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THE CORDOBA DURCHMUSTERUNG,

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During the past five years our efforts have been devoted, mainly, to the extension of the Southern Durchmusterung, from the limit to which it had been carried by Prof. SCHÖNFELD; or, rather, from the beginning of -22° , so as to have that belt in common with SCHÖNFELD's great work, for direct comparison of results. Up to the present, we have made more than a million of observations of objects situated in the belt between -22° and -42° , which have all been reduced to a common mean epoch (1875.0), and in the course of a few months the final revision for that entire region will have been completed. The progress of the work has been very much delayed by the great amount of cloudy weather and semi-transparent atmosphere, which tended to break up a night's work into isolated patches, of no practical value except as checks, and has compelled us, frequently, to triplicate, and even quadruplicate, our observations in certain regions.

The telescope employed is a small equatorial by ALVAN CLARK & SONS, of 12.5 centimeters aperture, and 168 focal length, with an eye-piece magnifying 15 times, showing stars to the $10\frac{1}{2}$ magnitude under the best conditions of sky, in dark field. It is mounted in the small dome over the north entrance to the Observatory. Its glass scale is ruled to $10'$ over an extreme width of field of $80'$, permitting the observation of zones of only one degree in width. No illumination has ever been used for the scale during the observations, and these have always been limited to dark sky, except for a few nights, just after new moon. Pointings are made by means of circles divided to $30'$ in declination, and $2''$ in right-ascension, subdivided by verniers to $1'$ and $4''$ respectively. The observing-chair can only be used when the telescope is inclined at angles greater than 30° of zenith-distance; and, with few exceptions, our observations have been made with the telescope inclined from 35° to 45° .

The transits are recorded electrically upon a Hipp chronograph, which is in an adjoining room. The recorder is seated at a table in the room beneath the dome, with the circuit-breaking chronometer at his side, and notes the scale-read-

ings and magnitudes as they are called out by the observer, and also the times of beginning and ending of zones and intermediate rattles. His record is made with a fountain pen directly upon the reduction-sheets. These contain columns for the chronographic record, scale-readings, magnitudes, mean places and magnitudes for 1875.0 from the various catalogues used in identifying, and, finally, our observations reduced to 1875.0. At intervals of every 15 or 20 transits, the observer calls out "rattle," which he records upon the chronograph, and which the assistant also indicates upon the sheets, thus dividing the observations into groups, and guarding against the continuance of an error in either record. During the first years we employed a "sounder" to enable the recorder to hear and keep in tally with the chronograph-taps. For this purpose the ordinary observing-key was converted into both a make-circuit and break-circuit apparatus, operated by a single pressure of the thumb. The few involuntary taps could thus usually be detected and indicated by the observer himself, but no benefit was derived from the arrangement in the crowded regions of the milky way, where zones of 1200 stars to the hour were not infrequent, and it became literally impossible for either observer or recorder to take account of the taps, and the incessant repetition of these was rather confusing. The discordances between records have, besides, been comparatively few, and in nearly all cases they could be cleared up by the duplicate zones. The zone containing the largest proportional number of stars extends from $7^h 55^m 10^s$ to $8^h 49^m 50^s$, and from $30^\circ 40'$ to $31^\circ 20'$, and contains 1254 stars, all observed without a single discrepancy in the records. This is at the rate of 1376 stars per hour for a zone of $40'$ in width, or 160 stars per square degree.

As our zones never exceed a degree in width, there is no need of plus and minus distinctions for north and south field, and we simply call the scale-reading, — from 20 to 80, going south. The magnitudes are estimated to quarters. In the crowded regions it became imperative to shorten the observer's notes to the utmost, especially for the more numer-

ous classes, and we adopted the following method. The scale-reading is always called first. If it is unaccompanied by a magnitude, it signifies the class 10, and is left in blank by the recorder; if accompanied by a 3, it is so recorded, and signifies 9.7; by a 2, the 2 is recorded, and is translated 9.5; by a 1, it means 9.3, by a 9, 9.0. For stars brighter than 9, the whole magnitude is always given; 8³ signifies 8.7; 6², 6.5. In the beginning we further distinguished the stars fainter than 10 by an α , but owing to the additional strain that this imposed upon the recorder, and his liability to mistake the α for an 8, the custom was discontinued.

