5	14.5	19.0	8.0	1851.7	1994.9		
	15.2	6.3	19.0	4.5	3.5	18.0	2623.3	1020.3					4.0	14.5	18.5	8.0	1847.7	1994.9		
h			19.0	4.5	3.5	18.0	2623.3	1020.3	7	11.1	7.3	20.4	6.0	2.1	16.5	1896.2	1211.2			
	14.4	6.6	15.1	14.5	7.4	8.0	2475.4	1099.9						20.5	6.0	2.0	16.6	1895.4	1210.8	
			15.0	14.5	7.5	8.0	2476.2	1099.9					11.1	7.2	19.0	3.0	3.5	19.5	1907.3	1187.3
i	15.8	11.1	2.0	0.3	20.5	22.2	2758.6	1881.8					19.0	3.0	3.5	19.5	1907.3	1187.3		
			2.0	0.5	20.5	22.0	2758.6	1883.4	8	13.3	10.4	17.0	6.9	5.5	15.6	2281.2	1755.4			
	15.1	11.5	20.5	10.4	2.0	12.1	2611.4	1962.2						17.0	7.0	5.5	15.4	2281.2	1756.6	
		20.5	10.5	2.0	12.0	2611.4	1963.0					13.4	10.2	15.1	4.0	7.4	18.5	2296.4	1732.3	
j	18.5	16.6	10.5	15.9	11.9	6.6	3227.6	2901.0					15.0	4.0	7.5	18.5	2297.2	1732.3		
			10.5	16.0	12.0	6.5	3228.0	2901.8	9	13.5	19.1	9.6	1.0	12.9	21.5	2340.1	3319.4			
	17.6	17.3	7.0	3.4	15.5	19.1	3076.8	2980.5												

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>	
14	9			9.5	1.0	13.0	21.5	2340.9	3319.4	15	3			13.0	8.5	9.5	14.0	702.1	515.1	
		13.6	18.9	8.1	20.9	14.3	1.6	2351.7	3298.8			4	10.4	2.3	14.5	3.5	8.0	19.0	1764.1	296.3
				8.1	20.9	14.4	1.6	2352.1	3298.8						14.5	3.5	8.0	19.0	1764.1	296.3
	a	10.6	10.3	5.5	5.0	17.0	17.5	1835.8	1740.2				10.3	1.8	16.1	20.0	6.3	2.5	1751.0	248.6
				5.5	5.0	17.0	17.5	1835.8	1740.2					16.3	20.0	6.2	2.5	1749.8	248.6	
		10.8	10.1	4.0	2.1	18.5	20.3	1847.7	1717.6		5	14.1	21.9	19.9	22.0	2.6	0.5	2437.1	3844.6	
	b			4.0	2.0	18.5	20.4	1847.7	1716.8						19.9	22.0	2.6	0.5	2437.1	3844.6
		13.6	13.4	7.0	8.0	15.5	14.4	2360.8	2301.5			14.1	21.6	21.1	16.0	1.4	6.5	2427.6	3796.8	
				7.0	8.0	15.5	14.4	2360.8	2301.5				21.0	16.0	1.5	6.5	2428.4	3796.8		
		13.7	13.3	5.5	5.5	17.0	16.9	2372.8	2281.6		6	14.4	14.6	15.0	13.5	7.4	9.0	2475.8	2523.9	
				5.5	5.6	17.0	16.9	2372.8	2282.0					15.0	13.5	7.4	9.0	2475.8	2523.9	
		16.9	7.9	2.5	21.0	20.0	1.6	2933.6	1330.2			14.3	14.4	16.5	7.9	6.0	14.6	2464.2	2479.3	
				2.5	21.0	20.0	1.5	2933.6	1330.6				16.5	7.6	6.0	14.9	2464.2	2476.9		
		16.9	7.8	1.5	18.5	21.0	4.0	2941.6	1310.7		7	20.0	1.9	0.1	22.0	22.4	0.5	3668.8	264.6	
				1.5	18.5	21.0	4.0	2941.6	1310.7					0.1	22.0	22.3	0.5	3668.4	264.6	
	d	17.5	13.8	11.0	19.0	11.5	3.6	3045.0	2388.3			19.9	1.6	1.5	15.9	21.0	6.6	3478.6	216.0	
				11.0	19.0	11.5	3.5	3045.0	2388.7				1.5	15.9	21.0	6.6	3478.6	216.0		
		17.6	13.6	9.5	16.0	13.0	6.5	3056.9	2364.8		a	10.5	19.6	12.9	14.0	9.6	8.5	1776.9	3422.9	
	e			9.5	16.0	12.9	6.5	3056.5	2364.8					13.0	14.0	9.5	8.5	1776.1	3422.9	
		17.6	7.3	8.0	4.1	14.5	18.4	3068.9	1196.1			10.4	19.4	14.5	8.2	8.0	14.2	1764.1	3377.1	
				8.0	4.0	14.5	18.4	3068.9	1195.7				14.4	8.0	8.1	14.4	1764.9	3375.5		
		17.6	7.1	6.6	2.0	15.9	20.5	3080.0	1179.4		b	12.3	13.7	16.0	16.0	6.5	6.5	2110.2	2364.8	
				6.5	2.0	16.1	20.5	3081.2	1179.4					16.0	16.0	6.5	6.5	2110.2	2364.8	
		20.8	3.2	4.0	4.2	18.6	18.2	3638.1	481.3			12.3	13.5	17.1	10.2	5.3	12.2	2101.0	2319.0	
				4.0	4.4	18.5	18.0	3637.7	482.9				17.5	10.0	5.0	12.5	2098.2	2317.0		
		20.9	3.1	2.4	1.9	20.1	20.6	3650.4	462.6		c	13.4	14.7	13.0	18.3	9.5	4.1	2313.1	2562.5	
				2.1	2.0	20.3	20.5	3652.4	463.4					13.0	18.5	9.5	4.0	2313.1	2563.7	
	E	16.3	13.2	17.5	4.5	5.0	18.0	2814.2	2273.3			13.4	14.6	14.5	12.2	8.0	10.3	2301.1	2513.6	
				17.5	4.6	5.0	17.9	2814.2	2274.1				14.5	12.5	8.0	10.0	2301.1	2516.0		
				17.4	4.6	5.1	18.0	2815.0	2273.7		d	13.8	13.4	2.9	9.5	19.6	13.0	2393.5	2313.1	
			17.5	4.5	5.0	18.0	2814.2	2273.3				2.9	9.5	19.6	13.0	2393.5	2313.1			
			17.5	4.5	5.0	17.9	2814.2	2273.7	13.7	13.2		4.1	3.5	18.3	19.0	2383.5	2265.3			
			17.4	4.5	5.0	18.0	2814.6	2273.3			4.1	3.5	18.3	19.0	2383.5	2265.3				
	16.3	13.1	15.9	2.0	6.6	20.5	2827.0	2253.4	e	15.4	12.1	15.0	1.0	7.5	21.5	2655.2	2066.4			
			15.9	1.9	6.7	20.6	2827.4	2252.6				15.0	1.0	7.5	21.5	2655.2	2066.4			
			16.0	2.0	6.5	20.5	2826.2	2253.4		15.3	11.7	16.5	17.5	6.0	5.0	2643.2	2018.8			
			16.0	1.9	6.5	20.6	2826.2	2252.6			16.5	17.5	6.0	5.0	2643.2	2018.8				
			16.0	2.0	6.5	20.5	2826.2	2253.4	E	14.3	13.4	17.0	7.4	5.5	15.1	2460.2	2296.4			
			16.1	2.0	6.4	20.5	2825.4	2253.4				17.0	7.5	5.5	15.0	2460.2	2297.2			
15	1	2.3	11.8	17.0	20.8	5.5	1.7	312.2		2045.0			16.5	7.5	6.0	15.0	2464.2	2297.2		
				17.1	20.8	5.4	1.7	311.4	2045.0			16.8	7.5	5.7	15.0	2461.8	2297.2			
		2.3	11.7	18.5	15.0	4.0	7.5	300.3	1998.8			16.9	7.5	5.6	15.0	2461.0	2297.2			
			18.5	15.0	4.0	7.5	300.3	1998.8			16.9	7.5	5.6	15.0	2461.0	2297.2				
	2	4.1	18.2	19.3	3.0	3.1	19.5	651.5	3156.3		14.2	13.1	18.1	2.0	4.3	20.5	2451.1	2253.4		
				19.1	3.0	3.4	19.5	653.5	3156.3				18.0	2.0	4.5	20.5	2452.3	2253.4		
4.1		17.8	20.5	19.9	2.0	2.6	642.4	3111.9				18.0	2.0	4.5	20.5	2452.3	2253.4			
			20.5	20.0	2.0	2.5	642.4	3112.6			18.0	2.0	4.6	20.4	2452.7	2253.8				
	3	4.5	3.6	11.5	14.5	11.0	8.0	714.0	562.9			18.0	2.0	4.5	20.4	2452.3	2253.8			
				11.5	14.5	11.0	8.0	714.0	562.9			17.9	2.0	4.6	20.5	2453.1	2253.4			
4.5		3.4	13.0	8.6	9.5	14.0	702.1	515.5	16	1	0.9	12.7	1.1	17.5	21.3	5.0	80.4	2197.8		

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>
16	1			1.0	17.6	21.5	4.9	81.6	2198.5	16	f			1.5	2.0	21.0	20.5	1688.6	2432.4
		1.2	12.7	19.4	15.5	3.4	7.0	115.3	2181.8			9.9	13.4	0.5	7.2	22.0	15.3	1696.6	2294.8
				19.4	15.5	3.1	7.0	114.1	2181.8					0.5	7.4	22.0	15.1	1696.6	2296.4
	2	1.3	9.3	16.1	4.0	6.4	18.4	140.4	1553.7		g	10.2	13.3	18.1	6.0	4.3	16.5	1735.1	2285.2
				16.1	4.0	6.4	18.5	140.4	1553.3					18.1	5.9	4.4	16.6	1735.5	2284.4
		1.5	9.2	11.5	2.0	11.0	20.5	177.0	1537.4		h	10.1	13.8	21.0	20.0	1.6	2.5	1712.8	2396.6
	3			11.5	2.1	11.0	20.4	177.0	1538.2					20.6	20.0	1.9	2.5	1715.6	2396.6
		2.7	15.4	5.5	7.5	17.0	15.0	403.8	2655.2			10.3	13.8	17.0	18.0	5.5	4.5	1744.2	2380.7
				5.1	7.9	17.4	14.6	407.0	2658.3		i			17.0	18.4	5.5	4.1	1744.2	2383.9
	4	2.9	15.3	1.0	6.5	21.4	16.0	439.2	2647.2			11.3	20.7	16.0	18.0	6.5	4.4	1931.2	3634.1
				1.0	6.0	21.5	16.5	439.6	2643.2					16.0	18.0	6.5	4.4	1931.2	3634.1
		6.2	19.4	19.5	8.0	3.0	14.5	1008.3	3375.1		j	11.5	20.7	11.9	16.4	10.6	6.1	1963.8	3621.0
	5			19.4	8.0	3.1	14.5	1009.1	3375.1					11.8	16.5	10.7	6.0	1964.6	3621.8
		6.4	19.3	15.1	6.0	7.4	16.5	1043.4	3359.2			12.8	13.3	3.0	6.1	19.5	16.3	2213.7	2286.4
				15.0	6.0	7.5	16.5	1044.2	3359.2		k			3.0	6.0	19.5	16.5	2213.7	2285.2
	6	12.2	7.7	18.5	17.0	4.0	5.5	2090.3	1298.8			13.1	13.2	21.0	4.5	1.5	18.0	2249.4	2273.3
				18.5	17.0	4.0	5.5	2090.3	1298.8					21.0	4.5	1.5	18.0	2249.4	2273.3
		12.4	7.6	14.0	15.0	8.5	7.4	2126.1	1283.2		l	12.8	13.7	2.0	18.0	20.6	4.5	2222.0	2380.7
	7			14.0	15.1	8.5	7.3	2126.1	1284.0					2.0	18.0	20.4	4.4	2221.2	2381.1
		13.5	5.4	11.0	7.1	11.5	15.4	2329.0	862.0			13.2	13.7	20.4	16.5	2.1	6.0	2254.2	2368.8
				11.0	7.4	11.5	15.0	2329.0	864.8		m			20.5	16.5	2.0	6.0	2253.4	2368.8
	a	13.7	5.3	6.0	6.0	16.5	16.5	2368.8	853.2			13.3	11.2	15.8	3.0	6.8	19.5	2291.2	1903.3
				6.4	6.0	16.1	16.5	2365.6	853.2					15.9	3.4	6.6	19.1	2290.0	1906.5
		16.8	5.7	4.2	16.9	18.3	5.6	2920.1	940.0		n	13.5	11.1	11.1	1.8	11.4	20.7	2328.2	1893.8
	b			4.2	17.0	18.2	5.5	2919.7	940.8					11.0	1.9	11.5	20.6	2329.0	1894.6
		17.0	5.7	22.0	15.0	0.5	7.4	2957.4	925.2			16.1	17.2	20.1	2.9	2.4	19.6	2793.6	2976.5
				22.0	15.5	0.5	7.0	2957.4	928.8		o			20.0	3.0	2.4	19.5	2794.0	2977.3
	c	6.6	13.9	10.8	21.0	11.8	1.4	1078.0	2405.0			16.3	17.1	16.0	1.4	6.4	21.1	2825.8	2964.6
				10.9	21.0	11.6	1.4	1076.8	2405.0					16.0	1.5	6.5	21.0	2826.2	2965.4
		6.7	13.8	6.1	19.0	16.3	3.5	1114.6	2388.7		E	17.4	19.1	12.1	0.6	10.3	21.9	3035.8	3316.2
	d			6.0	19.0	16.5	3.4	1115.8	2389.1					12.0	0.6	10.4	21.9	3036.6	3316.2
		7.7	15.9	7.0	21.0	15.4	1.5	1286.4	2762.6			17.6	18.9	8.0	21.5	14.5	0.9	3068.9	3304.0
				7.1	21.0	15.3	1.5	1285.6	2762.6		E			8.0	21.5	14.5	1.0	3068.9	3303.6
	e	7.8	15.8	2.9	19.0	19.6	3.4	1319.5	2747.1			19.3	17.1	16.0	1.0	6.5	21.5	3363.2	2961.4
				2.9	19.0	19.6	3.4	1319.5	2747.1					16.0	1.0	6.5	21.5	3363.2	2961.4
		8.6	10.6	7.1	12.4	15.4	10.0	1465.0	1799.6		E	19.5	16.9	11.5	22.0	11.0	0.5	3399.0	2949.6
	f			7.0	12.4	15.5	10.1	1465.8	1799.2					11.5	22.0	11.0	0.5	3399.0	2949.6
		8.8	10.5	2.4	10.5	20.0	12.0	1502.0	1784.0			9.8	13.6	3.0	12.5	19.5	10.0	1676.7	2337.0
				2.5	10.5	20.0	12.0	1501.6	1784.0		E			3.0	12.4	19.6	10.0	1677.1	2336.6
	g	9.1	13.6	21.0	14.0	1.5	8.5	1533.4	2348.9					3.0	12.4	19.5	10.0	1676.7	2336.6
				21.0	14.0	1.5	8.4	1533.4	2349.3					3.0	12.5	19.6	10.0	1677.1	2337.0
		9.3	13.6	16.5	12.0	6.0	10.4	1569.2	2333.4		E			3.0	12.5	19.4	10.0	1676.3	2337.0
	h			16.5	12.0	6.0	10.5	1569.2	2333.0					2.9	12.4	19.6	10.1	1677.5	2336.2
		9.5	13.7	10.5	16.8	12.0	5.8	1617.0	2370.8			10.1	13.4	21.0	10.7	1.5	11.9	1712.4	2322.2
				10.8	16.8	11.8	5.7	1615.0	2371.2		E			21.0	10.8	1.5	11.7	1712.4	2323.4
	i	9.7	13.7	6.1	14.9	16.4	7.6	1652.0	2356.1					21.0	10.9	1.5	11.6	1712.4	2324.2
				6.0	15.0	16.5	7.5	1652.8	2356.8					20.9	10.9	1.6	11.6	1713.2	2324.2
		9.7	14.2	6.0	3.9	16.5	18.7	1652.8	2447.1		E			20.9	10.9	1.6	11.6	1713.2	2324.2
	j			6.0	3.9	16.5	18.6	1652.8	2447.5					21.0	10.9	1.5	11.6	1712.4	2324.2
		9.9	14.2	1.9	2.0	20.6	20.5	1685.4	2432.4					2.0	9.0	20.1	13.2	1504.9	16.8

