PRACE TOWARZYSTWA PRZYJACIÓŁ NAUK W WILNIE.
Wydział nauk matematycznych i przyrodniczych. Tom X.
TRAVAUX DE LA SOCIÉTÉ DES SCIENCES ET DES LETTRES DE WILNO.
Classe des Sciences mathématiques et naturelles. Tome X.

BULLETIN
DE L'OBSERVATOIRE ASTRONOMIQUE
DE WILNO

I. ASTRONOMIE
№ 17

BIULETYN
OBSERWATORJUM ASTRONOMICZNEGO
W WILNIE

WILNO
1936
Wydano częściowo z zasiłku Funduszu Kultury Narodowej.
Zakłady Graficzne „ZNICZ", Wilno.

Bulletin
de
l'Observatoire astronomique
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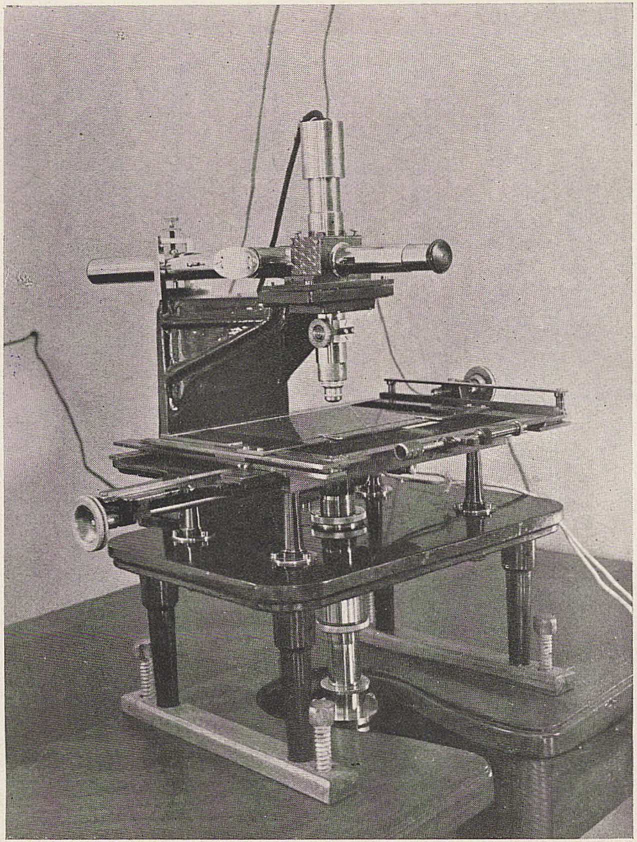
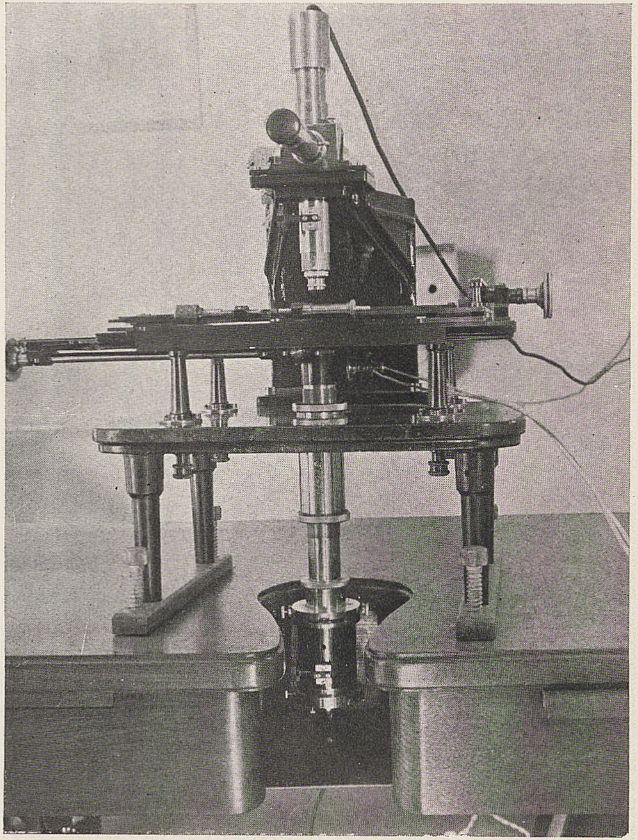
TABLICA I (VIII).