The zones are one hour long, and have laps of 10' in declination, and 1^m in R.A. In the milky way they are only 40' wide, and have equal laps. The laps in declination of the revision-zones fall in the middle of the original zones. During the past year I have diminished the laps in declination to 5', by the aid of a programme containing the times, magnitudes and places upon the scale of five or six stars in each hour, selected usually from among the fainter ones given in the Cordoba Zone-Catalogue. As the transits of these stars approach the recorder calls out the scale reading and magnitude, and the observer has thus furnished him a check upon his limits, and also an indication of the relative clearness of the sky during the night, or upon different nights, and can adhere more closely to a consistent scale in his estimates of magnitude. By this means, also, any isolated patches can be exactly fitted into their places without loss, and we can select possible nights from among the bad ones. As the estimates for the Zone-Catalogue were only made to half-magnitudes, it happens that sometimes they are in error by that amount, but these cases are easily detected, and do not influence our estimates. Down to the 9th magnitude, the magnitudes as given in the Zone-Catalogue, are remarkably close in my opinion, considering the stress under which they were made; but the 9 $\frac{1}{2}$ s should be distributed about equally between 9, 9 $\frac{1}{4}$ and 9 $\frac{1}{2}$, and the 10s are correct only in indicating that the object is fainter than 9 $\frac{1}{4}$, and I think there is no 10th magnitude in the catalogues.

A night's work, in view of the press of official duties during the day, and of the extent of our undertaking, has never exceeded six hours, and the observations have all been made in alternate zones by myself and Mr. RICHARD H. TUCKER, Jr., first assistant, except for six months of last year, when I observed alone. The record has been kept by Mr. GUSTAVUS A. SCHULDT, principally, by Mrs. THOME, and, when the night was a six-hour or five-hour one, the last zone was also recorded by me. The scale is not quite distinct for my vision, and I have, in consequence ruled upon it shorter, 5', divisions in addition, which has greatly assisted in the ease and readiness of estimating the reading, and my eye is much rested, too, by looking out at the sky during rattles. The transits are for the moment of extinction of light by the scale, as nearly as possible. When several stars transit at the same moment, one tap records the common time, and an

“also” accompanies the scale-readings, and they are indicated upon the record by a bracket, or simply by a vertical line. When two stars are too close to be observed separately, the scale-reading and magnitude are given for the brighter one, and it is marked “dpl.” Nebulas are described as fully as the conditions will permit—apparent diameter, appearance and brightness. Our places for these agree closely, in the large majority of cases, with those given by Dr. DREYER in his New General Catalogue, and we have found a number of new ones.

The chronographic times are read off and recorded as soon as possible after the observations, usually next day, and the identification of all the stars in the various Cordoba catalogues is then made. None of the objects whose positions are given in those publications, or in any other catalogue of positions that I have yet seen, except cases of palpable error, are missing in our work. The differential data furnished by all are used in the determination of the final constants of reduction for the middle of the zone. They are varied for beginning and end, and sometimes, slightly, with the scale-reading. The correction in declination, although determined for the middle of the zone, is afterward referred to the north limit, so that it is always a quantity additive directly to the scale-reading. Owing to the short duration of the zones, and the fact that the constants of reduction for each zone are deduced independently of all the others, the variation in constants for the beginning and end, and the extreme limits in declination are so small that the errors of observation would not be essentially increased by the assumption of a constant reduction. The final places are given to tenths of a second, and to tenths of a minute in declination. The arithmetical mean of the several estimates of magnitude is given to tenths, also.