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>
17	1			2.0	9.0	20.1	13.2	1504.9	16.8	17	h			4.1	17.9	18.3	4.6	1846.5	2021.8
		8.1	0.5	21.5	12.5	1.0	10.0	1350.4	9.9					7.2	22.0	15.0	0.1	2179.4	2593.6
				21.5	12.5	1.0	10.0	1350.4	9.9			12.6	14.9	7.2	22.0	15.0	0.3	2179.4	2592.8
	2	12.9	20.1	0.3	2.5	22.0	19.9	2235.5	3510.4					4.5	3.0	18.0	19.5	2022.7	2619.5
				0.2	2.0	22.0	20.5	2235.9	3506.0			11.7	15.2	4.5	3.0	18.0	19.5	2022.7	2619.5
		12.1	20.3	20.5	6.0	2.0	16.5	2074.4	3538.3		j	13.2	10.4	17.3	10.1	4.9	12.2	2277.0	1781.6
	3	13.7	16.6	5.5	12.9	16.8	9.3	2372.5	2878.4					17.5	10.1	4.8	12.1	2275.8	1782.0
				5.5	12.6	16.7	10.0	2372.1	2874.4			12.4	10.6	15.0	14.9	7.5	7.5	2118.2	1819.4
		12.8	16.7	3.0	16.0	19.5	6.5	2213.7	2901.7		k	13.4	11.7	15.0	14.9	7.5	7.6	2118.2	1819.0
	4			3.0	16.0	19.5	6.5	2213.7	2901.7					13.0	16.5	9.1	5.8	2311.3	2011.8
		14.5	12.4	9.2	7.1	13.0	15.1	2521.3	2116.0			12.5	11.8	13.0	16.8	9.2	5.6	2311.7	2013.8
				9.1	7.8	13.0	14.7	2521.7	2120.4		l			10.5	20.0	12.0	2.5	2154.0	2038.5
	5	13.6	12.5	6.5	11.0	16.0	11.5	2364.8	2146.0			14.2	11.1	10.0	20.0	12.5	2.5	2158.0	2038.5
				6.5	11.0	16.0	11.6	2364.8	2145.6					17.4	1.0	4.9	21.3	2455.6	1887.8
		21.8	16.8	3.0	18.0	19.1	4.1	3823.9	2919.6		m	13.3	11.3	17.2	1.0	5.0	21.4	2456.8	1887.4
	a			3.0	17.9	19.1	4.5	3823.9	2917.6					14.9	4.5	7.6	18.0	2297.9	1915.4
		20.9	16.9	0.5	21.9	22.0	0.6	3665.6	2948.6			15.9	22.7	14.5	4.5	8.0	18.0	2301.1	1915.4
				0.5	21.5	22.0	1.0	3665.6	2945.4		n			1.0	17.1	21.2	5.1	2766.4	3986.0
	b	2.2	7.8	19.0	17.9	3.1	5.0	293.9	1304.6			15.1	22.8	1.0	17.1	21.1	5.1	2766.0	3986.0
				18.9	17.3	3.3	4.9	295.1	1302.6					21.1	21.0	1.4	1.5	2606.6	4015.4
		1.3	7.9	16.0	20.5	6.6	2.0	141.6	1326.4		o	16.5	15.4	21.1	20.9	1.3	1.6	2606.2	4014.6
	c			16.0	20.8	6.5	1.7	141.2	1328.8					10.5	6.9	11.9	15.3	2869.6	2651.4
		2.2	11.4	18.1	9.5	4.0	13.0	301.2	1955.0			15.6	15.5	10.8	7.0	11.4	15.2	2866.4	2652.2
				18.1	9.2	4.0	13.1	301.2	1953.4		p			8.1	11.0	14.3	11.5	2709.7	2683.0
	d	1.3	11.5	15.2	12.5	7.3	10.0	147.6	1978.9			18.6	15.7	8.0	10.8	14.5	11.7	2710.9	2681.4
				15.5	12.5	7.0	10.0	145.2	1978.9					9.0	15.6	13.2	6.7	3238.9	2720.6
		3.1	11.8	21.5	17.8	1.0	4.9	454.4	2020.6		q	17.6	15.8	9.0	15.8	13.1	6.5	3238.5	2722.2
	e			21.3	17.4	1.0	5.0	455.2	2018.6					6.4	19.1	16.1	3.5	3081.6	2746.9
		2.2	11.9	19.0	20.8	3.5	1.7	296.3	2044.8			20.1	23.2	6.1	19.1	16.4	3.4	3084.0	2747.3
				19.0	20.5	3.4	2.0	295.9	2042.4		E			22.0	5.0	0.1	17.3	3491.7	4067.8
	f	3.1	13.4	20.0	9.9	2.1	12.4	464.9	2317.0					21.5	4.0	0.7	18.2	3496.2	4060.2
				20.1	10.0	2.0	12.3	464.1	2317.8			19.2	23.4	21.9	4.8	0.3	17.6	3493.0	4065.8
		2.3	13.6	17.2	12.8	5.2	9.7	310.2	2339.3		E			19.5	8.0	3.0	14.4	3335.3	4091.6
	g			17.5	13.0	5.0	9.5	308.2	2340.9			20.6	3.2	19.5	8.0	2.9	14.5	3334.9	4091.2
		4.4	15.5	13.8	10.5	8.8	11.7	695.8	2680.2					8.1	3.1	14.0	19.1	3603.8	473.0
				14.0	10.9	8.1	11.4	692.2	2683.0		E	19.6	3.4	8.0	3.0	14.2	19.3	3605.0	471.8
	h	3.5	15.6	11.1	14.0	11.4	8.5	538.2	2706.8					5.0	7.0	17.5	15.5	3450.8	503.3
				11.5	14.0	11.0	8.5	535.0	2706.8			12.7	11.6	5.0	7.0	17.5	15.5	3450.8	503.3
		4.8	8.7	3.5	17.0	18.9	5.5	778.1	1478.0		E			3.1	13.8	19.1	8.9	2212.5	1988.6
	i			3.2	17.0	19.0	5.4	779.7	1478.4					3.0	13.9	19.2	9.0	2213.3	1988.6
		3.9	8.9	0.5	20.1	22.0	2.4	622.6	1502.3					3.1	13.8	19.1	8.7	2212.5	1989.4
	j			1.0	20.0	21.5	2.5	618.6	1501.5					3.0	13.9	19.1	8.9	2212.9	1989.0
		7.9	12.6	1.5	13.1	20.8	9.0	1330.8	2164.4		E			3.1	13.8	19.0	8.7	2212.1	1989.4
				1.5	13.1	20.7	9.2	1330.4	2163.6			12.1	11.7	3.1	13.8	19.1	8.8	2212.5	1989.0
		7.1	12.7	21.4	16.9	1.0	5.6	1171.8	2192.9					22.0	17.3	0.5	5.1	2062.4	2017.4
	k			21.5	16.9	1.0	5.6	1171.4	2192.9					22.0	17.4	0.5	5.1	2062.4	2017.8
		11.7	11.6	7.0	14.2	15.1	8.0	2001.6	1993.8					22.0	17.5	0.5	5.0	2062.4	2018.6
				7.0	14.0	15.2	8.4	2002.0	1991.4					22.0	17.1	0.5	5.4	2062.4	2015.4
	l	10.8	11.8	4.1	18.0	18.4	4.5	1846.9	2022.6					22.0	17.1	0.5	5.4	2062.4	2015.4
														22.1	17.3	0.4	5.2	2061.6	2017.0

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		α	y	A	B	C	D	α	y			α	y	A	B	C	D	α	y
17	E	12.8	11.6	3.6	13.9	19.0	8.6	2210.1	1990.2	18	g	13.2	13.8	19.0	19.5	3.5	3.0	2265.3	2392.5
				3.8	13.6	18.6	8.9	2207.6	1987.8					19.0	19.5	3.6	3.0	2265.7	2392.5
				3.8	13.7	18.7	9.0	2208.0	1987.8					12.4	13.8	14.0	19.9	8.5	2.6
		11.9	11.7	22.0	17.5	0.5	5.0	2062.4	2018.6		13.5	20.0	9.0	2.5	2130.1	2396.6			
				22.0	17.3	0.5	5.2	2062.4	2017.0		h	16.8	12.6	3.5	12.0	19.0	10.5	2925.7	2154.0
22.1	17.2	0.5	5.3	2062.0	2016.2	3.5	12.0	19.0	10.6	2925.7	2153.6								
18	1	4.5	18.3	10.0	4.5	12.5	18.0	726.0	3168.4	19	i	18.2	15.7	21.0	12.0	1.6	10.5	2786.8	2154.0
				10.0	4.5	12.5	18.0	726.0	3168.4					21.0	12.0	1.5	10.4	2786.4	2154.4
	3.7	18.3	4.9	5.0	17.6	17.5	587.5	3172.2	19.0		16.9	3.4	5.6	3159.9	2729.9				
			4.6	5.0	17.9	17.5	589.9	3172.2	19.0		16.9	3.4	5.6	3159.9	2729.9				
	2	12.8	1.6	3.5	14.6	19.0	8.0	2209.7	205.2		E	9.4	14.3	13.9	17.0	8.6	5.5	3021.9	2730.8
				3.5	14.9	19.0	7.6	2209.7	208.0					13.9	17.0	8.6	5.5	3021.9	2730.8
	12.1	1.6	21.4	15.0	1.1	7.5	2067.2	208.8	15.0		4.5	7.4	18.0	1580.8	2452.4				
			21.4	15.0	1.1	7.5	2067.2	208.8	15.1		4.4	7.4	18.1	1580.4	2451.6				
	3	19.0	20.8	22.4	18.9	22.5	3.6	3311.9	3640.7		14.9	4.6	7.6	17.9	1581.9	2453.2			
				22.5	19.0	22.5	3.5	3311.5	3641.5		15.0	4.5	7.5	18.0	1581.2	2452.4			
				17.0	18.5	5.5	4.0	3176.2	3637.7		14.9	4.5	7.6	18.0	1581.9	2452.4			
	4	19.4	17.3	17.0	18.8	5.5	3.7	3176.2	3640.1		15.0	4.5	7.5	18.0	1581.2	2452.4			
				13.1	4.8	9.1	17.9	3385.1	2991.0		8.5	14.3	9.5	5.0	13.0	17.5	1445.9	2456.2	
				13.0	4.9	9.4	17.6	3386.7	2992.6		9.5		4.9	12.9	17.6	1445.5	2455.5		
	18.6	17.3	7.5	5.0	15.0	17.5	3251.8	2993.2	9.4		4.9		13.0	17.6	1446.3	2455.5			
			7.9	5.0	14.6	17.5	3248.7	2993.2	9.5		5.0	13.0	17.5	1445.9	2456.2				
			5	19.8	12.9	5.0	20.0	17.4	2.5		3450.4	2217.5	9.6	4.9	12.9	17.6	1445.1	2455.5	
	5.0	20.1	17.5			2.4	3450.8	2218.3	9.5		4.9	13.0	17.6	1445.9	2455.5				
	19.1	12.9	22.0	20.5	0.5	2.0	3315.4	2221.6	1		5.6	16.3	9.1	5.0	13.2	17.5	911.4	2814.2	
			22.0	20.1	0.5	2.4	3315.4	2218.4					9.1	4.8	13.3	17.7	911.8	2812.7	
			20.0	1.5	2.5	21.0	288.4	2249.6					10.0	1.5	12.4	21.0	904.6	2786.4	
	a	2.2	13.1	20.0	1.5	2.5	21.1	288.4	2249.2		10.0	1.5	12.5	21.0	905.0	2786.4			
				15.0	2.0	7.6	20.5	149.5	2253.4		2	19.8	19.4	4.1	10.0	18.4	12.5	3458.1	3391.0
				15.0	2.0	7.6	20.5	149.5	2253.4		4.5			10.0	18.0	12.5	3454.9	3391.0	
	b	6.8	9.7	2.0	15.8	20.6	6.7	1148.0	1647.1		5.0	6.9	17.4	15.6	3450.4	3366.4			
				2.0	15.5	20.5	7.0	1147.6	1644.7		5.0	7.0	17.4	15.6	3450.4	3366.8			
				19.2	16.0	3.3	6.4	1010.7	1649.2		3	20.4	15.8	14.0	19.1	8.4	3.4	3557.7	2747.5
	19.1	16.0	3.4	6.5	1011.5	1648.8	14.0	19.0	8.5		3.5			3558.1	2746.7				
	c	7.4	13.4	15.0	7.0	7.5	15.5	1223.2	2293.3		15.0	16.0	7.5	6.5	3550.2	2722.8			
				15.0	7.0	7.4	15.5	1222.8	2293.3		14.9	16.0	7.6	6.5	3550.9	2722.8			
				10.0	7.5	12.4	15.0	1083.6	2297.2		4	20.9	11.6	1.0	13.0	21.5	9.5	3661.8	1982.9
	10.0	7.5	12.5	15.0	1084.0	2297.2	1.0	13.0	21.5		9.5			3661.8	1982.9				
	d	8.3	13.6	17.0	13.5	5.5	9.0	1386.2	2344.9		20.8	11.4	2.1	10.0	20.3	12.4	3652.4	1959.4	
				17.0	13.5	5.5	9.0	1386.2	2344.9		2.1		10.0	20.3	12.5	3652.4	1959.0		
				11.9	14.0	10.6	8.5	1247.8	2348.9		a	3.4	10.9	13.5	22.0	9.0	0.4	519.0	1876.0
	12.0	14.0	10.5	8.5	1247.0	2348.9	13.5	22.0	9.0		0.5			519.0	1875.6				
	e	9.6	10.4	7.0	8.9	15.5	13.6	1644.8	1771.3		3.4	10.8	14.5	19.0	8.0	3.4	511.1	1852.1	
				7.0	9.0	15.5	13.5	1644.8	1772.1		14.5		19.0	8.0	3.5	511.1	1851.7		
				2.0	9.0	20.5	13.4	1505.6	1772.5		b	8.4	7.8	15.0	18.5	7.2	4.0	1400.9	1310.7
	2.0	9.5	20.5	13.0	1505.6	1776.1	15.1	18.5	7.1		4.0			1400.1	1310.7				
	f	9.9	17.2	1.0	3.0	21.5	19.5	1692.6	2977.5		8.3	7.7	16.1	15.5	6.3	7.0	1393.0	1286.8	
				1.0	3.0	21.5	19.6	1692.6	2977.1		16.0		15.6	6.5	6.9	1394.2	1287.6		
				9.2	17.1	18.5	3.0	4.0	19.5		1553.3	2977.3	c	8.6	11.4	9.9	10.0	12.6	12.4
	18.4	3.1	4.0	19.5		1553.7	2977.7	10.0	10.0		12.4	12.5				1441.6	1959.0		

