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COMMUNICATION FROM THE OBSERVATORY AT LEIDEN.

Observations of Eros stars in the year 1930, by *G. van Herk* and *D. Gaykema.*

In the months January to April 1930 about 150 Eros comparison stars, chosen from the list of Prof. KOPFF, published *A. N.* 5375, 5403, were observed with the meridian circle of the Leiden Observatory.

The observers at the telescope were Dr. C. H. HINS, D. GAYKEMA, G. VAN HERK and at the microscopes L. GAYKEMA, J. M. KRIEST, B. MEKKING and G. VAN HERK; the instrumental errors were determined by the latter.

The collimation constant was determined with the mercury basin, by reversing the instrument during transits of Polaris, and by pointings on the meridian marks. No appreciable difference between the values from these three methods was found.

The azimuth was determined by observations of Polaris.

The inclination was determined with the hanging level before and after observations.

In right ascension the stars were followed during four revolutions symmetrically with respect to the fixed middle wire, giving 26 contacts.

In declination the pointings on the stars were made in the middle of the field; two microscopes were read on one division each.

Each night only one co-ordinate was observed. The number of nights was 13 and 8 for R. A. and δ respectively.

On several occasions the seeing was poor to observe these rather faint stars.

The observations were reduced entirely differentially. On each night about 7 to 10 fundamental stars were observed before, during and after the programme stars. As fundamental stars only those were chosen which are published in *A. N.* 5481, and the places as there given were used, so that the positions are referred to the system "N. K. F. 3".

The stars were observed with two wire gauzes absorbing about 2·5 and 4·9 magnitudes.

From the fundamental stars the clock error, the equator point and their rates were determined.

Neither the clock errors nor the equatorpoints showed any correlation with magnitude.

The equatorpoints however did show a correlation with the declination, of the same amount as was found in a former investigation, which may be explained by a differential flexure of the tube. It amounts to $-''\cdot008$ per 1° of increasing declination, being zero at 37°·0. The positions of the programme stars were corrected for these values.

The observations clamp East and West showed no appreciable differences.

From all the residuals of each night, a night correction was computed. These corrections were applied to the individual observations.

From the resulting positions the mean error for one observation was computed with the aid of the formula:

$$\varepsilon^2 = \frac{\Sigma \Delta^2}{m-n},$$

Δ being the residual, m: number of obs., n: number of stars.

For α: $m = 381$, $n = 137$; δ: $m = 283$, $n = 124$.

From all residuals we found:

$$\varepsilon_\alpha = \pm {}^s\cdot037 \sec\delta, \qquad \varepsilon_\delta = \pm ''\cdot55$$

These large values are due almost entirely to a very few stars, but there were no real indications to exclude these.

A few stars not belonging to Prof. KOPFF's list were also observed, in R. A. only. These are given at the end.

The mean R. A. and δ given below are for 1930·0.

We wish to thank Dr. HINS for his help and advice in the reductions and the preparation of this paper.