From the following table, which gives a count by magnitudes of all objects observed at least twice in the first five degrees (22–26) of 0^h, it appears that our lower limit includes everything as far as 10.1, and that our usual reach upon a good night extends to about 10.3. There are 2038 stars in this region whose positions and magnitudes have been verified, and there are 600 more, of the lowest grade of brightness, with only one observation, and which are therefore only trustworthy as regards the magnitudes. These will not be further observed.

COUNT OF DM. STARS, —22° TO —26°, 0^h.

Mag.	By count		Per mil.	By regular progression		Mag.
Brighter than 7	24	24	0.012	24	24	
7.0	2		.000	1.5		
7.1	4		2	1.7		
7.2	4	21	2	2	10.7	7 $\frac{1}{4}$
7.3	6		3	2.5		
7.4	5		2	3		

Brighter than	Mag.	By count	Per mil.	By regular progression	Mag.	Brighter than	Mag.	By count	Per mil.	By regular progression	Mag.
	7.5	4	2	3.5			9.5	125	62	114	
	7.6	3	1	4.2			9.6	161	79	136	
	7.7	7 28	3	5	25.7	7 $\frac{3}{4}$	9.7	197 828	97	162 833	9 $\frac{3}{4}$
	7.8	10	5	6			9.8	148	73	192	
	7.9	4	2	7			9.9	197	.097	229	
	8.0	14	7	8			10	585 585	0.286	10.0 273	
	8.1	8	4	10						10.1 325 598	
	8.2	11 62	5	12	61	8 $\frac{1}{4}$	Sum	2038	1.000	2046	
	8.3	17	8	14			Observed once	600		10.2 381	
	8.4	12	6	17						10.3 460 1389	10 $\frac{1}{4}$
	8.5	32	16	20						10.4 548	
	8.6	17	8	24			Total	2638		3435	
	8.7	26 142	13	29	147	8 $\frac{3}{4}$	In the Introduction to the <i>Bonner Sternverzeichniss</i> , Vol. VIII, pages 22-26, Prof. SCHÖNFELD has given the result of a count, for each four minutes of right-ascension and each degree of declination, of the stars observed by him for his Durchmusterung. The stars observed for the Cordoba Durchmusterung in the belt of -22° have been counted in the same manner, and in the table which follows the results obtained by each have been placed side by side for comparison of reach.				
	8.8	25	12	34							
	8.9	42	21	40							
	9.0	49	24	48							
	9.1	60	30	57							
	9.2	58 348	29	67	347	9 $\frac{1}{4}$					
	9.3	96	47	80							
	9.4	85	42	95							

NUMBER OF STARS IN -22° DECLINATION AS OBSERVED AT BONN AND AT CORDOBA.

	0 ^h	0 ^m	4 ^m	8 ^m	12 ^m	16 ^m	20 ^m	24 ^m	28 ^m	32 ^m	36 ^m	40 ^m	44 ^m	48 ^m	52 ^m	56 ^m	60 ^m	Total	Ratio
Sch.	18	11	14	12	16	10	14	14	12	12	7	17	13	14	15			199	
Cord.	23	22	30	20	32	15	26	27	22	28	22	22	29	34	27			379	1.90
I ^h																			
Sch.	11	10	6	11	10	9	7	9	11	11	9	10	14	14	16			158	
Cord.	27	16	22	23	24	22	15	15	20	19	21	21	26	21	24			316	2.00
II ^h																			
Sch.	15	6	8	11	16	16	15	10	13	11	11	17	17	10	15			191	
Cord.	34	21	17	15	26	23	27	21	24	25	23	25	27	17	26			351	1.84
III ^h																			
Sch.	12	11	10	12	13	10	13	10	16	19	15	14	16	14	15			200	
Cord.	30	24	30	28	17	21	26	22	27	24	35	33	31	19	31			398	1.99
IV ^h																			
Sch.	18	13	22	10	12	17	11	18	18	25	17	17	19	16	26			259	
Cord.	35	25	40	26	39	36	31	31	32	48	36	32	41	36	48			536	2.07
V ^h																			
Sch.	24	19	17	22	17	22	21	21	19	30	18	15	21	18	17			305	
Cord.	41	38	44	49	41	46	48	41	45	53	56	47	53	65	63			730	2.39
VI ^h																			
Sch.	19	19	17	25	15	26	19	28	15	28	30	30	40	45	32			388	
Cord.	56	71	53	70	72	64	80	79	85	85	99	106	109	110	106			1245	3.21
VII ^h																			
Sch.	31	31	35	38	32	33	32	28	28	28	29	25	27	27	26			450	
Cord.	108	108	102	96	97	86	106	140	144	137	121	106	120	110	102			1683	3.74
VIII ^h																			
Sch.	23	23	25	23	24	31	22	17	28	23	25	25	15	22	21			347	
Cord.	103	103	105	95	94	90	96	91	96	71	73	62	83	57	49			1268	3.65
IX ^h																			
Sch.	16	25	21	30	21	13	26	20	21	23	23	20	26	26	23			334	
Cord.	53	75	75	68	82	65	73	72	63	64	74	63	69	74	61			1031	3.09