Prace Wydziału Mat.-Przyrodn. Tow. Przyj. Nauk w Wilnie. T. X.





W. Iwanowska.

WILHELMINA IWANOWSKA.

Fotometr termoelektryczny Obserwatorjum Wileńskiego.

The thermoelectric photometer of the Wilno Observatory [1]).

(Komunikat zgłoszony przez czł. Wł. Dziewulskiego na posiedz. w dn. 29.XI.1935 r.).

The microphotometer for measuring the densities of the photographic star images now used at the Wilno Observatory (plate I) was built in 1934 in the workshop of the Physical Laboratory under the kind supervision of Professor Wacław Dziewulski.

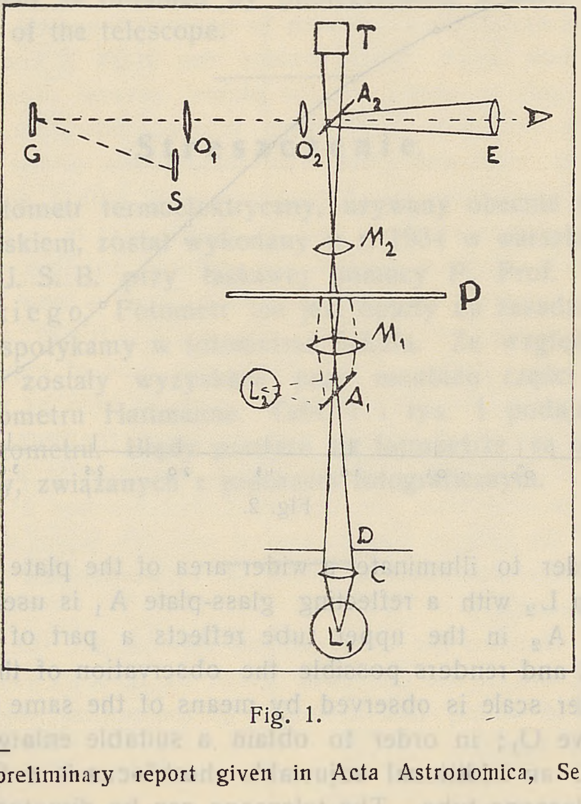


Fig. 1.

[1]) See preliminary report given in Acta Astronomica, Ser. c. Vol. 2 pg. 82. 1934.

The instrument has been designed on the lines similar to those of Schilt photometer. It is mounted on the base of a Hartmann photometer, consequently the optical axis, perpendicular to the moving plate holder, is vertical. The principle of the instrument is explained in fig. 1. A real image of the circular diaphragm D is formed on the plate P by a microscope objective M_1. The diaphragm is illuminated by a 6-Volt electric lamp L_1, the rays of which are concentrated on the diaphragm by the short focus positive lens C. The image of the diaphragm with the star image in its centre is reproduced again by a similar microscope objective M_2 on the window of a Zernike thermopile connected to a Zernike galvanometer. All the optical parts below the plate are contained in a tube providing sufficient stability. The lamp, the diaphragm and the tube as a whole can be adjusted with the aid of slow-motion arrangements.

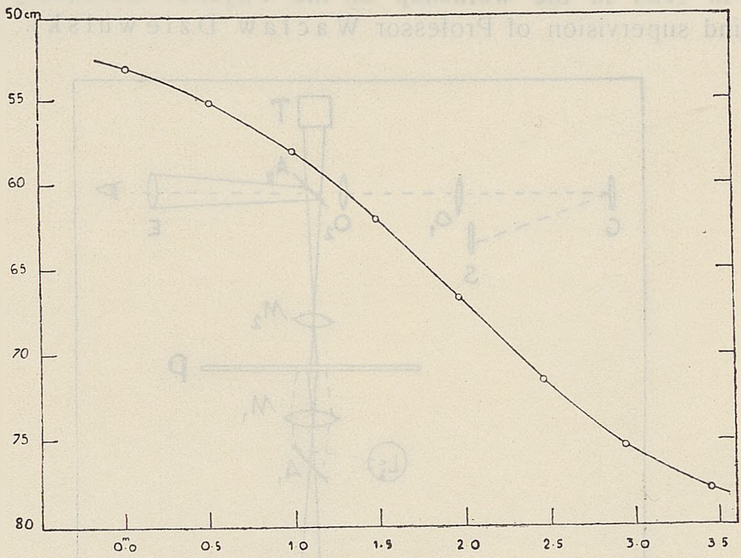


Fig. 2.