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>
19	c	8.5	11.3	11.0	7.0	11.5	15.5	1434.0	1935.2	19	E	9.7	12.5	5.9	10.4	16.6	12.1	1653.6	2141.2
				11.0	7.0	11.5	15.5	1434.0	1935.2					6.0	10.5	16.5	12.0	1652.8	2142.0
	d	9.4	11.7	12.6	17.0	9.9	5.5	1600.2	2014.8			2.6	5.2	6.0	10.5	16.4	12.0	1652.4	2142.0
				12.8	17.0	9.7	5.4	1598.6	2015.2					6.0	10.5	16.5	12.0	1652.8	2142.0
				13.9	14.0	8.6	8.5	1589.9	1990.9					7.9	2.0	14.6	20.4	384.7	821.8
	e	9.6	13.4	13.5	14.0	9.0	8.5	1593.1	1990.9			2.7	5.1	7.8	2.0	14.7	20.5	385.5	821.4
				9.0	9.5	13.4	13.0	1628.6	2313.1					6.2	1.8	16.2	20.8	397.8	819.4
				9.0	9.4	13.5	13.1	1629.0	2312.3					6.1	2.0	16.4	20.6	399.0	821.0
	f	11.0	15.4	10.5	6.0	12.0	16.5	1617.0	2285.2		2	9.1	6.6	22.2	13.5	0.3	9.0	1523.8	1091.9
				10.0	6.0	12.5	16.5	1621.0	2285.2					22.0	13.5	0.5	9.0	1525.4	1091.9
				22.4	8.1	22.5	14.4	1879.9	2659.9					21.0	13.0	1.6	9.4	1533.8	1088.3
	g	11.1	8.6	22.5	8.0	22.5	14.5	1879.5	2659.1		3	10.7	7.6	21.0	13.0	1.5	9.4	1533.4	1088.3
				1.0	5.0	21.5	17.5	1871.6	2635.2					5.5	12.2	17.0	10.1	1835.8	1261.4
				1.0	5.0	21.5	17.5	1871.6	2635.2					5.5	12.0	17.0	10.5	1835.8	1259.0
	h	14.4	12.3	21.5	14.4	1.0	8.0	1887.2	1457.5		4	13.7	9.8	4.1	12.0	18.3	10.5	1846.5	1259.0
				21.6	14.5	0.9	8.0	1886.4	1457.9					4.1	12.0	18.3	10.4	1846.5	1259.4
				22.5	11.5	22.5	11.0	1879.5	1434.0					3.5	18.9	19.0	3.6	2388.7	1671.9
	i	18.1	11.1	22.5	11.5	22.5	11.0	1879.5	1434.0		5	15.4	1.1	3.5	18.5	19.0	4.0	2388.7	1668.7
				15.0	6.0	7.4	16.5	2475.7	2106.2					2.1	18.5	20.3	4.0	2399.4	1668.7
				15.1	6.0	7.4	16.5	2475.3	2106.2					2.4	18.5	20.1	4.0	2397.4	1668.7
	j	19.3	14.4	16.0	3.0	6.5	19.5	2468.2	2082.3		6	15.9	21.3	13.5	1.5	8.9	21.0	2666.7	101.4
				16.0	3.0	6.6	19.5	2468.6	2082.3					13.5	1.5	9.0	21.0	2667.1	101.4
				21.8	1.5	0.7	21.0	3137.8	1891.4					12.0	1.5	10.3	21.0	2678.2	101.4
	k	19.5	9.7	22.0	1.5	0.5	21.0	3136.2	1891.4		7	16.7	24.7	12.1	1.5	10.4	21.0	2678.2	101.4
				0.5	21.0	22.0	1.5	3128.6	1867.6					2.0	7.0	20.5	15.4	2758.6	3725.6
				0.4	21.0	22.1	1.5	3129.4	1867.6					2.0	7.0	20.5	15.5	2758.6	3725.2
	l	19.7	11.1	18.0	8.0	4.4	14.5	3346.7	2480.1		8	16.9	19.3	1.0	7.0	21.5	15.6	2766.6	3724.8
				18.1	8.0	4.2	14.5	3345.5	2480.1					0.9	6.8	21.6	15.7	2767.4	3723.6
				19.0	5.0	3.5	17.5	3339.3	2456.2					5.5	16.5	17.0	6.0	2909.8	4337.8
	m	20.5	10.3	19.0	5.0	3.5	17.5	3339.3	2456.2		9	19.3	22.9	5.4	16.5	17.1	6.0	2910.6	4337.8
				11.5	18.0	11.0	4.5	3399.0	1664.7					4.8	16.5	17.7	6.0	2915.3	4337.8
				11.5	17.9	11.0	4.6	3399.0	1663.9					4.5	16.5	18.0	6.0	2917.7	4337.8
	E	9.8	12.6	12.5	15.0	10.0	7.3	3391.0	1641.6		a	0.4	16.6	1.1	7.0	21.4	15.4	2944.8	3367.6
				12.5	15.0	10.0	7.5	3391.0	1640.8					1.2	7.0	21.3	15.5	2944.0	3367.2
				5.0	1.5	17.5	21.0	3450.9	1891.4					22.5	7.0	22.4	15.4	2953.1	3367.6
	E	9.8	12.6	5.0	1.5	17.5	21.0	3450.9	1891.4		b	3.1	26.8	22.5	7.0	22.4	15.5	2953.1	3367.2
				6.5	21.0	15.9	1.4	3438.4	1868.0					17.0	22.0	5.5	0.5	3355.2	4023.6
				6.5	21.0	16.0	1.5	3438.8	1867.6					17.0	22.0	5.5	0.5	3355.2	4023.6
	E	9.8	12.6	11.0	7.1	11.5	15.3	3582.0	1757.4		c	5.6	15.5	16.0	21.9	6.4	0.5	3362.8	4023.2
				10.9	7.0	11.6	15.5	3582.8	1756.2					16.0	22.0	6.5	0.5	3363.2	4023.6
				11.5	4.5	10.9	18.0	3577.6	1736.3					14.1	13.8	8.4	8.8	22.7	2883.9
	E	9.8	12.6	11.5	4.0	10.9	18.6	3577.6	1731.9					14.0	13.9	8.4	8.6	22.3	2885.1
				5.0	13.1	17.3	9.1	1660.1	2163.9					13.0	13.5	9.5	9.0	13.9	2881.9
				5.0	13.4	17.3	9.0	1660.1	2165.5					13.0	13.4	9.5	9.1	13.9	2881.1
	E	9.8	12.6	5.0	13.5	17.5	9.0	1660.9	2165.9		b	3.2	26.7	20.0	17.9	2.5	4.6	467.4	4706.9
				5.0	13.5	17.5	9.0	1660.9	2165.9					20.0	18.0	2.5	4.5	467.4	4707.7
				5.0	13.0	17.5	9.5	1660.9	2161.9					19.0	17.8	3.5	4.7	475.3	4706.1
	E	9.8	12.6	5.0	13.0	17.5	9.5	1660.9	2161.9		c	5.6	15.5	19.0	17.9	3.5	4.6	475.3	4706.9
				6.0	10.5	16.5	12.0	1652.8	2142.0					6.1	11.0	16.3	11.5	935.6	2683.0
				6.0	10.4	16.5	12.1	1652.8	2141.2					6.1	11.0	16.4	11.4	936.0	2683.4

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.	
		α	y	A	B	C	D	α	y			α	y	A	B	C	D	α	y
20	c	5.7	15.5	5.0	11.0	17.5	11.5	944.8	2683.0	21	2	7.4	45.3	8.6	5.0	6.5	10.0	415.8	2690.0
				5.0	10.9	17.5	11.6	944.8	2682.2					8.8	5.0	6.3	10.0	415.0	2690.0
	d	5.9	14.6	1.5	13.1	21.0	9.3	972.6	2521.1			7.2	45.0	12.4	1.5	2.7	13.6	400.6	2675.8
				1.2	13.1	21.3	9.3	975.0	2521.1					12.2	1.5	2.8	13.6	401.2	2675.8
		5.9	14.6	0.4	13.0	22.1	9.4	981.4	2520.3		3	18.5	4.9	8.0	14.5	7.1	0.5	1078.2	267.9
				0.3	13.0	22.1	9.4	981.8	2520.3					7.9	14.8	7.1	0.3	1078.4	268.9
	e	8.6	14.9	9.4	20.9	13.1	1.6	1446.7	2582.8			18.3	4.7	10.9	11.9	4.1	3.2	1066.4	257.4
				9.4	20.9	13.1	1.6	1446.7	2582.8					11.0	11.5	4.0	3.6	1066.0	255.8
		8.6	14.9	8.4	20.6	14.1	1.9	1454.7	2580.4		4	37.8	8.2	2.5	3.5	12.6	11.6	2240.1	463.9
				8.4	20.5	14.1	2.0	1454.7	2579.6					2.5	3.6	12.5	11.4	2239.9	464.5
	f	9.6	15.4	9.8	7.2	12.7	15.2	1622.5	2653.2			37.6	8.1	5.5	0.9	9.6	14.1	2228.2	453.6
				9.8	7.4	12.7	15.1	1622.5	2654.4					5.5	0.5	9.5	14.5	2228.0	452.0
		9.6	15.4	8.5	7.0	14.0	15.5	1632.9	2651.2		5	43.2	10.8	11.0	11.9	4.0	3.1	2566.1	617.5
				8.5	7.0	14.0	15.4	1632.9	2651.6					11.1	11.5	4.0	3.5	2565.9	615.9
	g	10.1	11.7	21.1	15.0	1.4	7.5	1711.6	1998.8			43.1	10.5	14.4	8.9	0.6	6.1	2552.4	605.6
				21.4	15.0	1.1	7.5	1709.2	1998.8					14.1	8.9	0.9	6.1	2553.6	605.6
		10.2	11.7	20.1	14.6	2.4	7.9	1719.6	1995.7		6	52.9	17.1	0.5	1.0	14.5	14.0	3147.9	994.1
				20.1	14.8	2.4	7.7	1719.6	1997.3					0.5	0.8	14.6	14.3	3148.1	993.1
	h	10.7	11.8	5.0	19.0	17.5	3.4	1839.8	2031.1			52.8	16.8	4.0	12.5	11.0	2.5	3134.0	980.0
				5.0	19.0	17.5	3.4	1839.8	2031.1					3.8	12.5	11.3	2.5	3135.0	980.0
		10.8	11.8	3.9	18.8	18.6	3.7	1848.5	2029.1		a	14.0	40.1	15.0	0.5	15.0	14.5	810.0	2372.1
				3.9	19.0	18.6	3.5	1848.5	2030.7					15.0	0.5	15.0	14.5	810.0	2372.1
	i	11.5	12.6	11.1	15.5	11.4	7.0	1970.2	2181.8			13.7	39.7	3.6	12.0	11.5	3.0	795.8	2358.0
				11.1	15.5	11.3	7.0	1969.8	2181.8					3.5	12.0	11.5	3.0	796.0	2358.0
		11.5	12.6	10.0	15.0	12.5	7.4	1979.0	2178.2		b	27.8	35.4	2.1	5.9	13.0	9.2	1641.7	2093.4
				10.0	15.1	12.4	7.3	1978.6	2179.0					2.1	6.0	12.9	9.1	1641.5	2093.8
	j	13.1	12.4	21.8	10.9	0.8	11.6	2243.4	2145.2			27.6	35.2	5.6	2.5	9.4	12.6	1627.6	2079.8
				21.6	11.0	0.9	11.5	2244.6	2146.0					5.8	2.5	9.2	12.6	1626.8	2079.8
		13.2	12.5	20.5	10.8	2.0	11.8	2253.4	2144.0		c	28.7	36.8	5.0	12.5	10.1	2.6	1690.1	2179.7
				20.5	10.8	2.0	11.8	2253.4	2144.0					5.0	12.5	10.0	2.6	1690.0	2179.7
	k	13.1	13.7	21.9	15.0	0.6	7.4	2242.2	2357.2			28.4	36.6	8.5	9.0	6.5	6.0	1676.0	2166.0
				21.9	15.0	0.7	7.4	2242.6	2357.2					8.5	9.0	6.6	6.0	1676.2	2166.0
		13.2	13.7	20.6	15.0	1.9	7.4	2252.6	2357.2		d	29.8	35.6	2.9	9.0	12.1	6.0	1758.3	2106.0
				21.0	15.0	1.5	7.5	2249.4	2356.8					3.0	9.0	12.0	6.1	1757.9	2105.8
	E	11.0	12.5	22.5	10.8	22.5	11.7	1879.5	2144.4			29.6	35.4	6.2	5.5	8.8	9.5	1745.2	2092.0
				22.5	10.9	22.4	11.6	1879.1	2145.2					6.1	5.5	8.9	9.6	1745.6	2091.8
				22.5	11.0	22.5	11.5	1879.5	2146.0		e	30.3	32.8	11.0	12.9	4.0	2.1	1786.1	1941.5
				22.5	10.9	22.4	11.6	1879.1	2145.2					11.0	13.0	4.0	2.1	1786.1	1941.7
				22.5	10.9	22.4	11.6	1879.1	2145.2			30.1	32.7	14.5	9.5	0.5	5.5	1772.0	1928.0
				22.5	11.0	22.4	11.5	1879.1	2146.0					14.6	9.5	0.4	5.6	1771.6	1927.8
				21.4	10.9	1.1	11.6	1888.2	2145.2		f	30.3	36.9	9.9	14.8	5.1	0.3	1790.4	2188.9
				21.5	10.9	1.0	11.5	1887.4	2145.6					9.8	14.8	5.2	0.3	1790.8	2188.9
				21.5	11.0	1.0	11.4	1887.4	2146.4			30.2	36.7	13.0	11.5	2.0	3.6	1778.0	2175.8
				21.4	10.9	1.1	11.6	1888.2	2145.2					13.1	11.5	2.0	3.5	1777.8	2176.0
21	1	1.9	44.4	21.5	10.9	1.0	11.7	1887.4	2144.8		g	38.3	33.3	10.9	5.0	4.2	10.1	2266.7	1969.9
				21.4	11.0	1.1	11.5	1888.2	2146.0					10.9	5.0	4.1	10.1	2266.5	1969.9
				14.1	1.9	0.9	13.1	2253.6	1957.6					14.4	1.5	0.6	13.5	2252.4	1956.0
				10.2	5.0	4.9	10.0	2449.5	2030.0		h	41.3	34.4	10.2	5.0	4.9	10.0	2449.5	2030.0
				10.5	5.0	4.6	10.0	2448.3	2030.0					10.5	5.0	4.6	10.0	2448.3	2030.0