	X ^h 0 ^m	4 ^m	8 ^m	12 ^m	16 ^m	20 ^m	24 ^m	28 ^m	32 ^m	36 ^m	40 ^m	44 ^m	48 ^m	52 ^m	56 ^m	60 ^m	Total	Ratio	
Sch.	23	21	15	18	11	11	20	19	19	17	9	22	12	20	12		249		
Cord.	59	57	66	64	54	59	58	48	59	47	44	42	37	40	44		775	3.11	
X ^I ^h																			
Sch.	14	8	9	17	16	10	20	14	14	12	17	10	16	12	22		211		
Cord.	47	39	41	48	46	35	46	43	47	42	27	35	39	35	33		613	2.90	
X ^{II} ^h																			
Sch.	14	14	23	21	11	14	17	10	16	15	8	21	10	6	16		216		
Cord.	25	28	35	46	23	30	39	29	40	36	22	32	24	28	31		468	2.17	
X ^{III} ^h																			
Sch.	19	13	22	16	17	20	12	16	9	10	12	9	21	11	12		219		
Cord.	30	33	35	46	37	31	35	36	30	39	38	31	42	29	40		532	2.43	
X ^{IV} ^h																			
Sch.	17	12	12	19	6	11	11	11	11	12	7	12	11	14	11		177		
Cord.	44	42	20	34	31	35	34	43	38	37	37	34	37	36	44		546	3.09	
X ^V ^h																			
Sch.	8	13	10	14	12	11	14	17	12	14	15	13	12	9	17		191		
Cord.	28	38	28	31	37	33	37	41	35	35	35	29	31	35	46		519	2.72	
X ^{VI} ^h																			
Sch.	21	17	22	10	4	5	3	8	16	17	17	14	13	11	13		191		
Cord.	43	49	50	23	12	11	11	16	35	29	43	34	51	31	41		479	2.51	
X ^{VII} ^h																			
Sch.	15	10	14	19	6	13	16	12	16	24	13	19	28	58	32		295		
Cord.	46	51	36	47	19	32	41	41	36	39	49	58	44	90	94		723	2.45	
X ^{VIII} ^h																			
Sch.	30	35	36	29	27	29	36	22	18	23	32	25	20	22	24		408		
Cord.	97	89	68	81	65	54	81	61	52	56	63	70	75	57	68		1037	2.48	
X ^{IX} ^h																			
Sch.	23	24	28	32	24	19	27	22	23	30	22	19	19	24	17		353		
Cord.	59	68	67	65	68	57	60	50	45	48	67	64	38	63	40		859	2.43	
X ^X ^h																			
Sch.	20	18	15	26	15	24	23	13	19	23	15	18	14	15	14		272		
Cord.	48	36	39	54	45	49	65	51	57	58	40	38	42	41	36		699	2.57	
X ^{XI} ^h																			
Sch.	11	15	27	12	13	15	17	16	15	12	15	12	16	13	14		223		
Cord.	43	39	40	36	37	30	42	34	35	27	41	37	40	33	26		540	2.42	
X ^{XII} ^h																			
Sch.	17	17	18	15	13	15	14	17	23	15	8	17	17	8	18		232		
Cord.	37	37	25	27	31	30	28	32	34	29	30	34	29	18	29		450	1.94	
X ^{XIII} ^h																			
Sch.	18	14	10	8	15	6	14	17	9	14	14	17	15	15	11		197		
Cord.	32	24	30	22	22	21	22	31	24	25	27	25	31	20	20		376	1.91	
																	Sch.	6265	
																	Cord.	16550	2.64