In order to illuminate a wider area of the plate an additional 2-Volt lamp L_2 with a reflecting glass-plate A_1 is used. A similar glass-plate A_2 in the upper tube reflects a part of light into the eyepiece E and renders possible the observation of the plate. The galvanometer scale is observed by means of the same eyepiece and the objective O_1; in order to obtain a suitable enlargement of the scale image an additional adjustable short-focus lens O_2 is inserted into the telescope tube. The telescope can be directed towards the galvanometer mirror by a slight revolution of the objective part $O_1—O_2$ of the doubly broken telescope tube.

In order to give an illustration of the sensibility of the instrument a density-curve of a plate taken with the objective wire grating on the telescope is given in fig. 2. The mean error of one measurement is about 0.1 cm; for the central part of the density-curve that corresponds to $0^m.01$ which value is less than the errors connected with the photographing process, the iteration of measurements is therefore not necessary. Controlling measurements are recommended instead in order to eliminate possible systematic errors arising chiefly from the gradual fall of voltage of the lamp battery.

The handling of the photometer is simple and takes little time: one measurement of a star including the setting and recording lasts about 30 sec.. In the course of the photometric investigations made with the Zeiss astrograph (O = 15 cm, F = 150 cm) in conjunction with the present photometer it has been found that the best compromise between the economy in exposure time and the accuracy of measurement is obtained by photographing a little, say 1 mm, out of focus of the telescope.

Streszczenie.

Mikrofotometr termoelektryczny, używany obecnie w Obserwatorjum Wileńskiem, został wykonany w r. 1934 w warsztatach Zakładu Fizyki U. S. B. przy łaskawej pomocy P. Prof. Wacława Dziewulskiego. Fotometr ten jest oparty na zasadzie podobnej do tej, jaką spotykamy w fotometrze Schilta. Ze względów oszczędnościowych zostały wyzyskane przy montażu części (podstawa i stolik) fotometru Hartmanna. Tabl. I i rys. 1 podają fotografję i schemat fotometru. Błędy pomiaru na fotometrze są mniejsze od błędów kliszy, związanych z procesem fotograficznym.

WŁADYSŁAW DZIEWULSKI.

Obserwacje fotograficzne i wizualne gwiazdy zmiennej GO Cygni.

Photographic and visual observations of the variable star GO Cygni.

(Komunikat zgłoszony na posiedzeniu w dniu 29.XI. 1935 r.).

From the 6th of November 1931 were made 169 intrafocal exposures at Wilno Observatory for the investigation of the variable stars X and GO Cygni. The exposures were made with interruptions till the 1st of July 1935 by Miss W. Iwanowska, Mr W. Zonn and Mr B. Marczewski, I wish to express them all my sincerest thanks for their work. Since besides the stars X and GO Cygni, which are largely separated on the plates, several other stars, suspected of the variability, were taken into consideration, the number of comparison stars was great. The magnitudes of the comparison stars were derived from the exposures, made with a wire grating in front of the objective. They will be given later in a paper on the variable star X Cygni; at present the material for this variable star is a little too scarce, therefore only GO Cygni is now investigated.

The exposures were made with a Zeiss-triplet (0 = 15 cm, F = 150 cm) on Lumière „Opta“ plates, the time of exposures being usually 15 minutes; for the exposures, made in 1935, at the moments when the brightness of X Cygni was maximum, the time of exposures was from 1 to 8 minutes. On the plates, made with a wire grating in front of the objective, the time of exposures was $1^h\,20^m$. — The blackness of the images was measured with the Wilno thermoelectric microphotometer, described by Miss W. Iwanowska in this number of the Bulletin.

Table I contains the observational material and the phases computed by the aid of the elements, given by B. Kukarkin[1]. (The observations to which half a weight of the normal observations is attributed are signed:).

[1] Tashkent Circular. № 5. 1932.

TABLE I.