No.	m	α	ep.	δ	ep.	n α	n δ	No.	m	α	ep.	δ	ep.	n α	n δ
		h m s		° ′ ″						h m s		° ′ ″			
169	9·0	7 53 0·297	1930·16	46 37 45·29	1930·11	2	4	270	8·9	9 27 43·422	1930·20			3	
170	8·7	54 53·377	·11	47 58 37·41	·11	4	4	271	9·4	29 19·739	·22	43 10 47·12	1930·11	1	1
171	9·3	56 15·877	·13	46 57 36·01	·11	3	3	272	9·0	30 12·816	·22			2	
174	9·6	58 14·499	·11	46 39 29·19	·11	4	3	273	8·3	30 54·184	·15	40 16 31·58	·24	1	1
176	8·8	8 0 1·350	·11	48 6 16·43	·11	4	3	274	9·9	31 24·928	·22	40 59 9·01	·14	1	2
177	9·5	1 32·705	·09	46 21 10·00	·12	3	2	276	8·8	33 24·947	·21	41 6 23·59	·18	2	2
180	9·6	3 43·605	·09	47 13 37·73	·11	3	3	277	8·8	33 52·743	·19	39 52 14·99	·14	3	1
182	7·8	7 5·170	·11	47 9 3·22	·11	4	3	278	9·5			41 53 59·40	·18		2
184	8·8	8 1·951	·11	46 21 4·03	·11	4	3	279	9·2	36 10·076	·19	41 23 36·16	·14	3	2
185	9·4	10 27·230	·09	46 19 21·25	·11	3	3	282	9·4	37 2·045	·27	40 48 54·38	·17	2	2
187	7·1	11 11·397	·17	47 1 0·52	·24	3	2	283	9·0	37 47·538	·19	39 33 59·61	·14	3	2
188	9·3	12 40·369	·09	46 26 37·14	·13	3	4	284	9·3	38 12·134	·27	41 10 21·37	·18	2	2
189	9·7	12 44·497	·20	47 22 37·30	·24	2	2	285	9·4			40 43 26·31	·18		2
190	9·3	13 58·923	·09	47 53 30·47	·13	3	4	287	8·8	39 59·374	·19	38 46 47·83	·14	3	2
191	9·3	15 9·077	·17	46 41 21·09	·24	3	2	289	9·4	40 51·602	·27	41 28 38·10	·18	2	2
192	8·3	16 0·825	·09	47 38 25·54	·13	3	4	290	9·0	42 24·138	·27	40 6 9·78	·18	2	2
194	9·4	19 3·338	·16	45 59 59·90	·13	2	3	291	9·2	43 11·402	·19	39 25 36·58	·14	3	2
197	9·4	22 14·094	·09	45 49 41·53	·13	3	3	294	8·9	44 0·724	·27	40 51 2·55	·18	2	2
199	7·2	23 13·344	·18	46 28 50·31	·17	4	3	295	9·4	45 10·425	·19	39 29 17·94	·14	3	2
200	9·9	24 37·697	·15	45 46 7·41	·18	1	2	296	7·0	45 56·304	·27	39 57 29·90	·18	2	2
201	9·3	25 34·336	·18	46 5 42·49	·14	4	1	297	8·8	47 0·583	·21	40 31 32·83	·14	4	2
202	7·8	25 42·458	·09	46 31 15·58	·16	3	3	299	9·7	47 19·840	·27	38 45 56·99	·18	2	2
203	9·2	26 40·651	·17	46 50 19·46	·14	3	2	302	9·0	50 6·200	·27	39 14 38·79	·11	2	1
204	9·8	28 43·332	·14	46 9 31·38	·16	3	3	303	9·4	50 14·759	·19	37 48 39·65	·14	3	2
205	7·5	29 26·356	·17	45 26 11·39	·14	3	2	304	8·5	50 27·668	·22	39 27 3·47	·24	2	1
207	8·8	31 55·513	·16	45 17 7·85	·16	4	3	306	9·0	51 33·450	·27	37 31 38·70	·18	2	2
209	9·4	32 17·239	·20	45 53 7·29	·14	4	2	307	8·8	52 35·895	·19	37 6 39·42	·14	3	2
211	9·5	33 20·412	·18	46 5 14·12	·16	2	3	308	9·2	52 51·094	·27	38 23 14·24	·18	2	2
212	9·0	36 4·725	·09	46 40 41·71	·16	3	3	310	8·3	53 53·933	·19	39 16 13·86	·14	3	2
213	8·5	36 10·741	·19	45 23 53·05	·14	5	2	311	9·4	54 46·206	·27	37 28 28·58	·18	2	2
216	9·4	37 38·206	·10	45 7 0·32	·13	2	3	313	8·9	55 30·323	·19	38 56 47·76	·14	3	2
217	8·3	39 7·083	·09	45 42 25·26	·17	3	2	314	9·7	56 27·036	·29	36 8 49·48	·24	2	1
218	7·8	40 34·601	·09	46 25 36·42	·17	3	2	316	9·7	57 14·274	·22	35 50 7·58	·14	2	2
219	9·5	41 1·533	·19	45 15 57·41	·14	3	2	317	8·1	57 22·934	·18			1	
223	7·8	44 59·913	·18	45 14 18·00	·14	4	1	318	8·6	57 44·324	·27	38 4 52·00	·24	2	1
224	7·6	46 36·289	·18			4		319	9·0	58 55·821	·19	37 11 24·94	·14	3	2
226	9·3	47 41·882	·19	44 37 50·44	·14	3	2	320	9·7	59 37·363	·24	37 50 37·63	·30	1	1
227	9·4	49 14·124	·14	45 33 3·98	·13	3	3	323	9·2	10 0 26·700	·19	35 26 36·94	·14	3	1
228	8·7	50 51·064	·09	45 55 46.19	·17	3	2	324	9·8			35 59 2·55	·24		1
229	8·3	51 6·242	·19	44 55 50·06	·14	5	2	326	9·7	1 55·874	·20	37 32 4·89	·14	2	2
231	9·9	53 20·144	·18	45 37 32·35	·11	2	1	328	9·3	2 25·670	·27	33 52 24·15	·18	2	2
232	7·8	54 16·974	·18	44 41 49·26	·14	4	2	329	9·5	4 10·048	·27	35 40 45·11	·18	2	2
233	8·9	56 54·896	·09	43 57 22·00	·17	3	2	331	7·4	4 37·969	.19	34 35 11·51	·14	3	2
234	9·3	57 14·109	.19	45 24 44·38	·14	3	2	333	8·3	5 36·918	·27	33 8 3·25	·18	2	2
235	9·7	58 59·174	·14	45 47 50·43	·18	3	2	335	8·3	6 17·824	·21	34 28 31·24	·14	4	2
236	9·4	59 20·392	·20	45 5 52·39	·14	2	2	336	9·5	6 59·366	·30	35 11 28·90	·18	1	2
237	8·1	9 0 13·206	·20	43 44 10·15	·14	2	2	339	9·5	8 28·418	·26	35 34 6·45	·14	2	2
238	8·9	0 47·126	·09	44 19 52·40	·16	3	3	340	8·7	8 37·158	·27	34 13 17·04	·18	2	2
239	9·5	2 32·863	·14	44 59 8·82	·16	3	3	342	8·4	10 5·198	·27	31 54 38·00	·18	2	2
240	8·9	2 39·362	·19	45 27 29·65	·14	3	2	343	9·6	10 12·306	·26	33 10 20·98	·14	2	2
242	9·0	4 23·193	·11	44 20 10·50	·16	3	3	347	8·7	12 6·120	·27	34 8 35·54	·18	2	2
243	9·0	5 20·106	·19	44 47 23·42	·14	3	2	348	9·2	12 8·267	·20	32 36 55·42	·14	2	2
245	7·7	7 8·260	·09	45 6 39·50	·16	3	3	353	7·5	13 35·466	·19	31 14 14·22	·14	3	1
246	9·4	7 35·612	·19	43 41 31·07	·14	3	2	355	9·2	14 44·410	·21			3	
247	8·2	8 45·773	·09	44 35 57·45	·16	3	3	368	8·8	18 20·193	·27	31 53 51·34	·18	2	2
248	8·9	9 7·918	·19	44 7 0·58	·14	3	2	369	9·3	18 39·857	·21	29 23 58·50	·14	3	2
249	9·5	11 10·232	·14	44 32 52·12	·16	3	3	371	8·7	19 31·381	·21	30 12 14·05	·14	3	2
250	7·5	11 23·113	·19	42 43 27·64	·14	3	2	383	7·6	23 3·116	·21	30 1 56·27	·14	3	2
252	8·4	12 31·061	·17	43 22 40·50	·14	3	2	395	8·0	25 44·331	·21	24 19 46·25	·14	3	2
253	8·2	13 34·034	·09	42 21 35·55	·16	3	3	608	9·3			— 8 17 56·75	·24		1
254	9·6	13 56·005	·19	44 43 50·26	·14	3	1	618	9·4	14 23·950	·30	— 7 31 51·39	·18	1	2
256	9·5	14 54·171	·10	43 49 29·33	·16	2	3	629	9·5	15 47·673	·30	— 9 36 0·61	·11	1	1
257	8·7	18 18·952	·16	42 30 6·80	·16	4	3	631	8·9	15 55·375	·21	— 5 16 53·88	·14	3	2
259	9·0	18 54·060	·17	42 10 15·56	·14	3	2	636	9·0	17 4·556	·27	— 6 38 46·27	·18	1	2
260	8·1	19 46·522	·16	43 16 50·98	·16	4	3	637	9·0	17 21·130	·23	— 7 37 46·83	·14	3	2
261	9·3	21 22·882	·16	41 30 34·17	·12	4	2	652	9·4	19 19·822	·30			1	
262	8·8	21 30·354	·18	42 14 42·49	·14	4	2	661	7·5	20 34·330	·21	— 4 34 20·69	·14	3	2
264	9·2	24 39·557	·14			2		667	9·3	21 23·140	·27	— 3 9 48·00	·18	2	2
265	8·8	24 44·222	·22			1		668	9·5	21 25·478	·20	— 1 7 24·14	·14	2	1
267	7·9	25 34·316	·18	42 34 17·77	·14	4	2	677	9·4	23 10·329	·30	— 6 9 26·25	·11	1	1
268	9·0	26 34·150	·14	40 57 4·13	·12	3	2	686	8·5	24 23·232	·27	— 2 21 19·83	·18	2	2