To test the correctness and general relation of our adopted magnitudes, comparisons have been made, on p. 109, with SCHÖNFELD'S SDM. and the Cordoba Zone-Catalogues. In the comparison with SCHÖNFELD, his determinations and the Cordoba ones have been used alternately as standards. The comparisons with the Zone-Catalogue have usually extended over ten degrees.

Finally, in the table on p. 110 is given the probable error of our adopted positions as deduced from the differences between these and those given in the Argentine General Catalogue, OELTZEN'S Argelander, Cordoba Zone-Catalogues and SCHÖNFELD'S SDM. For the first three, the positions given have been accepted as being without sensible error in comparison with our determinations, and for SCHÖNFELD'S the

reduction was made upon the assumption that his and our determinations are effected by an equal error. This is not quite true, and our positions would undoubtedly have been much improved if we, too, had used an illuminated reticule. But as that implied a sacrifice of nearly all the objects fainter than $9\frac{1}{2}^m$, I preferred to adhere to dark field and longer reach. It must be remembered, also, that the constants of reduction were determined from the brighter stars at the moment of extinction, and that they are not quite correct for the mass of faint stars, as these latter are extinguished or lost, in the vicinity of the transit line, earlier than the bright stars, although really having a greater right-ascension.

COMPARISON OF MAGNITUDES WITH SCHÖNFELD'S SDM.

Mag.	7 ^m - 7 ^{m.4}		7 ^{m.5} - 7 ^{m.9}		8 ^{m.0} - 8 ^{m.4}		8 ^{m.5} - 8 ^{m.9}		9 ^{m.0} - 9 ^{m.4}		9 ^{m.5} - 10 ^m		10 ^m	
O ^h Sch. standard	7.10	7.25	7.62	7.56	8.17	8.19	8.61	8.67	9.18	9.31	9.65	9.64	10	9.85
C. standard	7.30	7.28	7.90	7.70	8.20	8.28	8.55	8.70	9.16	9.20	9.69	9.70	9.94	10
No. comp. Sch.	2		5		15		12		49		68		17	
No. comp. C.	4		6		8		14		41		76		12	
I ^h Sch. standard	7.00	6.90	7.83	7.87	8.13	8.17	8.67	8.72	9.21	9.16	9.66	9.58	10	9.80
C. standard			7.70	7.90	8.23	8.27	8.71	8.82	9.19	9.26	9.65	9.70	9.81	10
No. comp. Sch.	2		4		11		15		44		39		17	
No. comp. C.			3		12		23		33		51		7	
III ^h Sch. standard					8.22	8.28	8.69	8.78	9.24	9.31	9.65	9.72	10	9.96
C. standard					8.40	8.22	8.75	8.72	9.16	9.25	9.56	9.69	9.81	10
No. comp. Sch.					10		28		65		62		10	
No. comp. C.					10		24		51		71		18	
V ^h Sch. standard			7.60	7.50	8.12	8.07	8.72	8.71	9.21	9.20	9.63	9.55	10	9.75
C. standard													9.80	10
No. comp. Sch.			1		16		32		107		119		24	
No. comp. C.													65	
VII ^h Sch. standard	7.20	7.00	7.68	7.62	8.18	8.32	8.72	8.89	9.19	9.29	9.66	9.61	10	9.78
C. standard													9.82	10
No. comp. Sch.	2		6		12		35		158		200		34	
No. comp. C.													28	
Mean Sch. - C.														
O ^h	-0.06		+0.13		-0.05		-0.08		-0.08		0.00		+0.05	
I	+ .10		+ .12		00		+ .03		+ .06		+ .06		.00	
III					+ .06		- .03		- .08		- .10		- .08	
V			+ .10		+ .05		+ .01		+ .01		+ .08		+ .03	
VII	+0.20		+0.06		-0.14		-0.17		-0.10		+0.05		+0.02	