J. D. M. Gr. hel. T.	Phase	m	Observ.	J. D. M. Gr. hel. T.	Phase	m	Observ.
2426652.273	0.693	9.02	M	2426914.424	0.143	8.50	M
652.285	0.705	8.98	„	918.415	0.545	8.50	„
654.251	0.518	8.40	„	918.426	0.556	8.48	„
654.264	0.531	8.43	„	918.437	0.567	8.49	„
654.275	0.542	8.41	„	918.488	0.618	8.53	„
654.288	0.555	8.43	„	919.428	0.122	8.52	„
675.230	0.682	8.80	„	928.462	0.543	8.44	„
675.244	0.696	8.90	„	928.473	0.554	8.42	„
675.257	0.709	9.01	„	928.484	0.565	8.47	„
678.256	0.119	8.44	„	928.493	0.576	8.45	„
678.269	0.132	8.45	„	930.426	0.354	8.65	„
678.283	0.146	8.41	„	930.437	0.365	8.70	„
678.310	0.173	8.43	„	930.448	0.376	8.61	„
678.323	0.186	8.42	„	930.460	0.388	8.61	„
680.300	0.010	9.02	„	961.421	0.327	8.57	„
680.311	0.021	8.95	„	961.432	0.338	8.56	„
680.322	0.032	8.89	„	980.270	0.672	8.81	Iw
680.334	0.044	8.70	„	980.285	0.687	8.94	„
680.345	0.055	8.70	„	980.328	0.012	9.00	„
710.172	0.453	8.47	„	980.410	0.094	8.52	Z
710.183	0.464	8.47	„	980.461	0.145	8.43	„
710.194	0.475	8.46	„	980.497	0·181	8.47	„
710.211	0.492	8.47	„	980.543	0.227	8.49	Iw
710.222	0.503	8.41	„	981.260	0.227	8.47	„
826.458	0.462	8.48	„	981.313	0.280	8.56	„
826.470	0.474	8.49	„	981.362	0.329	8.58	„
826.482	0.486	8.50	„	981.401	0.368	8.68	Z
834.494	0.602	8.44	„	981.426	0.393	8.62	„
834.506	0.614	8.56	„	981.471	0.438	8.58	„
835.490	0.163	8.40:	„	981.514	0.481	8.51	„
835.501	0.174	8.41:	„	981.536	0.503	8.47	„
854.450	0.461	8.47:	„	981.572	0.539	8.41	„
854.461	0.472	8.47:	„	982.294	0.543	8.46	Iw
856.423	0.280	8.55	„	983.371	0.184	8.43	Z
856.434	0.291	8.53	„	985.336	0.714	9.02	„
856.445	0.302	8.60	„	985.381	0.041	8.80	„
857.412	0.552	8.48:	„	986.456	0.398	8.59	„
857.423	0.563	8.48:	„	986.495	0.437	8.57	„
857.434	0.574	8.45	„	986.539	0.481	8.51	„
859.432	0.418	8.63	„	987.301	0.525	8.47	Iw
859.454	0.440	8.58	„	987.395	0.619	8.48	Z
861.412	0.245	8.49	„	987.431	0.655	8.78	„
861.450	0.283	8.58	„	987.451	0.675	8.86	„
864.436	0.398	8.65	„	987.496	0.003	9.04	Iw
864.448	0.410	8.62	„	987.538	0.045	8.81	„