Plate.	Star.	Estimates.		Scale readings.				Uncorrected.		Plate.	Star.	Estimates.		Scale readings.				Uncorrected.					
		<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>			<i>x</i>	<i>y</i>	A	B	C	D	<i>x</i>	<i>y</i>				
21	h	41.1	34.1	13.8	1.9	1.2	13.1	2434.8	2017.6	21				10.5	7.0	4.7	8.1	1668.5	2157.8				
				13.9	1.5	1.1	13.5	2434.4	2016.0					10.5	7.0	4.6	8.1	1668.3	2157.8				
	i	42.1	23.2	14.8	3.5	0.2	11.6	2490.9	1363.9					10.4	7.0	4.7	8.0	1668.7	2158.0				
				14.8	3.2	0.2	11.8	2490.9	1362.9					10.5	7.0	4.6	8.0	1668.3	2158.0				
		41.7	23.1	3.5	0.2	11.6	14.8	2476.2	1350.8					10.5	7.0	4.5	8.0	1668.1	2158.0				
				3.1	0.2	11.9	14.8	2477.6	1350.8					28.1	36.3	14.0	3.5	1.0	11.5	1654.0	2144.0		
	j	44.3	23.7	11.5	9.6	3.5	5.5	2624.1	1388.2					14.0	3.6	1.1	11.5	1654.2	2144.2				
				11.6	9.6	3.4	5.5	2623.7	1388.2					14.0	3.6	1.0	11.5	1654.0	2144.2				
		44.0	23.4	14.9	6.9	0.1	8.2	2610.4	1377.4					14.0	3.7	1.1	11.4	1654.2	2144.6				
				14.8	6.5	0.2	8.5	2610.8	1376.0					14.0	3.6	1.0	11.5	1654.0	2144.2				
	k	46.6	26.1	6.5	0.3	8.5	14.8	2764.0	1531.1					E	29.3	35.9	13.9	3.5	1.1	11.5	1654.4	2144.0	
				6.6	15.1	8.4	15.0	2763.6	1530.2								12.0	14.5	3.0	0.6	1722.1	2127.7	
	10.0	12.2	5.0	2.9	2750.0	1518.6	11.9	14.5	3.1								0.6	1722.5	2127.7				
	10.0	12.5	5.0	2.6	2750.0	1519.8	12.0	14.5	3.1								0.5	1722.3	2127.9				
	12.5	1.1	2.5	13.9	3040.1	1474.5	11.9	14.4	3.1								0.6	1722.5	2127.5				
	12.8	1.5	2.2	13.7	3038.9	1475.7	12.0	14.5	3.1								0.6	1722.3	2127.7				
		50.9	24.9	1.0	13.5	14.0	1.5	3026.0	1464.0							28.9	35.7	12.0	14.4	3.0	0.6	1722.1	2127.5
				1.0	13.4	14.0	1.6	3026.0	1463.6									0.5	11.0	14.7	4.0	1708.4	2114.0
	m	51.4	28.7	9.5	10.0	5.5	5.0	3052.0	1690.0									0.5	11.0	14.6	4.1	1708.2	2113.8
				9.5	10.0	5.5	5.0	3052.0	1690.0									0.5	11.0	14.5	4.0	1708.0	2114.0
		51.2	28.4	13.0	7.1	2.0	7.9	3038.0	1678.4									0.5	11.0	14.6	4.0	1708.2	2114.0
				13.0	7.0	2.0	8.0	3038.0	1678.0									0.5	11.0	14.6	4.0	1708.2	2114.0
	E	28.4	36.5	10.5	7.0	4.6	8.0	1668.3	2158.0									0.6	11.0	14.5	4.0	1707.8	2114.0

REMARKS ON TABLES III AND IV.

Plate 2, star 8, enlargement 1. The computed values of D are 13.0, 13.1. The star was not used as a standard.

Plate 2, star 10, enlargement 1. The computed values of B are 1.5, 0.6. In enlargement 2, the image was faint and was measured with difficulty. The star was not used as a standard.

Plate 2, star 12, enlargement 1. The computed values of A are 19.4, 18.3. The star was not used as a standard.

Plate 2, star *a*, enlargement 1. The value of *x* is derived exclusively from the first and third lines, since the second reading was made from the wrong square, as appears from the fact that an estimate made at the time of that reading was 0.1. The first estimate was confirmed by a third, made when the third measurement was undertaken.

Plate 2, Eros. The first series of measurements, six on each enlargement, relates to the centre of the image as a whole; the second series relates to the centre of its brightest part.

Plate 3, star 7, enlargement 1. As the image was nearly on a line of the reticule, as shown by the estimate in *y*, the two readings of B and D, in successive lines, are from different squares. In other similar cases, men-

tioned in the description of Table IV, the readings of A and C, or of B and D, are practically the same numerically, but are measured in opposite directions.

Plate 3, star *a*, enlargement 1. Line C beyond edge of enlargement; values, 15.5 and 15.4 assumed.

Plate 3, star *f*. The first measure of the first enlargement should be B = 3.9, D = 16.5, and *y* = -50.0. The values of *x* and *y* in Table III were derived exclusively from the second enlargement.

Plate 3, star *k*, enlargement 2. The estimate in *y* was at first erroneously recorded as 60.6. On examining the enlargement again, it appeared that the true reading was 16.6.

Plate 4, star 1. Computed values of C, 7.7, 7.5, 13.0, 13.0. The star was not used as a standard.

Plate 5, star 3, enlargement 2. The second reading of D was first recorded 10.6; it was again examined and changed to 15.6.

Plate 5, star *e*. The measures of the first enlargement should be B = 11.5, D = 9.0, as shown by new measures B = 12.0, D = 8.6 from which *y* = 3436.5.

Plate 6, star *c*, enlargement 2. Measurements in D doubtful, as that line of the reticule was defective. This star

- was measured by mistake for a standard star which had been intended for measurement.
- Plate 7, Eros, enlargement 1. In the last two readings, C was originally recorded as 30.6; on another examination, this was changed to 13.6.
- Plate 8, Eros, enlargement 2. An estimate in y , 10.10, was corrected by other trials to 10.8.
- Plate 9, star 5, enlargement 1. The computed values of B are 12.5, 12.5. The star was not used as a standard.
- Plate 9, star b , enlargement 1. Edge of image measured; the centre was concealed by the image of Eros.
- Plate 9, Eros. The four series of measurements relate to the four corners of a rectangular image.
- Plate 10, star d , enlargement 2. The lines of the square were very faint.
- Plate 10, star f , enlargement 1. The estimate of x first recorded was 32.5; it was changed by another examination to 33.5.
- Plate 10, star h , enlargement 1. The estimate of y first recorded was 28.3; it was changed by another examination to 29.3. In enlargement 2, the estimate of x first recorded was 34.5; it was changed by another examination to 35.5.
- Plate 10, Eros. The two series of measurements relate to the ends of the image.
- Plate 11, star 6, enlargement 1. The estimate of y was finally determined as 56.2 after other estimates of 55.1 and 58.1 had been made. In enlargement 2, the estimate of x first recorded was 35.6; it was changed by another examination to 38.6.
- Plate 12, star 9, enlargement 1. The estimate of y first recorded was 14.6; it was changed by another examination to 4.6.
- Plate 12, star a . Very faint. Measured only in enlargement 2.
- Plate 12, Eros. The second series of measurements, three in each enlargement, relates to the same point as the first series, and was combined with it in the reduction.
- Plate 13, star h , enlargement 1. The estimate of x first recorded was 10.4; it was changed by another examination to 19.4.
- Plate 14, star d , enlargement 2. The second reading of C was first recorded as 15.0; it was changed by another examination to 12.9.
- Plate 14, Eros, enlargement 1. The sixth readings of B and D were first recorded as 3.9 and 17.9; they were changed by another examination to 4.5 and 18.0.
- Plate 17, star 5, enlargement 1. The second reading of B was first recorded as 13.9; it was changed by another examination to 17.9.
- Plate 17, star p , second measure rejected.
- Plate 17, Eros. The second series of measurements, three in each enlargement, relates to the same point as the first series, and was combined with it in the reduction.
- Plate 18, star e , enlargement 2. The second readings of B and D were first recorded as 9.0 and 14.4; they were changed by another examination to 9.5 and 13.0.
- Plate 18, star g , enlargement 2. The first reading of D was first recorded as 9.6; it was changed by another examination to 2.6.
- Plate 18, Eros. Very faint on both enlargements.
- Plate 20, star 5, enlargement 2. The first reading of C was first recorded as 10.0; it was changed by another examination to 10.3.
- Plate 20, Eros, enlargement 1. The fourth reading of B was first recorded as 7.9; it was changed by another examination to 10.9.
- Plate 21, Eros. The two series of measurements relate to the ends of an elongated image.

We have next to adjust the results of Table IV to the computed rectangular coördinates of the standard stars in the seventh column of Table II. The large apparent differences between the two sets of values for these standard stars are due to the fact that the origin of the measurements on the enlargements was at one corner of the plate instead of near its centre. Moreover, as already mentioned, the enlargements place Eros near the centre, while its position on any negative is of course purely casual.

Turner's formula for the required adjustment, in the Monthly Notices of the Royal Astronomical Society, Volume LIV, page 15, is as follows:—

$$\kappa \xi = (1 + a)x + \beta y + \gamma \qquad \kappa \eta = \delta x + (1 + \epsilon)y + \zeta,$$

in which ξ and η correspond to computed, x and y , to observed values. The notation employed in the following paragraphs is

$$0 = x - X + ax + by + c \qquad 0 = y - Y + a'y + b'x + c'$$

and, at the outset of the work, c and c' are eliminated by the process of taking residuals, leaving only a , b , a' , and b' to appear in the normal equations to be subsequently formed.

The means and residuals of the first terms of the second members of the equations last mentioned appear in Table V. The first column designates the plate, as previously. In the second column the letter M denotes the mean result from all the standard stars, which are indicated in the same column by their numbers from Table II. The next four columns give the mean value of the differences $x - X$ and $y - Y$ for each enlargement, followed by the corresponding residuals for each star. Thus, the second line of Table V has +9.8 in the third column, showing that the corresponding value of $x - X$ was +12150".4. This difference was formed as follows: the mean of the two results in x from the first enlargement, D 6441, for star No. 1, is +10".3, as appears from Table IV. From this we subtract -12140".1, found in the first line of the seventh column in Table II. The other values of $x - X$ for Plate 1 were similarly formed, and their mean was found to be +12140".6, given in the first line of Table V.

The last two columns of Table V give the corresponding residuals for the two enlargements, after the adjustment of the observed to the computed values of x and y for the standard stars has been completed.

TABLE V.
MEANS AND RESIDUALS OF DIFFERENCES IN X AND Y.

Plate.	Star.	Enlargement I.		Enlargement II.		Corrected Residuals.			
		x	y	x	y	x	y	x	y
1	M	+12140.6	+16704.2	+12104.5	+16695.5	"	"	"	"
	1	+ 9.8	+ 1.9	+ 9.6	+ 1.7	-0.1	+0.5	-0.2	+0.6
	2	+ 7.6	- 0.7	+ 8.6	- 0.7	-0.2	+0.5	+1.0	+0.6
	3	+ 3.1	- 8.0	+ 3.5	- 7.3	-1.0	-0.7	-0.3	-0.6
	4	+ 0.6	- 5.9	- 1.5	- 5.6	+2.1	+0.6	+0.1	+0.3
	5	- 4.1	- 2.6	- 5.2	- 2.7	-0.5	-2.2	-1.7	-2.4
	6	- 0.3	+ 5.0	- 3.6	+ 5.7	+1.5	-0.7	-2.1	+0.5
	7	- 3.1	+ 4.3	- 0.8	+ 1.7	-0.4	-0.2	+1.5	-2.4
	8	- 4.7	+ 2.7	- 3.3	+ 2.8	+0.4	+0.1	+1.6	+0.4
	9	- 9.2	+ 3.6	- 7.0	+ 4.3	-1.7	+2.1	+0.2	+2.8
2	M	- 7399.2	+16488.0	- 7250.8	+16522.1	"	"	"	"
	1	+ 14.6	+ 25.4	+ 12.3	+ 23.7	+1.2	-0.1	-0.1	-0.2
	2	- 8.6	+ 23.5	- 7.9	+ 21.7	-0.6	-0.5	-0.7	-1.0
	3	+ 1.9	+ 15.2	+ 2.9	+ 16.5	+0.4	-2.1	+1.3	+0.3
	4	+ 4.5	+ 13.7	+ 4.9	+ 10.7	-3.1	+3.7	-2.1	+1.4

Plate.	Star.	Enlargement I.		Enlargement II.		Corrected Residuals.							
		<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>				
2	5	+ "	11.3	+ "	4.8	+ "	10.9	+ "	4.3	- 1.5	+ 2.2	- 0.7	+ 2.0
	6	+ "	8.2	- "	18.1	+ "	7.1	- "	16.3	+ 1.6	- 3.8	+ 1.1	- 2.9
	7	- "	2.4	- "	13.9	- "	3.1	- "	13.0	+ 2.9	- 0.6	+ 1.9	- 0.6
	9	- "	14.6	- "	23.0	- "	13.6	- "	24.0	- 1.0	+ 1.8	- 1.1	- 0.9
	11	- "	14.8	- "	27.7	- "	13.3	- "	23.8	- 0.2	- 0.3	+ 0.2	+ 1.8
3	M	+ 12887.2	- 1388.7	+ 12742.3	- 1364.4	..	..	..	..	..	..	..	..
	1	+ "	2.9	- "	2.0	+ "	1.5	- "	4.8	- 1.2	- 0.9	- 0.9	- 0.6
	2	+ "	7.4	+ "	3.0	+ "	6.7	+ "	0.9	+ 1.7	+ 0.9	+ 0.8	+ 0.9
	3	+ "	2.1	+ "	3.3	+ "	4.7	+ "	3.2	- 0.6	- 0.7	- 0.1	- 1.6
	4	+ "	1.7	+ "	4.4	+ "	4.1	+ "	6.9	- 0.2	+ 0.2	- 0.3	+ 1.2
	5	- "	3.1	- "	2.2	- "	3.0	- "	2.5	0.0	+ 0.2	+ 0.9	- 0.3
	6	- "	5.7	- "	1.7	- "	6.7	- "	0.8	- 0.2	+ 1.7	- 0.2	+ 1.6
	7	- "	5.5	- "	5.0	- "	7.1	- "	3.2	+ 0.6	- 1.6	- 0.2	- 1.2
4	M	+ 16040.7	- 1125.8	+ 15919.0	- 1321.2	..	..	..	..	..	..	..	..
	2	- "	10.7	- "	13.8	- "	8.3	- "	16.9	+ 1.0	+ 2.7	+ 2.6	+ 1.1
	3	- "	13.2	- "	10.5	- "	12.8	- "	10.0	- 0.9	0.0	- 0.9	+ 1.7
	4	+ "	24.8	- "	9.2	+ "	25.2	- "	9.7	+ 1.9	- 0.6	+ 1.2	- 1.9
	5	- "	9.3	- "	11.6	- "	10.8	- "	10.1	- 1.8	- 3.4	- 3.6	- 1.1
	6	+ "	21.8	- "	5.0	+ "	23.7	- "	4.2	- 1.6	+ 0.2	- 0.4	- 0.2
	7	- "	17.9	+ "	24.3	- "	19.8	+ "	21.8	+ 1.1	+ 0.6	+ 1.3	- 1.8
	8	+ "	4.2	+ "	25.6	+ "	2.5	+ "	29.4	+ 0.2	+ 0.1	+ 0.2	+ 2.5
5	M	- 8878.3	- 2966.7	- 8706.1	- 2998.2	..	..	..	..	..	..	..	..
	1	+ "	10.9	+ "	0.1	+ "	9.4	- "	0.3	- 0.1	+ 0.1	+ 0.5	- 0.5
	2	- "	7.2	+ "	8.2	- "	7.6	+ "	5.7	+ 0.1	0.0	- 0.4	+ 0.5
	3	+ "	4.3	- "	6.8	+ "	3.5	- "	3.4	+ 0.4	- 0.1	- 0.6	+ 0.8
	4	- "	8.0	- "	1.6	- "	5.3	- "	2.0	- 0.3	+ 0.1	+ 0.7	- 0.9
6	M	+ 12400.0	+ 3017.4	+ 12355.4	+ 3042.7	..	..	..	..	..	..	..	..
	1	+ "	11.1	- "	26.4	+ "	11.6	- "	24.2	- 1.1	- 0.6	- 0.6	- 0.6
	2	- "	1.2	- "	13.4	- "	4.1	- "	14.9	+ 1.9	+ 1.5	+ 0.1	+ 0.6
	3	- "	8.9	+ "	5.0	- "	7.2	+ "	4.8	- 2.5	- 1.5	- 0.4	- 0.5
	4	- "	1.0	+ "	35.0	- "	0.1	+ "	34.2	+ 1.6	+ 0.6	+ 0.9	+ 0.2
7	M	- 8432.7	- 8507.0	- 8338.4	- 8478.6	..	..	..	..	..	..	..	..
	1	+ "	6.1	+ "	0.9	+ "	4.4	+ "	3.3	+ 2.1	- 2.0	+ 0.4	+ 0.6
	2	+ "	4.9	- "	0.8	+ "	5.1	- "	4.1	- 0.1	+ 0.8	+ 0.7	- 0.8
	3	- "	1.9	+ "	5.1	- "	0.6	+ "	5.8	- 1.1	+ 1.2	- 0.4	+ 0.6
	4	- "	0.6	- "	2.9	- "	0.1	- "	3.3	- 1.3	- 0.3	- 0.7	+ 0.2
	5	- "	2.5	+ "	2.6	- "	1.2	+ "	2.1	- 0.7	+ 0.4	0.0	- 1.3
	6	- "	2.6	- "	0.9	- "	3.7	- "	1.2	- 0.5	+ 1.5	- 1.7	+ 1.3
	7	- "	3.7	- "	4.3	- "	3.6	- "	2.5	+ 1.8	- 1.7	+ 1.5	- 0.5
8	M	+ 2869.7	+ 17457.2	+ 2842.9	+ 17457.5	..	..	..	..	..	..	..	..
	1	+ "	1.1	- "	5.9	- "	3.7	- "	5.8	+ 1.8	+ 0.7	- 2.5	+ 1.6
	2	+ "	9.5	+ "	1.6	+ "	10.2	- "	2.4	+ 0.3	+ 3.2	+ 0.3	+ 0.4
	3	- "	1.8	- "	4.3	- "	0.9	- "	4.6	+ 0.3	- 0.4	+ 1.7	- 0.6
	4	- "	6.0	- "	3.7	- "	3.8	- "	4.6	- 1.9	+ 0.2	+ 1.0	- 0.8
	5	+ "	3.8	- "	6.3	+ "	5.7	- "	2.8	- 1.2	- 5.7	+ 0.5	- 1.6