COMPARISON OF MAGNITUDES WITH THE CORDOBA ZONE-CATALOGUES

Zone Mag.	7	7 $\frac{1}{4}$	7 $\frac{1}{2}$	7 $\frac{3}{4}$	8	8 $\frac{1}{4}$	8 $\frac{1}{2}$	8 $\frac{3}{4}$	9	9 $\frac{1}{4}$	9 $\frac{1}{2}$	9 $\frac{3}{4}$	10
II ^h Cord. DM.	7.10	7.29	7.40	7.66	7.92	8.18	8.51	8.57	8.82	9.01	9.02	-	9.20
No. comp.	5	12	21	15	41	23	67	44	95	21	22	-	3
III ^h Cord. DM.	7.09	7.25	7.43	7.78	8.05	8.23	8.49	8.66	8.86	8.91	8.85	-	8.83
No. comp.	12	11	20	16	31	32	65	45	100	15	44	-	3
IV ^h Cord. DM.	7.19	7.21	7.32	7.51	7.86	8.17	8.40	8.57	8.75	8.95	9.09	-	9.14
No. comp.	10	9	18	20	39	44	66	60	148	23	74	-	7
V ^h Cord. DM.	7.06	7.34	7.55	7.71	7.92	8.21	8.38	8.54	8.85	8.87	9.14	9.10	9.31
No. comp.	14	9	15	17	39	38	93	50	202	43	114	2	21
VII ^h Cord. DM.	7.21	7.67	7.66	7.71	8.05	8.07	8.54	8.77	8.97	9.08	9.27	-	9.34
No. comp.	21	3	19	7	46	27	121	28	227	22	171	-	22
Mean, Z.C. - D.M.													
II	-0.10	-0.04	+0.10	+0.09	+0.08	+0.07	-0.01	+0.18	+0.18	+0.24	+0.48		+0.80
III	.09	.00	+ .07	- .03	- .05	+ .02	+ .01	+ .09	+ .14	+ .34	+ .65		+1.17
IV	.19	+ .04	+ .18	+ .24	+ .14	+ .08	+ .10	+ .18	+ .25	+ .30	+ .41		+ .86
V	.06	- .09	- .05	+ .04	+ .08	+ .04	+ .12	+ .21	+ .15	+ .38	+ .36	+0.65	+ .69
VII	-0.21	-0.42	-0.16	+0.04	-0.05	+0.18	-0.04	-0.02	+0.03	+0.17	+0.23		+0.66

DETERMINATION OF THE PROBABLE ERROR OF ADOPTED POSITIONS.

Catalogue		No. Comp.	Width	P.e. of Diff.		P.e. of Positions		Catalogue		No. Comp.	Width	P.e. of Diff.		P.e. of Positions	
			°	^s	ⁱ	^s	ⁱ				°	^s	ⁱ	^s	ⁱ
0 ^h	Sch. DM.	199	1	±0.61	±0.35	±0.41	±0.23	IV ^h	Sch. DM.	259	1	±0.60	±0.35	±0.42	±0.25
I ^h	Sch. DM.	188	1	.67	.45	.45	.22		A.G.C.	35	10	.43	.21	.43	.21
	A.G.C.	37	10	.34	.17	.34	.17		Oe. Arg.	50	8	.50	.25	.50	.25
II ^h	Sch. DM.	191	1	.59	.40	.40	.26	V ^h	Sch. DM.	305	1	.56	.33	.39	.23
	A.G.C.	35	10	.44	.26	.44	.26		A.G.C.	37	10	.45	.23	.45	.23
	Oe. Arg.	25	5	.45	.25	.45	.25		Oe. Arg.	51	8	.43	.24	.43	.24
III ^h	Sch. DM.	200	1	.62	.34	.44	.24		C.Z.C.	134	10	.40	.22	.40	.22
	A.G.C.	42	10	.44	.21	.44	.21	VII ^h	Sch. DM.	450	1	.56	.33	.39	.23
	Oe. Arg.	57	8	±0.44	±0.26	±0.44	±0.26		A.G.C.	43	10	±0.40	±0.22	±0.40	±0.22
														±0.42	±0.23