J. D. M. Gr. hel. T.	Phase	m	Observ.	J. D. M. Gr. hel. T.	Phase	m	Observ.
2426988.403	0.192	8.41	Z	2427414.210	0.365	8.66	Iw
988.447	0.236	8.46	"	419.192	0.323	8.56	"
988.484	0.273	8.55	"	420.179	0.592	8.39	"
2427006.424	0.269	8.54	"	421.187	0.164	8.38	"
006.472	0.317	8.62	"	421.195	0.172	8.40	"
030.215	0.374	8.63	Iw	421.204	0.181	8.41	"
030.228	0.387	8.63	"	423.181	0.005	8.97	"
031.212	0.653	8.66	"	423.193	0.017	8.97	"
031.223	0.664	8 71	"	423.204	0.028	8.85	"
032.322	0.397	8.67	Z	423.215	0.039	8.81	"
032.433	0.438	8.56	Z	429.212	0.294	8.60	"
062.171	0.030	8.86	"	429.224	0.306	8.64	"
062.211	0.070	8.59	"	429.236	0.318	8.63	"
062.258	0.117	8.46	"	429.248	0.330	8.61	"
062.273	0.132	8.45	Iw	635.434	0.518	8.41:	Z
091.199	0.348	8.69	Z	635.445	0.529	8.41:	"
096.213	0.337	8.61	"	685.547	0.387	8.60	"
158.537	0.216	8.42	Iw	689.574	0.108	8.46	"
158.551	0.230	8.45	"	689.585	0 119	8.49	"
196.397	0.034	8.74	"	918.528	0.095	8 50	"
196.512	0.149	8.48	"	918 533	0.100	8.51	"
196.521	0.158	8.43	"	933.510	0.004	8.98	"
301.436	0.280	8.55	"	933.513	0.007	8.97	"
301.447	0.291	8.53	"	935.510	0.568	8.46	"
301.458	0.302	8.54	"	935.514	0.572	8.49	"
301.469	0.313	8.54	"	951.498	0.048	8.68	"
313.347	0.707	9.01	"	951.500	0.050	8.71	"
313.356	0.716	9.00	"	952.427	0.259	8.51	"
313.368	0.010	8.96	"	952.429	0.261	8.49	"
313.384	0.026	8.86	"	967.426	0.185	8.49	"
313.397	0.039	8.74	"	967.428	0.187	8.41	"
313.410	0.052	8.69	"	968.437	0.478	8.54	"
313.424	0.066	8.62	"	968.439	0.480	8.49	"
313.438	0.080	8.58	"	969.430	0.036	8.81	"
313.450	0.092	8.54	"	969.432	0.038	8.84	"
313.462	0.104	8.51	"	983.412	0.380	8.70	"
371.269	0.490	8.44	"	983.415	0.383	8.69	"
387.328	0.040	8.73	Z	985.426	0.241	8.48	"
398.192	0.138	8.39	Iw	985.427	0.242	8.49	"
399.205	0.433	8.56	Dz				

Abbreviations: Iw = W. Iwanowska, M = B. Marczewski, Z = W. Zonn.

The star GO Cygni was discovered as variable by H. Schneller[1]) on seven plates. As on one of these plates the star was weak, Kukarkin[2]) has later deduced the moment of minimum from the observations of Schneller. As this moment is very uncertain, it will be omitted here. The oldest observations were found on Moscow plates (1898 — 1911) by N. Florja. The star GO Cygni was then observed visually by B. Kukarkin[3]), S. Szczyrbak[4]), K. Kordylewski[5]), M. Beyer[6]), and photographically by W. Iwanowska and Wł. Dziewulski[7]) (the moment of minimum was corrected) and by S. P. Liau[8]); several series of visual observations made at Wilno Observatory with a shortfocus refractor by W. Iwanowska, W. Zonn and Wł. Dziewulski have not yet been published. These observations were reduced separately and the moments of minimum were derived for every observer.

From the photographic observations, made at Wilno Observatory and given in table I, the normal points were formed, which are given in tab'e II and fig. 1.

TABLE II.

Phase	m	Number of obs.	Phase	m	Number of obs.	Phase	m	Number of obs.
0.010	8.98	6	0.264	8.52	8	0.540	8.44	5
0.028	8.86	6	0.292	8.56	7	0.553	8.45	5
0.039	8.79	6	0.320	8.59	8	0.573	8.46	7
0.049	8.71	6	0.351	8.64	6	0.611	8.51	3
0.083	8.56	6	0.380	8.64	8	0.642	8.64	3
0.115	8.48	8	0.410	8.61	8	0.673	8.80	4
0.147	8.44	8	0.452	8.52	7	0.695	8.96	4
0.178	8.43	8	0.481	8.49	8	0.715	9.01	6
0.219	8.45	8	0.510	8.44	6			

The dispersion of the deviations of single observations from the curve is: $\pm$ 0^{m}032. The moment of the primary minimum, deduced from the photographic observations, is: J. D. 2427140.3745.

The photographic observations of Cecilia Payne Gaposchkin[9]) were not taken into consideration, as the moment of minimum was not given in her investigation.