No.	m	α	ep.	δ	ep.	n_α	n_δ	No.	m	α	ep.	δ	ep.	n_α	n_δ
		h m s		° ′ ″						h m s		° ′ ″			
687	9·5	10 24 23·899	1930·20	— 0 12 8·42	1930·14	2	2	759	9·5	10 30 23·101	1930·30			1	
700	9·3	25 53·630	·28			2		768	8·7	31 18·162	·27	4 53 55·28	1930·18	2	2
713	9·4	26 56·862	·27	6 58 40·55	·11	2	1	773	9·4	31 43·608	·20	11 17 43·50	·14	2	2
715	9·4	27 30·498	·26	9 8 22·66	·14	2	1	784	9·5	32 33·264	·28	19 16 54·15	·11	2	1
733	9·4	28 48·798	·20	17 16 14·94	·14	2	2	791	9·5	32 52·566	·20	17 12 2·86	·14	2	2
742	8.9	29 33·298	·27	14 12 49·09	·18	2	2	809	9·9			10 49 44·73	·14		1
753	9·4	30 8·894	·20	16 51 34·06	·14	2	2	814	8·3	35 5·268	·27	13 7 36·65	·18	2	2

No.	m	α	ep.	n
		h m s		
B.D. 46° 1337	9·1	7 53 18·578	1930·06	2
45 1620	7·7	8 36 58·939	·07	1
45 1677	9·4	9 2 22·364	·22	1
40 2226	6·8	31 5·389	·27	2