Plate.	Star.	Enlargement I.		Enlargement II.		Corrected Residuals.			
		<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>
8	6	- " 2.6	+ " 7.7	- " 2.8	+ " 6.4	-0.3	+2.9	-0.4	+0.7
	7	- 3.8	+ 10.8	- 4.7	+ 13.6	+0.8	-0.7	0.0	+0.3
9	M	+ 5800.3	- 9547.4	+ 5827.4	- 9559.1	..	..	..	..
	1	+ 3.7	- 4.2	+ 4.5	- 4.9	0.0	-0.4	+0.3	-0.9
	2	+ 3.1	0.0	+ 3.3	+ 0.1	-0.1	+0.1	-0.4	0.0
	3	+ 1.1	- 1.0	+ 0.9	- 0.9	-1.0	-0.5	-1.5	-0.5
	4	+ 6.0	+ 4.8	+ 7.2	+ 5.2	+1.5	+1.0	+1.3	+0.7
	6	+ 0.8	- 0.5	+ 1.5	+ 1.0	+0.5	-0.2	+1.1	+1.3
	7	+ 1.0	+ 3.9	+ 1.6	+ 4.3	-1.0	-0.9	-0.7	-1.2
	8	- 2.0	+ 1.2	- 3.5	+ 0.1	+1.2	+0.8	+0.3	-0.4
	9	- 5.7	+ 0.7	- 6.9	- 2.1	+0.5	+3.2	+0.3	+0.8
	10	- 7.8	- 5.1	- 8.4	- 3.1	-0.9	-3.0	-0.2	-0.7
10	M	+ 6641.8	- 3281.8	+ 6693.1	- 3330.9	..	..	..	..
	1	+ 8.7	+ 21.8	+ 5.4	+ 23.0	-2.3	+2.7	-3.9	+2.6
	2	- 12.7	+ 9.5	- 12.6	+ 10.0	-1.1	-1.6	-0.4	-1.1
	3	- 4.3	+ 8.2	- 3.7	+ 7.5	+1.4	+0.2	+2.4	-0.5
	4	+ 10.4	+ 5.9	+ 10.6	+ 6.7	+1.0	-1.9	+2.1	-1.8
	5	- 4.9	- 3.7	- 5.8	- 3.7	+0.9	-0.1	-0.3	+0.4
	6	+ 10.4	- 15.7	+ 12.0	- 15.6	+0.5	-1.3	+1.4	-0.9
	7	- 7.4	- 26.3	- 5.7	- 28.0	-1.0	+1.6	-1.4	+1.5
11	M	+ 1051.4	+10982.9	+ 1078.0	+10987.1	..	..	..	..
	1	- 15.6	- 4.3	- 12.1	- 8.0	-1.1	+0.5	0.0	+0.3
	2	- 2.3	+ 6.4	- 5.0	+ 6.5	+0.1	-1.0	-1.4	-0.4
	3	+ 1.9	+ 4.2	+ 0.9	+ 5.9	-0.5	-1.0	-0.2	+0.1
	4	+ 1.8	- 1.2	+ 1.4	- 1.4	+2.9	+0.3	+2.1	+0.4
	5	+ 2.8	+ 5.8	+ 1.8	+ 5.9	-0.8	+0.2	-0.3	-0.4
	6	+ 4.8	+ 6.4	+ 4.1	+ 6.1	+0.5	+1.3	+1.2	+0.1
	7	+ 1.7	- 13.5	+ 3.2	- 13.3	+0.4	-0.7	-0.5	-0.5
12	8	+ 5.1	- 3.6	+ 6.1	- 1.5	-1.9	+0.3	-0.9	+0.8
	M	- 9102.0	+15754.1	- 8988.2	+15701.4	..	..	..	..
	1	+ 16.5	- 8.9	+ 16.1	- 6.2	-1.5	-0.8	+0.3	+0.2
	2	- 8.4	- 9.9	- 7.3	- 10.8	+1.2	+1.2	+0.3	-0.3
	3	+ 25.8	+ 0.5	+ 20.2	+ 1.5	+1.5	-1.1	-0.6	-1.1
	4	- 12.4	- 9.3	- 10.7	- 6.3	+1.8	-3.1	+1.1	0.0
	5	- 14.4	- 3.8	- 13.0	- 3.4	-2.3	+1.1	-2.9	+1.6
	6	- 0.2	+ 2.1	+ 0.9	- 0.1	+0.2	+2.6	+1.1	+0.5
	7	- 16.3	- 3.2	- 12.1	- 5.3	-2.5	+0.9	-0.6	-0.8
	8	- 12.2	- 2.8	- 10.8	- 3.4	+1.7	+0.2	+1.0	+0.1
	9	+ 16.5	+ 13.0	+ 14.0	+ 13.8	-0.8	-1.0	-0.3	+0.5
13	10	+ 11.9	+ 16.2	+ 9.3	+ 13.6	+1.5	+2.5	+0.9	+0.8
	11	- 7.1	+ 6.3	- 6.2	+ 6.3	-0.7	-2.6	-0.4	-1.3
	M	+ 208.5	-11913.5	+ 58.4	-11835.5	..	..	..	..
	1	+ 1.3	- 25.7	+ 0.3	- 31.6	+0.1	-1.4	+1.5	-1.9
	2	+ 3.0	- 23.2	+ 0.4	- 28.7	+0.1	-0.4	-1.3	-0.7
	3	+ 2.8	- 15.3	+ 1.8	- 18.1	+0.6	+1.6	+0.5	+2.7

Plate.	Star.	Enlargement I.		Enlargement II.		Corrected Residuals.			
		<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>	<i>x</i>	<i>y</i>
13	4	— 5.4	— 4.8	— 8.3	— 5.7	— 2.2	0.0	— 2.4	— 0.3
	5	— 3.6	+ 19.9	— 4.5	+ 24.1	+ 1.4	+ 0.3	+ 1.4	— 0.3
	6	— 5.3	+ 19.2	— 6.0	+ 24.8	+ 0.1	— 0.1	+ 0.6	+ 0.7
	7	+ 7.4	+ 30.0	+ 16.3	+ 35.5	— 0.1	— 0.1	+ 0.4	— 0.4
14	M	— 5672.2	— 10479.0	— 5660.7	— 10501.0	..	..	..	..
	1	+ 9.6	— 2.2	+ 6.0	— 0.1	+ 1.3	— 1.8	— 0.3	— 0.5
	2	+ 7.8	+ 1.0	+ 7.8	— 0.7	— 0.8	+ 1.7	+ 1.2	— 0.8
	3	— 5.2	+ 7.7	— 4.7	+ 5.8	— 1.7	+ 0.2	— 1.1	— 1.1
	4	— 2.9	+ 7.2	— 2.4	+ 8.1	+ 2.3	+ 0.3	+ 2.2	+ 2.0
	5	— 3.6	+ 4.7	— 3.2	+ 4.8	— 0.7	+ 0.4	— 0.5	+ 0.8
	6	— 0.9	— 3.5	— 2.1	— 1.4	— 0.3	— 0.5	— 2.0	+ 1.4
	7	— 6.7	— 1.1	— 6.7	— 2.8	— 1.2	— 1.0	— 2.6	— 2.4
	8	— 3.0	— 3.4	+ 1.1	— 5.1	+ 1.0	+ 0.7	+ 3.6	— 0.9
	9	+ 4.5	— 10.3	+ 4.4	— 8.9	— 0.1	+ 0.3	— 0.3	+ 0.8
15	M	— 4700.1	+ 13278.6	— 4711.3	+ 13231.8	..	..	..	..
	1	+ 7.1	— 12.1	+ 6.8	— 11.5	+ 1.6	+ 0.9	+ 1.7	+ 0.6
	2	— 6.4	— 17.2	— 5.3	— 14.5	0.0	— 0.9	+ 0.4	+ 0.5
	3	+ 16.2	— 1.7	+ 15.5	— 2.5	— 0.4	— 0.3	+ 0.1	— 1.0
	4	+ 11.8	+ 8.8	+ 9.3	+ 7.9	— 1.5	— 0.3	— 2.8	— 0.3
	5	— 22.7	— 3.2	— 20.6	— 4.2	— 0.4	+ 1.6	0.0	0.0
	6	— 11.8	+ 0.8	— 12.2	+ 1.8	— 1.2	— 2.0	— 2.2	— 0.8
	7	+ 6.1	+ 24.7	+ 6.3	+ 22.9	+ 2.0	+ 0.7	+ 2.9	+ 0.9
	M	+ 9643.5	+ 6106.4	+ 9679.3	+ 6092.3	..	..	..	..
	1	+ 1.1	— 14.5	— 1.0	— 16.8	— 0.7	+ 1.7	— 1.8	+ 0.5
16	2	+ 8.6	— 11.8	+ 9.4	— 13.4	— 0.3	0.0	+ 0.9	— 0.9
	3	— 3.5	— 18.2	— 5.3	— 15.7	+ 1.5	— 3.1	+ 1.0	+ 0.3
	4	— 17.2	— 11.0	— 17.9	— 12.8	— 0.9	+ 1.1	0.0	0.0
	5	+ 1.0	+ 13.9	+ 1.0	+ 12.8	— 1.1	+ 1.3	— 2.1	— 0.6
	6	+ 6.6	+ 16.7	+ 9.0	+ 20.6	+ 0.7	— 1.2	+ 1.7	+ 1.5
	7	+ 3.1	+ 24.8	+ 4.8	+ 25.5	+ 1.0	+ 0.3	+ 1.0	— 0.5
	M	+ 12892.9	+ 11094.3	+ 12735.0	+ 11121.9	..	..	..	..
	1	+ 33.2	— 2.5	+ 36.6	— 3.4	+ 0.4	— 0.2	0.0	+ 0.1
	2	— 13.3	— 8.6	— 16.7	— 6.1	+ 1.2	— 0.3	+ 0.5	+ 1.6
	3	— 9.4	— 2.8	— 10.1	— 5.1	— 2.3	+ 1.2	— 1.7	— 1.5
17	4	+ 2.4	— 0.2	+ 3.6	— 0.2	+ 0.5	— 1.2	+ 1.3	— 1.2
	5	— 12.9	+ 14.0	— 13.3	+ 14.8	+ 0.4	+ 0.5	+ 0.1	+ 0.8
	M	— 13666.0	— 6391.4	— 13803.3	— 6389.9	..	..	..	..
	1	— 5.7	— 35.9	— 5.7	— 33.6	— 0.5	— 0.9	— 0.1	— 0.5
	2	+ 44.6	+ 3.4	+ 39.4	+ 4.1	0.0	+ 1.1	— 0.8	+ 0.4
	3	— 27.1	+ 10.3	— 25.3	+ 6.6	— 1.0	+ 3.5	— 2.2	+ 1.2
	4	— 12.9	+ 11.4	— 11.3	+ 11.3	+ 1.1	+ 0.7	+ 0.8	+ 1.8
	5	+ 1.0	+ 10.9	+ 3.1	+ 11.5	+ 0.5	+ 4.0	+ 2.2	— 2.6
	M	+ 343.3	+ 11059.1	+ 335.9	+ 11034.3	..	..	..	..
	1	+ 9.5	— 6.9	+ 10.1	— 9.1	+ 0.1	0.0	0.0	— 0.1
19	2	— 7.4	+ 1.9	— 6.1	+ 2.3	+ 0.6	+ 0.5	+ 0.4	+ 0.6