[1]) Astronomische Nachrichten. Bd. 235. Kiel. 1929.
[2]) Tashkent Circular. № 5. 1932.
[3]) Veränderliche Sterne. Bd. IV. Nishni Novgorod. 1934.
[4]) Rocznik Astronomiczny. Supplemento № 10. Kraków. 1932.
[5]) Acta Astronomica. Ser. c. Vol. II. pag. 48. Kraków. 1933.
[6]) Astronomische Nachrichten. Bd. 258. Kiel. 1936.
[7]) Bulletin de l'Observatoire astronomique de Wilno. № 13. 1932.
[8]) Publ. de l'Observ. de Lyon. Tome I, fasc. 13. 1935.
[9]) Bulletin of the Harvard College Observatory. № 899. 1935.

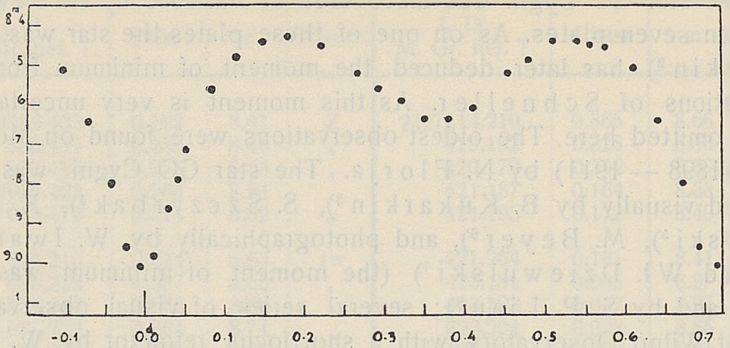


Fig. 1.

From all the observations, which are collected in table III, the corrections of the light variation elements given by Kukarkin were reckoned by the least-squares method, attributing greater weights to the photographic observations than to the visual ones. The solution gives the following elements:

$$\textbf{Min.} = \textbf{J. D. } \mathbf{2426509.4621 + 0^{d}.7177638\ E}$$
$$\pm 0.0014 \pm 0.0000003$$

TABLE III.

Author		Minimum observed	Weight	Minimum calculated	O. — C.
Florja	phot.	2416162.898	2	2416162.897	+ 0.001
Kukarkin	vis.	2425864.905	1	2425864.910	— 0.005
Beyer	vis.	2426112.539	1	2426112.539	0.000
Iwanowska-Dziewulski	phot.	2426120.424	1	2426120.434	— 0.010
Szczyrbak	vis.	2426509.467	1	2426509.462	+ 0.005
Kukarkin	vis.	2426540.327	1	2426540.326	+ 0.001
Kordylewski	vis.	2426711.145	1	2426711.154	— 0.009
Iwanowska	vis.	2427058.553	1	2427058.551	+ 0.002
Dziewulski	phot.	2427140.3745	4	2427140.3765	— 0.002
Zonn	vis.	2427325.561	1	2427325.560	+ 0.001
Liau	phot.	2427330.589	4	2427330.584	+ 0.005
Dziewulski	vis.	2427417.433	1	2427417.433	0.000

The column O.— C. gives the differences between minima observed and calculated with the above elements.

Streszczenie.

Praca niniejsza zawiera wyniki pomiarów 169 zdjęć gwiazdy zmiennej GO Cygni. Pomiarów zaczernienia dokonano zapomocą nowego mikrofotometru termoelektrycznego, opisanego w pracy Dr W. Iwanowskiej. Tablica I podaje materjał obserwacyjny, tablica II— miejsca normalne krzywej zmian blasku (rys. 1). Otrzymano moment głównego minimum: J. D. 2427140.3745.

W tablicy III zestawiono momenty minimum, wyznaczone z obserwacyj różnych autorów, przytem opracowano obserwacje wizualne, wykonywane w Wilnie (Dr W. Iwanowska, Dr W. Zonn i autor), a które dotychczas nie były ogłoszone drukiem. Wyprowadzono wreszcie nowe elementy zmian blasku:

$$\text{Min.} = \text{J. D. } 2426507.4621 + 0^{d}.7177638\ \text{E}$$
$$\pm 0.0014 \pm 0.0000003$$

WŁODZIMIERZ ZONN.

Krzywa jasności i elementy orbity gwiazdy CO Lacertae.
The light curve and the orbital elements of CO Lacertae.