Cordoba, 1890 October 10.

FILAR-MICROMETER OBSERVATIONS OF COMET *e* 1890 (ZONA, Nov. 15),

MADE WITH THE 12-INCH EQUATORIAL OF THE LICK OBSERVATORY,

By E. E. BARNARD.

1890 Mt. Hamilton M.T.		*	No. Comp.	∠ — *		∠'s apparent		log pΔ	
				∠α	∠δ	α	δ	for α	for δ
Nov. 17	8 ^h 17 ^m 22 ^s	1	4, 6*	—0 ^m 0.58	—11 9.4	5 23 10.53	+33 55 38.8	n9.745	0.566
18	7 10 19	2	18, 6	—0 33.61	+2 37.5	5 17 43.68	+34 7 47.3	n9.754	0.669
19	7 22 6	3	16, 6	+0 11.86	+2 10.8	5 11 52.78	+34 19 32.4	n9.756	0.635

Mean Places for 1890.0 of Comparison-Stars.

*	α	Red. to app. place	δ	Red. to app. place	Authority
1	5 23 7.73	+3.88	+34 6 44.4	+3.8	Lal. 10245
2	5 18 13.88	+3.41	+34 5 6.4	+3.7	Weisse's Bessel, 5 ^h 439
3	5 11 37.48	+3.44	+34 17 18.1	+3.5	Compared with Bonn VI, 34° 996

* ∠α measured directly with the micrometer.

The comet is round, gradually brighter in the middle, with no definite nucleus. It is about 12^m.

Star 3 — Bonn 34° 996 —0^m 20^s.49 (18), —4' 10^s.4 (3)

The star DM. 34° 995 was compared with star 3.

DM. 34° 995, α = 5^h 11^m 58^s.31, δ = +34° 26' 57^s.0 (1890.0)

DM. 34° 995, —*3 +0^m 20^s.83 (12), +9' 38^s.9 (3)

RING-MICROMETER OBSERVATIONS OF COMET *e* 1890 (ZONA),

MADE WITH THE RUTHERFURD (13-INCH) EQUATORIAL OF COLUMBIA COLLEGE OBSERVATORY,

By J. K. REES AND HAROLD JACOBY.

1890 Col. College M.T.		*	No. Comp.	∠ — *		∠'s apparent		log pΔ		Obs.
				∠α	∠δ	α	δ	for α	for δ	
Nov. 18	10 25 37	1	1	—0 35.59	+2 44.9	5 17 41.72	+34 7 54.5	n9.582	0.320	Jac.
18	11 7 0	1	5	—0 44.96	+3 2.4	5 17 32.35	+34 8 12.0	n9.486	0.218	Rees
20	11 32 20	2	4	—0 19.88	—4 56.4	5 5 49.49	+34 30 56.5	n9.331	0.094	Jac.
20	11 42 4	2	6	—0 22.85	—5 8.1	5 5 46.52	+34 30 44.8	n9.285	0.072	Rees

Mean Places for 1890.0 of Comparison-Stars.

*	α	Red. to app. place	δ	Red. to app. place	Authority
1	5 18 13.71	+3.59	+34 5 5.7	+3.8	Paris 6222
2	5 6 5.72	+3.65	+34 35 47.9	+5.0	Weisse's Bessel V, 65