Plate.	Star.	Enlargement I.		Enlargement II.		Corrected Residuals.			
		x	y	x	y	x	y	x	y
19	3	— " 4.6	+ " 1.4	— " 4.5	+ " 1.9	— 1.1	— 0.8	— 0.9	— 1.1
	4	+ 2.5	+ 3.7	+ 0.5	+ 4.8	+ 0.6	+ 0.4	+ 0.5	+ 0.5
20	M	+ 11610.4	— 1980.8	+ 11619.9	— 1981.8	..	..	..	..
	1	+ 6.4	+ 9.1	+ 10.2	+ 8.7	+ 0.2	+ 0.1	+ 1.4	+ 1.1
	2	+ 2.9	+ 5.9	+ 2.4	+ 3.3	+ 0.5	+ 0.1	— 1.5	— 1.9
	3	+ 2.2	+ 2.7	+ 3.4	+ 2.7	+ 0.8	— 1.9	+ 0.9	— 1.5
	4	+ 1.9	+ 0.5	+ 2.1	— 0.1	+ 2.3	— 1.5	+ 2.1	— 2.1
	5	— 3.9	+ 9.4	— 2.1	+ 10.4	— 2.1	+ 2.3	— 1.7	+ 3.0
	6	— 5.4	— 3.0	— 6.5	— 3.2	— 4.3	+ 3.2	— 3.9	+ 2.7
	7	— 2.6	— 6.7	— 5.8	— 5.7	— 1.2	+ 2.1	— 2.3	+ 2.6
	8	— 3.4	— 4.9	— 4.2	— 3.9	— 1.6	+ 0.4	— 0.9	+ 1.0
	9	+ 2.1	— 13.0	+ 0.4	— 12.2	+ 5.1	— 4.5	+ 5.7	— 4.4
21	M	— 4176.6	— 2580.7	— 4189.7	— 2593.6	..	..	..	..
	1	+ 2.1	+ 21.2	+ 1.4	+ 19.3	— 0.2	+ 1.6	+ 0.2	+ 1.3
	2	+ 4.3	+ 15.6	+ 2.9	+ 14.3	— 0.1	— 1.9	— 0.3	— 1.5
	3	— 10.0	— 2.0	— 9.0	— 0.9	+ 0.5	+ 0.2	+ 0.1	— 0.3
	4	— 3.7	— 11.1	— 2.5	— 9.6	— 0.9	— 1.2	— 0.4	— 0.8
	5	+ 1.0	— 11.1	+ 1.1	— 9.3	+ 0.8	+ 0.4	+ 0.6	+ 1.3
	6	+ 6.3	— 12.8	+ 5.9	— 13.5	+ 0.2	+ 0.8	0.0	— 0.1

Theoretically, we should next take from Table IV the means of the values of the standard stars in x and y for each enlargement, and form the corresponding residuals. But some labor may be saved with little diminution of accuracy by adopting approximate values, which will serve equally well for either enlargement. Such approximate values may be derived from the seventh column of Table II, containing the computed values X and Y . Taking the means of these for each plate, and forming residuals from these means, we have a series of numbers closely similar, as will appear upon examination, to those obtained from the values of x and y in Table IV. But as there will be differences in the last figures of the corresponding numbers, no further loss of accuracy will result if we divide each residual by 100, so as to determine $100a$, $100b$, $100a'$, and $100b'$, instead of a , b , a' , and b' directly. The terms c and c' have unity for each coefficient, and the residuals will all be zero. It will appear, upon examination, that this method of eliminating c and c' , before the formation of the equations of condition, is mathematically equivalent to the method of retaining them until the normal equations have been reached.

The first equation of condition for Plate 1, formed in the manner just described, is $0 = +9.8 - 25.1(100a) - 11.5(100b)$, in which the first term of the second member is taken from Table V, and the other terms are found from Table II as

TABLE VI.

NORMAL EQUATIONS AND RESULTING CONSTANTS.

Plate.	Enlargement I.		Enlargement II.		Coefficients.		Adjustment in x .			Adjustment in y .		
	Eq. in a, b .	Eq. in a', b' .	Eq. in a, b .	Eq. in a', b' .	a, b' .	a', b .	a	b	c	a'	b'	c'
1	- 817.69	+ 324.74	- 785.72	+ 309.89	+ 2479.18	- 343.84	+ 346	+ 113	- 10.6	+ 308	- 88	- 3.2
	- 28.32	- 432.51	- 44.89	- 392.44	- 343.84	+ 1304.85	+ 334	+ 122	- 10.4	+ 278	- 86	- 2.7
2	- 839.47	- 2686.79	- 782.35	- 2515.64	+ 2123.67	- 124.62	+ 316	- 1356	+ 9.9	+ 216	+ 1278	- 31.2
	+ 482.55	+ 88.68	+ 440.06	+ 77.89	- 124.62	+ 326.81	+ 296	- 1234	+ 8.8	+ 218	+ 1197	- 31.3
3	- 239.41	- 96.34	- 247.52	- 17.55	+ 448.80	+ 271.31	+ 431	+ 169	- 11.3	+ 366	- 6	- 3.9
	- 204.81	- 188.09	- 284.67	- 187.73	+ 271.31	+ 519.40	+ 322	+ 380	- 10.9	+ 498	- 262	- 0.2
4	- 329.12	+ 1152.11	- 419.68	+ 1189.55	+ 762.17	+ 70.26	+ 299	+ 1443	- 37.1	+ 192	- 1530	+ 25.0
	- 1173.87	- 45.60	- 1196.12	- 115.54	+ 70.26	+ 798.58	+ 416	+ 1461	- 36.3	+ 284	- 1587	+ 22.7
5	- 240.12	- 57.49	- 185.89	- 40.66	+ 402.15	- 222.92	+ 380	- 392	+ 0.8	+ 389	+ 358	- 17.1
	+ 412.59	- 245.45	+ 369.06	- 150.80	- 222.92	+ 836.90	+ 255	- 373	+ 2.6	+ 243	+ 236	- 11.3
6	- 141.09	+ 852.77	- 111.40	+ 828.08	+ 343.07	+ 13.58	+ 334	+ 1958	- 71.3	- 204	- 2478	+ 52.6
	- 74.22	+ 40.89	- 80.82	+ 27.92	+ 13.58	+ 35.60	+ 238	+ 2179	- 77.4	+ 139	- 2419	+ 39.0
7	- 244.13	- 88.38	- 227.28	- 52.51	+ 780.15	- 181.93	+ 296	- 72	- 2.9	+ 220	+ 165	- 6.7
	+ 116.78	- 163.87	+ 87.13	- 240.19	- 181.93	+ 879.84	+ 282	- 41	- 3.7	+ 302	+ 138	- 8.1
8	- 70.62	+ 196.58	- 67.77	+ 228.70	+ 170.55	+ 9.80	+ 349	+ 1130	- 33.2	+ 250	- 1167	+ 25.9
	- 117.37	- 13.73	- 129.61	- 1.54	+ 9.80	+ 100.84	+ 325	+ 1254	- 35.0	+ 147	- 1350	+ 32.6
9	- 313.78	+ 24.02	- 367.86	+ 19.22	+ 870.81	+ 578.71	+ 200	+ 241	- 9.5	+ 298	- 225	+ 0.1
	- 378.50	- 193.51	- 445.73	- 223.56	+ 578.71	+ 1089.40	+ 234	+ 284	- 11.1	+ 336	- 245	- 0.1
10	+ 23.05	- 1163.47	+ 107.98	- 1212.35	+ 880.01	- 430.74	- 653	- 1280	+ 32.8	- 436	+ 1109	- 8.1
	+ 409.69	+ 713.00	+ 345.09	+ 761.14	- 430.74	+ 539.66	- 715	- 1210	+ 32.2	- 510	+ 1128	- 7.8
11	+ 394.56	- 170.31	+ 386.91	- 77.75	+ 712.95	+ 77.39	- 527	- 246	+ 15.8	- 472	+ 290	+ 4.2
	+ 376.90	+ 622.84	+ 216.04	+ 714.04	+ 77.39	+ 1367.39	- 529	- 128	+ 13.5	- 532	+ 167	+ 8.0
12	- 257.98	+ 639.87	- 250.53	+ 562.36	+ 874.97	+ 73.11	+ 225	+ 830	- 28.9	+ 294	- 756	+ 4.6
	- 2602.34	- 859.41	- 2181.38	- 909.31	+ 73.11	+ 3110.95	+ 228	+ 696	- 24.9	+ 308	- 668	+ 3.6
13	- 142.40	+ 2593.76	+ 99.49	+ 3169.54	+ 2208.92	- 955.70	+ 338	+ 631	- 23.0	+ 470	- 971	+ 13.9
	- 139.76	- 1271.75	- 390.48	- 1529.47	- 955.70	+ 732.37	+ 426	+ 1089	- 35.8	+ 495	- 1221	+ 17.4
14	- 92.49	- 231.16	- 42.66	- 227.17	+ 381.99	+ 120.67	+ 420	- 564	+ 4.3	+ 402	+ 478	- 13.9
	+ 397.84	- 377.10	+ 343.17	- 328.01	+ 120.67	+ 795.20	+ 260	- 471	+ 4.7	+ 338	+ 488	- 12.9
15	- 346.07	+ 791.35	- 331.25	+ 730.66	+ 841.37	- 126.79	+ 547	+ 901	- 25.6	+ 554	- 857	+ 4.4
	- 1093.40	- 823.42	- 995.51	- 746.43	- 126.79	+ 1290.05	+ 518	+ 823	- 23.2	+ 501	- 793	+ 4.5
16	+ 90.34	+ 1187.15	+ 176.49	+ 1259.14	+ 798.16	- 424.62	+ 497	+ 1146	- 27.4	+ 575	- 1181	+ 4.6
	- 415.43	- 815.98	- 490.80	- 866.12	- 424.62	+ 546.53	+ 438	+ 1238	- 28.3	+ 612	- 1252	+ 5.3
17	- 469.81	+ 238.16	- 500.60	+ 254.67	+ 293.35	+ 281.46	+ 391	+ 1262	- 38.5	+ 424	- 1219	+ 20.7
	- 1068.74	+ 21.18	- 1197.70	+ 64.04	+ 281.46	+ 759.76	+ 301	+ 1465	- 40.8	+ 368	- 1222	+ 20.0
18	- 380.41	+ 916.76	- 314.14	+ 847.70	+ 559.03	+ 65.04	+ 458	+ 1912	- 58.7	+ 409	- 1687	+ 34.2
	- 1436.91	- 191.03	- 1295.41	- 235.24	+ 65.04	+ 736.05	+ 361	+ 1728	- 51.3	+ 458	- 1570	+ 27.8
19	- 243.05	+ 185.64	- 262.11	+ 243.41	+ 531.15	- 36.62	+ 511	+ 777	- 36.0	+ 86	- 344	+ 7.6
	- 59.50	- 21.28	- 35.37	- 28.82	- 36.62	+ 100.63	+ 531	+ 545	- 30.1	+ 123	- 450	+ 9.7
20	- 209.70	- 423.22	- 325.64	- 371.86	+ 680.17	+ 788.55	+ 343	- 30	- 7.3	+ 366	+ 197	- 12.8
	- 209.50	- 903.47	- 432.67	- 841.95	+ 788.55	+ 2040.69	+ 422	+ 49	- 10.9	+ 365	+ 124	- 11.1
21	+ 51.16	- 816.53	+ 75.76	- 871.41	+ 767.78	- 471.75	- 533	- 759	+ 18.2	- 606	+ 763	- 4.4
	+ 195.22	+ 639.68	+ 147.04	+ 716.07	- 471.75	+ 588.44	- 497	- 648	+ 16.1	- 462	+ 779	- 6.5

above described. The other equations were formed in like manner. The normal equations derived from these equations of condition are exhibited in Table VI, the first column of which gives the usual number of the plate, and the next four columns the absolute terms of the pairs of normal equations in a , b and in a' , b' , for both enlargements. The next two columns give the coefficients of a , b' and a' , b , which serve for either enlargement. Thus, for the first enlargement of Plate 1, D 6441, the normal equation in a is $0 = -817.69 + 2479.18(100a) - 343.84(100b)$; that in b is $0 = -28.32 - 343.84(100a) + 1304.85(100b)$. The normal equations in b' and a' are $0 = +324.74 - 343.84(100a') + 2479.18(100b')$ and $0 = -432.51 + 1304.85(100a') - 343.84(100b')$.

Having found a , b , a' , and b' , we substitute their values in the equations of condition in order to find c , c' , and the residual of each equation.

The last four columns of Table VI give the values of a , b , c , a' , b' , and c' for the two enlargements of each plate. The values of a , b , a' , and b' , are given in decimals of the fifth place, in order to save space in printing. Thus, the values of a for D 6441 and D 6442 are respectively $+0.00346$ and $+0.00334$; the corresponding values of b are $+0.00113$ and $+0.00122$; while those of c are $-10''.6$ and $-10''.4$.

Table VII contains the positions of Eros computed by means of the corrections which have been determined. The first column gives the number of the plate, and the second the rectangular coördinates of the planet for each of the two enlargements, in successive lines. Thus, to find the rectangular coördinates for D 6441, we proceed as follows: from Table IV, we find the mean results in x and y , from the six measures of each, to be $+2514''.4$ and $+766''.2$; multiplying these respectively by $+0.00346$ and $+0.00113$, we find the values of ax , $+8''.7$, and of by , $+0''.9$; the value of c is $-10''.6$, and the sum of these corrections is $-1''.0$. The corrected value of x is therefore $+2513''.4$; from this is to be subtracted $+12140''.6$, taken from the first line of Table V, the result being $-9627''.2$, as given in Table VII. Similarly, to determine y , we multiply $+2514''.4$ by -0.00088 , and $+766''.2$ by $+0.00308$; the values of $b'x$ and of $a'y$ are therefore $-2''.2$ and $+2''.4$; the value of c' is $-3''.2$, and the sum of these corrections is $-3''.0$. From $+763''.2$ we then subtract $+16704''.2$, with the result $-15941''.0$, as in Table VII.

The third and fourth columns of Table VII contain the right ascensions and declinations for 1875.0 corresponding to the rectangular coördinates given in the second column. This reduction was made on the system explained by Turner in the Monthly Notices, Volume LIV, page 15, as above mentioned.

The process just described for determining the rectangular coördinates of Eros was also employed in finding those of the stars observed, with the results given

in the eighth column of Table II and the third column of Table III. The seventh and eighth columns of Table II furnish the corrected residuals in the last two columns of Table V.

In order to test the validity of the process of finding the constants of reduction from the values of X and Y in Table II, above explained, the rectangular coördinates of Eros were computed for several plates by the stricter method of employing the measured values of x and y in Table IV. The Remarks following Table VII give results thus obtained. The differences were never important.

Table VIII contains data showing the accordance of the observations. The first column gives the number of the plate, and the next two columns give the average deviations of the results in x and y obtained from different stars, as shown by the corrected residuals in the last columns of Table V. The number of stars employed is given in the fourth column. The mean value of the average deviations in the

TABLE VII.
CONCLUDED POSITIONS OF EROS.

Plate.	Rectangular coördinates.		R. A. 1875.0.			Dec. 1875.0.			Plate.	Rectangular coördinates.		R. A. 1875.0.			Dec. 1875.0.		
	x	y	$h.$	$m.$	$s.$	$^{\circ}$	$'$	$''$		x	y	$h.$	$m.$	$s.$	$^{\circ}$	$'$	$''$
1	- 9627.2	-15941.0	5	58	48.11	+53	39	46.8	11	+ 1058.2	- 9589.0	7	29	58.47	- 0	21	42.1
	- 9627.0	-15941.2	5	58	48.13	+53	39	46.7	12	+10997.4	-13093.8	7	29	59.01	- 0	21	54.4
2	+ 9760.3	-14440.0	6	4	33.13	+54	6	25.8		+10992.6	-13097.4	7	29	58.69	- 0	21	58.0
	+ 9760.7	-14441.3	6	4	33.16	+54	6	24.5	13	+ 2201.3	+13823.8	9	17	0.62	-13	33	54.0
3	-10903.8	+ 3653.4	6	7	37.42	+54	20	11.2		+ 2200.9	+13825.6	9	17	0.59	-13	33	52.2
	-10900.1	+ 3655.3	6	7	37.82	+54	20	13.4	14	+ 8489.9	+12761.3	9	21	47.01	-13	38	52.7
4	-15368.2	+ 4066.2	7	17	31.35	+57	49	34.0		+ 8488.5	+12762.6	9	21	46.91	-13	38	51.4
	-15370.6	+ 4065.5	7	17	31.06	+57	49	33.0	15	+ 7170.1	-10985.5	10	38	1.88	-14	57	21.9
5	+10544.4	+ 5340.3	7	45	56.41	+54	38	39.2		+ 7171.7	-10982.0	10	38	1.98	-14	57	18.3
	+10546.8	+ 5340.5	7	45	56.69	+54	38	39.3	16	- 7958.9	- 3771.5	18	36	59.92	-38	32	48.8
6	-10591.8	- 642.9	7	45	57.59	+52	58	16.4		- 7958.6	- 3770.5	18	36	59.95	-38	32	47.8
	-10593.7	- 644.5	7	45	57.40	+52	58	14.7	17	-10686.4	- 9103.3	18	30	6.81	-40	2	45.2
7	+10580.3	+10362.3	7	44	43.17	+50	55	0.2		-10677.8	- 9102.7	18	30	7.56	-40	2	45.0
	+10580.7	+10361.7	7	44	43.20	+50	54	59.6	18	+15242.6	+ 8861.3	18	27	51.27	-39	58	33.0
8	- 654.1	-15761.6	7	26	28.40	+28	45	48.4		+15245.4	+ 8861.9	18	27	51.51	-39	58	32.3
	- 656.7	-15760.7	7	26	28.20	+28	45	49.3	19	+ 1306.6	- 8891.1	18	27	39.55	-39	58	2.1
9	- 3564.4	+11541.9	7	23	33.46	+21	14	58.0		+ 1307.4	- 8887.7	18	27	39.62	-39	57	58.7
	- 3564.6	+11541.0	7	23	33.45	+21	14	57.0	20	- 9732.7	+ 4124.9	17	37	43.91	-36	21	26.7
10	- 4631.2	+ 5082.7	7	23	17.74	+ 8	46	33.6		- 9733.9	+ 4126.3	17	37	43.82	-36	21	25.3
	- 4629.0	+ 4940.8	7	23	17.92	+ 8	44	11.9	21	+ 5837.9	+ 4733.8	17	36	19.98	-36	11	6.6
	- 4632.6	+ 5085.3	7	23	17.64	+ 8	46	36.2		+ 5891.8	+ 4704.2	17	36	24.48	-36	11	35.1
	- 4629.0	+ 4942.1	7	23	17.92	+ 8	44	13.2		+ 5837.8	+ 4734.3	17	36	19.97	-36	11	6.1
11	+ 1059.4	- 9589.6	7	29	58.55	- 0	21	42.7		+ 5891.7	+ 4704.6	17	36	24.47	-36	11	34.7

REMARKS.

- Plate 1. A computation of the constants of reduction was made with the measured values of x and y ; the results for Eros in the two enlargements are -9627.3 , -9627.0 , and -15941.1 , -15941.1 .
- Plate 2. A computation of the constants of reduction was made with the measured values of x and y , but only from eight stars; the results for Eros were as follows: $+9670.2$, $+9670.7$, and -14440.1 , -14441.4 . The results in Table VII depend on nine stars. The position given is that of the centre of the brightest part of the image. The position of the centre of the image as a whole precedes this $0^s.66$ and is $8''.6$ south of it.
- Plate 4. A computation of the constants of reduction was made with the measured values of x and y ; the results for Eros were as follows: -15368.0 , -15370.5 , and $+4066.3$, $+4065.5$.
- Plate 5. A computation of the constants of reduction was made with the measured values of x and y , resulting for Eros as follows: $+10544.3$, $+10546.7$, and $+5340.2$, $+5340.5$.
- Plate 9. The position given is the mean of the four corners of the image, which was rectangular, as stated in the Remarks on Tables III and IV.
- Plate 10. The position given is the mean of the two ends of the elongated image.
- Plate 13. A computation of the constants of reduction was made with the measured values of x and y ; the results for Eros were as follows: $+2201.2$, $+2200.8$, and $+13823.8$, $+13825.6$.
- Plate 15. A computation of the constants of reduction was made with the measured values of x and y ; the results for Eros were as follows: $+7170.1$, $+7171.7$, and -10985.5 , -10982.0 .
- Plate 17. A computation of the constants of reduction was made with the measured values of x and y ; the results for Eros were as follows: -10686.5 , -10677.8 , and -9103.1 , -9102.6 .
- Plate 18. A computation of the constants of reduction was made with the measured values of x and y ; the results for Eros were as follows: $+15243.0$, $+15245.8$, and $+8861.5$, $+8862.0$.
- Plate 21. The position given is the mean of the two ends of the elongated image.

second and third columns is next given, followed by the corresponding probable error of one observation, which depends upon a pair of the measurements given in Table IV, and the probable error of the mean result. The next two columns contain the average deviations of the measurements of Eros, given in Table IV, separately for each set of measurements. These are followed by the number of measurements on which each result depends, the mean of the average deviations, and the probable error of one observation and of the mean. The last three columns give three determinations of the weights to be assigned to the different plates. The first, A, is found by multiplying by 10 the reciprocal of the square of the probable error given in the seventh column. It would give the correct weight if the deviations were principally due to the errors in the assumed positions of the standard stars and in the method of reduction. The second weight, B, is found in the same way by multiplying by 10 the reciprocal of the square of the probable error given in the thirteenth column. It would give the correct weight, if the errors were mainly in the uncertainty in setting on the true centres of the images of Eros. Where more than one point was measured, the weight is evidently the sum of the weights of each. The third weight, C, was found by inspecting the various images of Eros, and estimating their quality on a scale of 10.

TABLE VIII.
ACCORDANCE OF OBSERVATIONS.

Plate.	Average Deviation.		No. of stars.	Mean of Av. Dev.	Probable Error.		Av. Dev., Eros.		No. of Obs.	Mean of Av. Dev.	Probable Error.		Weights.		
	x	y			1 pr. obs.	Mean.	x	y			1 obs.	Mean.	A	B	C
1	"0.9,1.0"	"0.8,1.2"	9	1.00	"0.90"	"0.30"	"0.2,0.2"	"0.7,0.3"	6	0.35	"0.32"	"0.13"	1.1	5.9	8
2	1.4,1.0	1.7,1.2	9	1.32	1.18	0.39	{ 0.3,1.9 0.4,1.1 }	{ 0.9,0.0 0.3,0.3 }	6 6	0.78 0.52	{ 0.72 0.48 }	{ 0.29 0.20 }	0.7	3.7	1
3	0.6,0.5	0.9,1.1	7	0.78	0.71	0.27	0.4,0.2	2.2,0.4	6	0.80	0.74	0.30	1.4	1.1	4
4	1.2,1.5	1.1,1.5	7	1.32	1.21	0.46	0.4,0.2	0.2,0.5	6	0.32	0.30	0.12	0.5	6.9	5
5	0.2,0.6	0.1,0.7	4	0.40	0.39	0.20	0.4,0.4	0.1,0.2	6	0.28	0.26	0.11	2.5	8.3	8
6	1.4,0.4	0.8,0.4	5	0.75	0.71	0.32	0.3,0.3	0.4,0.3	6	0.32	0.30	0.12	1.0	6.9	2
7	1.1,0.8	1.1,0.8	7	0.95	0.87	0.33	0.2,0.3	0.1,0.0	6	0.15	0.14	0.06	0.9	2.8	7
8	0.9,0.9	2.0,0.9	7	1.18	1.08	0.41	0.7,0.5	0.3,0.4	6	0.48	0.44	0.18	0.6	3.1	4
9	0.6,0.6	1.0,0.6	10	0.70	0.62	0.20	{ 0.3,0.3 0.4,0.3 0.3,0.2 0.5,0.1 }	{ 0.5,0.2 0.1,0.4 2.3,0.3 1.5,0.2 }	6 6 6 6	{ 0.32 0.30 0.78 0.58 }	{ 0.30 0.28 0.72 0.54 }	{ 0.12 0.11 0.29 0.22 }	2.5	18.5	7
10	1.2,1.7	1.3,1.3	7	1.38	1.26	0.48	{ 0.0,0.1 0.1,0.1 }	{ 0.3,0.1 0.1,0.1 }	6 6	{ 0.12 0.10 }	{ 0.11 0.09 }	{ 0.05 0.04 }	0.4	102.5	10
11	1.0,0.8	0.7,0.4	8	0.72	0.65	0.23	0.2,0.2	0.1,0.1	6	0.15	0.14	0.06	1.9	27.8	6
12	1.4,0.9	1.6,0.7	11	1.15	1.02	0.31	{ 0.4,0.4 0.2,0.5 }	{ 0.0,0.3 1.6,0.0 }	6 3	{ 0.28 0.58 }	{ 0.26 0.60 }	{ 0.11 0.35 }	1.0	9.1	4
13	0.7,1.2	0.6,1.0	7	0.88	0.80	0.30	0.1,1.5	0.4,0.4	6	0.60	0.56	0.23	1.1	1.9	4
14	1.0,1.5	0.8,1.2	9	1.12	1.00	0.33	0.3,0.5	0.3,0.4	6	0.38	0.35	0.14	0.9	5.1	3
15	1.0,1.4	1.0,0.6	7	1.00	0.91	0.34	1.1,0.4	0.2,0.2	6	0.48	0.44	0.18	0.9	3.1	3
16	0.9,1.2	1.2,0.6	7	1.00	0.91	0.34	0.3,0.4	0.3,0.6	6	0.40	0.37	0.15	0.9	4.4	3
17	1.0,0.7	0.7,1.0	5	0.85	0.80	0.36	{ 0.3,0.2 1.0,0.1 }	{ 0.3,1.0 1.0,0.9 }	6 3	{ 0.45 0.75 }	{ 0.42 0.78 }	{ 0.17 0.45 }	0.8	3.9	1
18	0.6,1.2	2.0,1.3	5	1.29	1.22	0.54	0.4,0.3	0.3,0.3	6	0.32	0.30	0.12	0.3	6.9	1
19	0.6,0.4	0.4,0.6	4	0.50	0.49	0.24	0.4,0.3	1.6,0.4	6	0.68	0.63	0.26	1.7	1.5	2
20	2.0,2.3	1.8,2.3	9	2.10	1.88	0.63	0.2,0.4	0.4,0.5	6	0.38	0.35	0.14	0.3	5.1	5
21	0.4,0.3	1.0,0.9	6	0.65	0.60	0.25	{ 0.2,0.1 0.1,0.2 }	{ 0.1,0.1 0.1,0.0 }	6 6	{ 0.12 0.10 }	{ 0.11 0.09 }	{ 0.05 0.04 }	1.6	102.5	9

It will be seen that there is but little resemblance between the weights given in the last three columns. The value of A does not necessarily increase with the number of comparison stars. If there were only three of them the method of reduction is such that their positions would be represented exactly and the weight would be infinite. The scale for Plates 10, 11, and 21 is nearly three times that of the others and yet the weight is not sensibly greater. The principal sources of error in them are the distortion of the plate and the errors in the positions of the

stars. The small values of the probable errors in the thirteenth column and the correspondingly large values of weight B show that the uncertainty in the positions of the images is insensible. In other words, the accuracy would not be perceptibly increased if more measures were made, or if repeated by other observers. It was expected that weights C would bear a close relation to weights B. This does not seem to be the case. Measures are made persistently on the same portion of an image even when the latter is very irregular. A large part of this irregularity is due to the motion of Eros, as is seen in Plates II and III. It is remarkable that the error of setting should be so small when it is considered that the larger dimension of the images both of Eros and of the stars is nearly a minute of arc in several cases.

The mean of the probable errors given in the seventh column is $\pm 0''.34$; of those in the thirteenth column, $\pm 0''.17$. The positions here given should therefore agree with an ephemeris, to which all the corrections for the perturbations have been applied, with an average deviation of less than half a second of arc. Notwithstanding the large and irregular form of many of the images, the errors of setting are so small that a repetition of them would not be advisable, and would not be likely to affect the results sensibly. On the other hand, meridian circle observations of the catalogue stars, and measures of the positions of the lettered stars given in Table III, on plates taken for the purpose with a telescope of long focus, might materially diminish the errors in the observed positions of Eros.

The computed path of Eros during the opposition of 1893 is shown by the heavy line in Plate I, and the circular dots represent the twenty-one positions in which it was photographed. Five spectrum photographs are included and are indicated by the letter S. The two photographs taken on February 16, 1894, are represented by a single dot. A spectrum plate taken on January 1, 1894, is described in Circular 36. Similar plates taken January 8 and 30, are described in Circular 37. Plate I 10420, taken January 12, and I 10742, taken March 4, 1894, also show the spectrum of Eros. Plate I 10026, taken November 24, 1893, has recently been found to give an excellent chart image of Eros, from which its position and magnitude might be satisfactorily determined. It will be seen that the observations are very satisfactorily distributed and include the times at which Eros was distant both before and after opposition as well as the time of nearest approach.

Figures 1 to 21 of Plates II and III represent the twenty-one photographs of Eros and correspond to the same numbers in Table I. Figures 10, 11, and 21 are enlarged six times from Bruce plates, and are therefore on a scale of $10'' = 0.1$ cm.

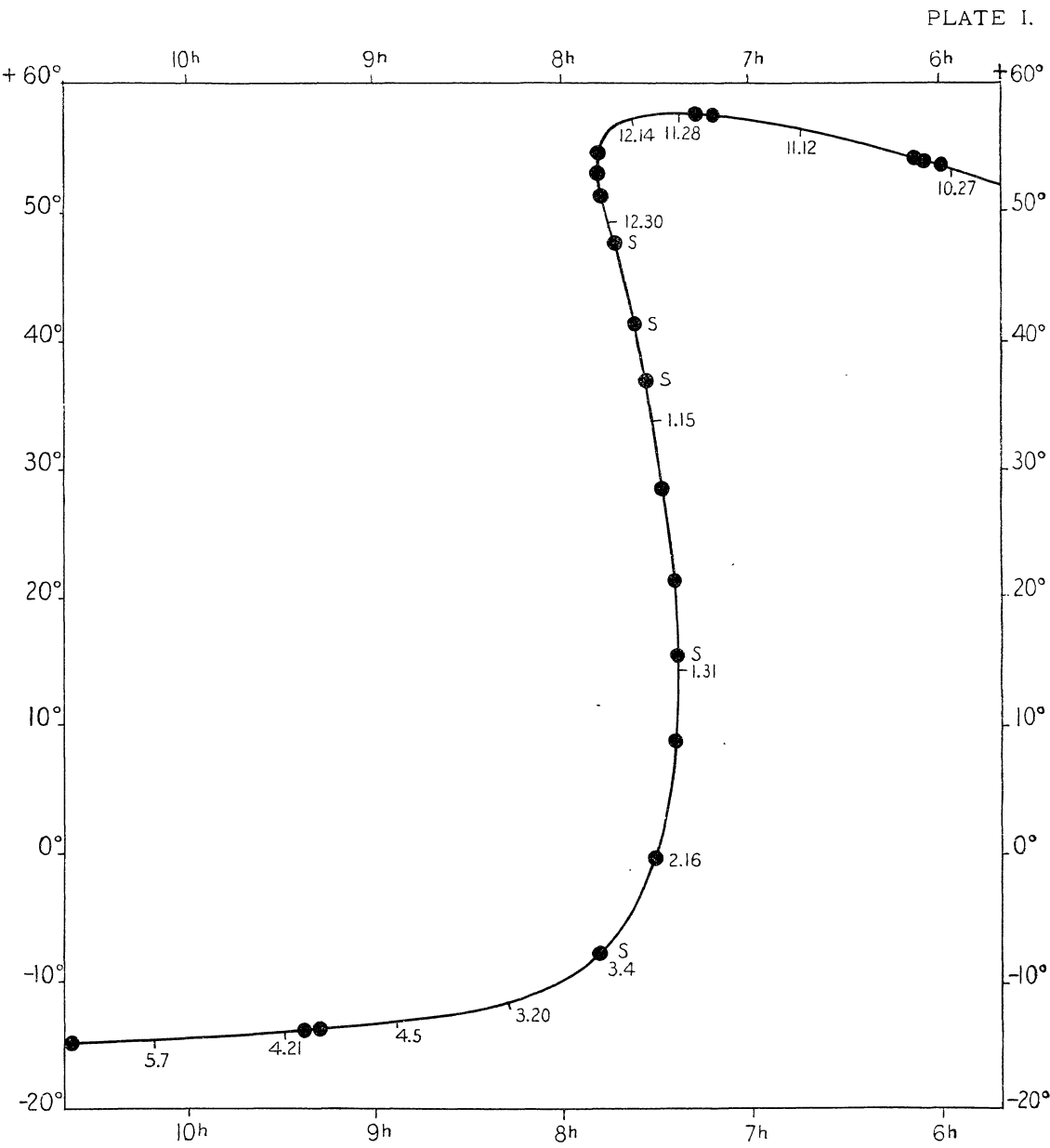
The faint squares are due to the reticule superposed upon the original negative, one side of which is one minute of arc. In the other figures, the scale is $20'' = 0.1 \text{ cm.}$, so that the enlargement is eight or nine times. The side of the square in these figures is somewhat less than three minutes of arc.

The irregularity in the images is due to three causes, the aberration of the lenses when the image is not near the centre of the plate, the motion of Eros, and its variation in light. The four corners of the images shown in Figure 9 and the ends of the images in Figures 9 and 21 were measured separately. In several cases, the images were so bad that they were at first supposed to be defects. The variation in light of Eros is shown in Figures 17 and 21 and perhaps in Figures 10 and 12.

Figure 22 illustrates the method used for photographing a moving body whose path is known but which is too faint to leave a trail when photographed in the usual way by following on a star. The eyepiece used in following is connected with the photographic plate by means of a screw, so that the distance between them may be varied by any desired amount. The whole is free to turn around the axis of the telescope to any required position angle. This angle is made equal to that of the motion of the object, as given by its computed orbit, and a star is followed by means of the eyepiece. The computed motion is then given to the plate by the screw. The stars are thus photographed as trails having a direction and length equal to that of the moving body, while the latter appears as a point. An exposure indefinitely great can thus be given to a rapidly moving object, while if the trail of the latter is photographed, the actual exposure is only equal to that required for it to move its own diameter. This method was first employed successfully on Eros, on April 28, 1900, when it reappeared after conjunction with the Sun. It was thus photographed several weeks before it was obtained at other observatories where the usual method was employed.

A portion of Plate A 5450, enlarged three times so that the scale is $20'' = 0.1 \text{ cm.}$, is shown in Figure 22. Three exposures were made of thirty minutes each. During the first, the stars were followed in the usual way and accordingly appear as dots. Eros appears as a faint trail to the left of the centre of the figure. During the second and third exposures a motion of 0.003 cm. per minute was given to the plate, in a direction whose position angle was 105° , and the plate was moved about 0.1 cm. after the second exposure. Eros, therefore, appears as two dots near the centre of the figure, and each star as two lines to the right of the dot formed by the first exposure. The only catalogue star that appears in this figure is the lower one, which is $-15^\circ 3494$, magn. 9.4.

Figure 23 illustrates the method of photographing Eros employed here and at Arequipa, during the opposition of 1900. A series of exposures was made moving the plate automatically in declination after each, so that the exact time of beginning and ending each exposure is known. To distinguish them a double motion is given after every tenth exposure. Figure 23 is an enlargement of C 12928 to a scale of $4'' = 0.1$ cm. Each exposure has a length of 5^m . Since the apparent motion of Eros is sensibly uniform, we should expect that its images would all be alike and elongated in the direction of its motion. This is far from being the case. While the star images are all sensibly circular, the first image of Eros, beginning at the top is much elongated, while the second is more nearly circular. The direction of the elongation of the sixth image differs about 20° from the images preceding and following it. Any real irregularity in motion appears to be impossible on theoretical grounds, and from the amount required would be obvious in any set of successive micrometric measures. On the other hand, it is difficult to see how any instrumental or photographic error would effect Eros and leave the star images so nearly circular. Eccentricity or irregularity in the driving screw might produce this effect, but we should then expect a similar elongation in the star images. The irregularity in the trail of Eros in Figure 10 is probably due to the same cause, and again is much greater than the elongation of the star images. The rapidity with which these changes take place may have caused them to be overlooked where longer exposures were used or where the number of images on a single plate was small.



OBSERVATIONS OF EROS (433) 1893-94

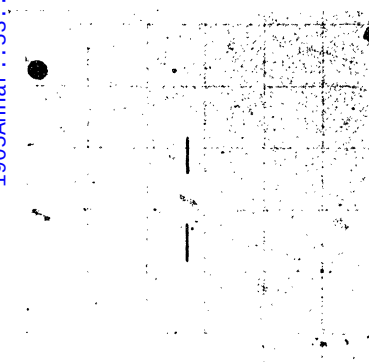


FIG. 1. OCTOBER 28, 1893.

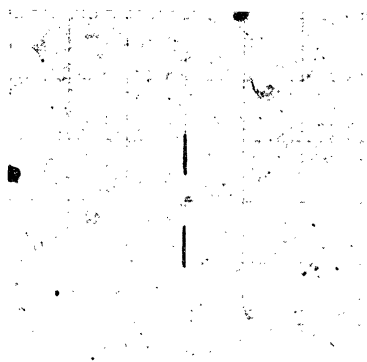


FIG. 2. OCTOBER 30, 1893.

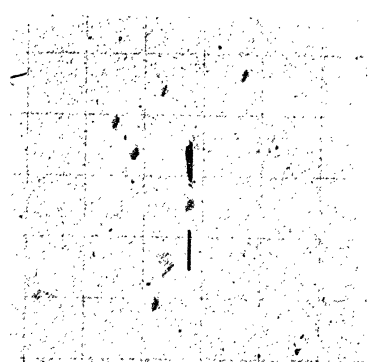


FIG. 3. OCTOBER 31, 1893.

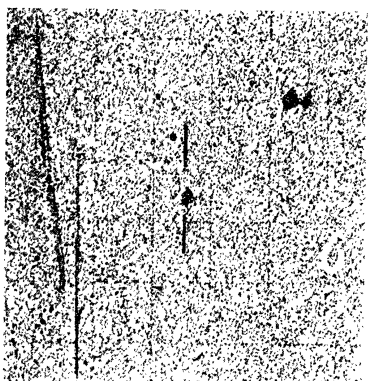


FIG. 4. NOVEMBER 26, 1893.

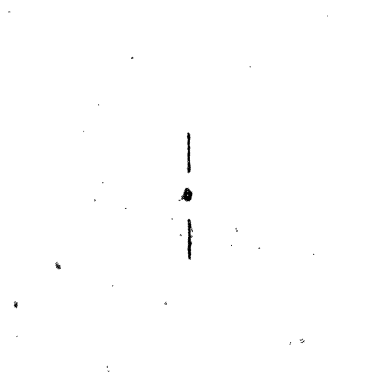


FIG. 5. DECEMBER 19, 1893.

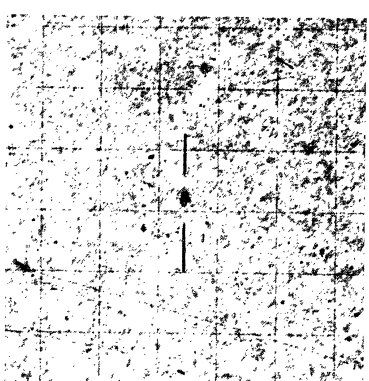


FIG. 6. DECEMBER 23, 1893.

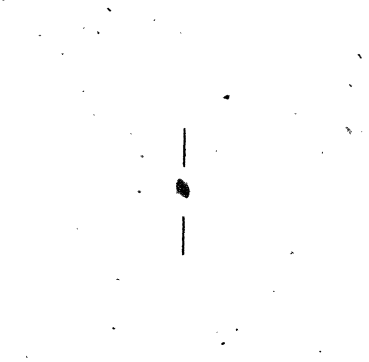


FIG. 7. DECEMBER 27, 1893.

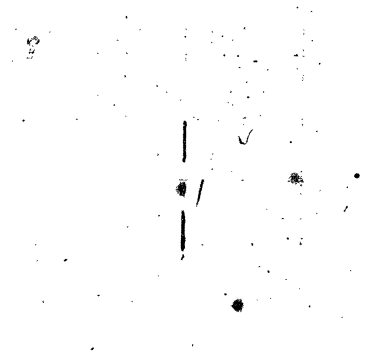


FIG. 8. JANUARY 19, 1894.

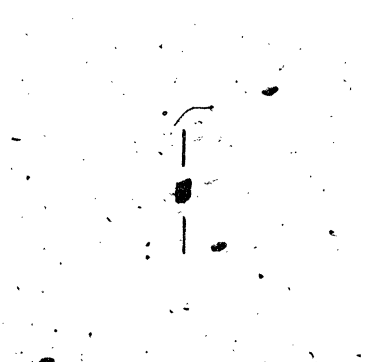


FIG. 9. JANUARY 25, 1894.



FIG. 10. FEBRUARY 5, 1894.

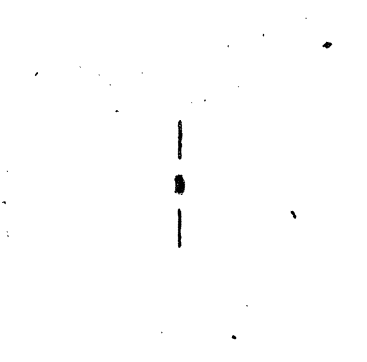


FIG. 11. FEBRUARY 16, 1894.



FIG. 12. FEBRUARY 16, 1894.

PHOTOGRAPHS OF EROS, 1893-1894.

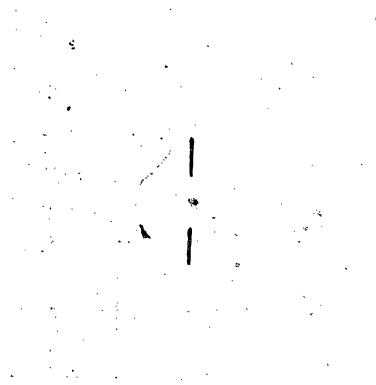


FIG. 13. APRIL 16, 1894.

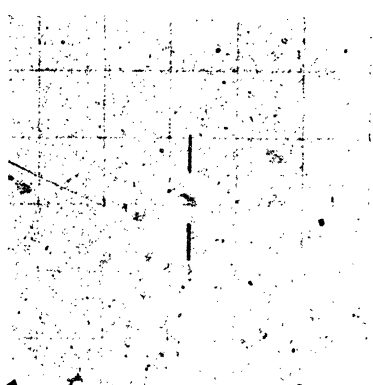


FIG. 14. APRIL 18, 1894.



FIG. 15. MAY 19, 1894.

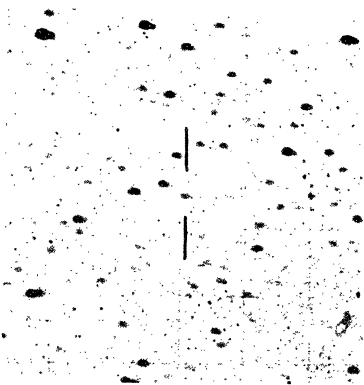


FIG. 16. APRIL 6, 1896.

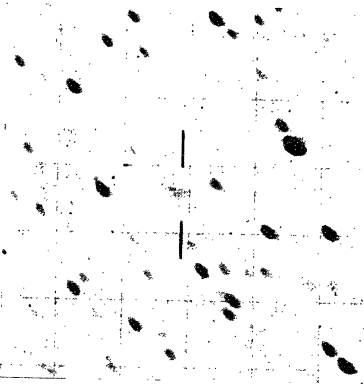


FIG. 17. JUNE 4, 1896.

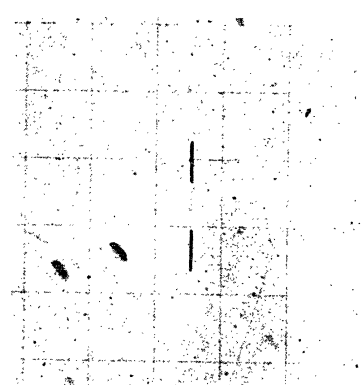


FIG. 18. JUNE 5, 1896.

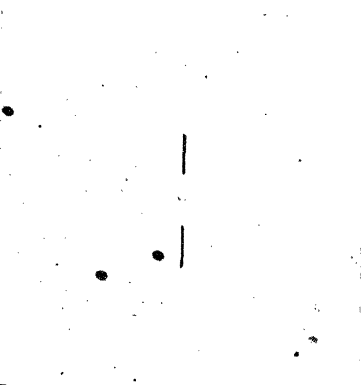


FIG. 19. JUNE 5, 1896.

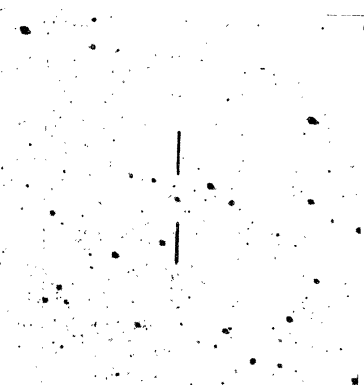


FIG. 20. JUNE 29, 1896.

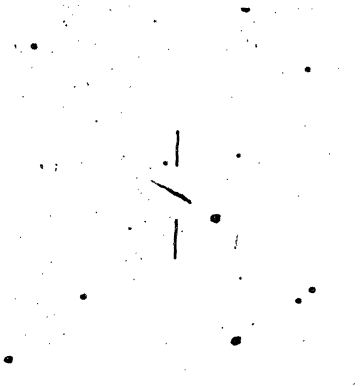


FIG. 21. JUNE 30, 1896.

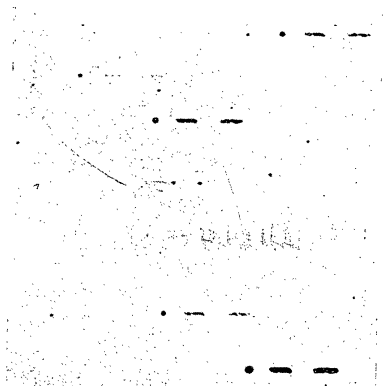


FIG. 22. JULY 15, 1901.

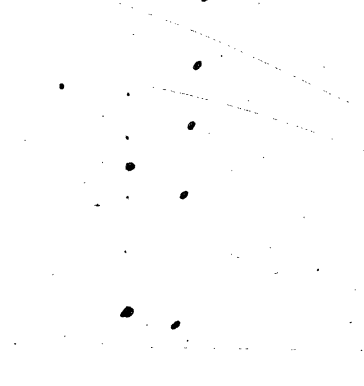


FIG. 23. NOVEMBER 2, 1900.

PHOTOGRAPHS OF EROS, 1894-1901.