(Komunikat zgłoszony przez czł. Wł. Dziewulskiego na posiedz. w dn. 29.XI.1935 r.).

This eclipsing binary, which is BD + 56°2857 (its provisional name was 62.1933 Lac.) is a very interesting object, as it shows, according to the U i t t e r d i j k's investigations [1]), a remarkable apsidal motion, the period of the revolution of the line of apsides being of the order of forty years. Since at the epoch 1933—1936 the line of the apsides must be nearly perpendicular to the line of sight, (the longitude of the periastron near 180°), the excentricity of the orbit of this binary must at this time have a considerable ininfluence on the shape of the light curve. Therefore the first observational material collected during the summer 1933 and used for the preliminary study of this star [2]) was enlarged during 1934 and 1935 so that there were together 210 focal and 66 intrafocal exposures, 70% of them made during the eclipses of the star. As the measurements of the plates taken at 1933 were very inaccurate, they were measured once more on the thermoelectric microphotometer together with the plates recently obtained.

The camera and the plates used were those previously described.

The comparison stars were also the same. Their brightness was obtained by means of the field B_9 of „Harvard Standard Regions". The magnitudes thus obtained are given in table I. The last column contains the differences between the magnitudes obtained from focal and intrafocal exposures. They are very small for stars a, c, d and f, which are according to the U i t t e r d i j k's remark of early spectral types. For the stars b and e which are probably of later types they are greater.

[1]) B. A. N. VII, p. 159. 1934. [2]) Wilno Bulletin Nr. 14, p. 3. 1933.

TABLE I.

Name	B. D.	Magnitude		Diff.
		focal	intrafocal	
	^{0}	m	m	m
a	+ 56 2855	9.96	9.95	+ 0.01
b	56 2867	10.02	10.18	— .16
c	56 2856	10.36	10.36	.00
d	—	10.38	10.42	— .04
e	—	10.54	10.77	— .23
f	—	10.87	10.87	.00

The magnitudes of the variable star were deduced graphically from the relation between the galvanometer readings and the magnitudes of comparison stars. As the latter were situated very closely to the variable star (within a rectangle 10 × 10 mm²) no corrections for the differential extinction and the position on the plate were applied. The results of the individual exposures are collected in tables IV and V. They were then grouped according to the phases into normal places, each containing from 2 to 7 observations. The dispersion of single observations from the normal curve $\sqrt{\frac{[vv]}{n}}$ amounts to $\pm 0^m.06$ for the focal exposures and $\pm 0^m.04$ for the intrafocal ones. The phases were computed by the aid of the formula: phase $= 0^{d^{-1}}.6484200$ (J. D. — 2427000), the value of the reciprocal period being the mean of those given by Uitterdijk.

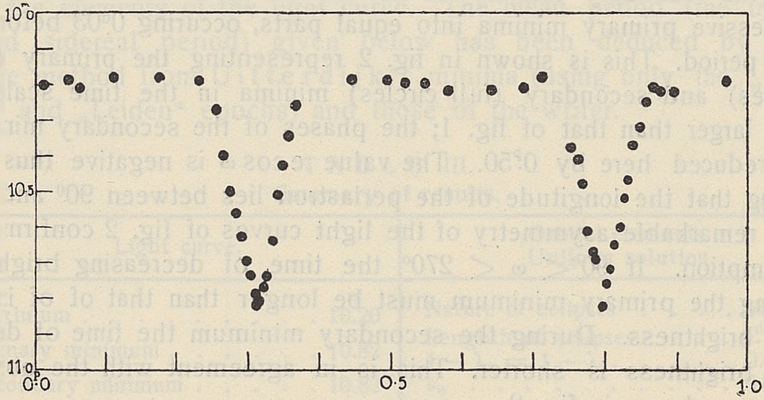


Fig. 1.

The 51 normal places containing only the results of focal photographs are given in table II and fig. 1. The few intrafocal observations were not used for the determination of the light curve. They

TABLE II.

№	Phase	Magn.	Number of observ.	№	Phase	Magn.	Number of observ.	№	Phase	Magn.	Number of observ.
	p	m			p	m			p	m	
1	0.010	10.20	2	18	0.326	10.74	5	35	0.772	10.61	3
2	.045	.19	5	19	.334	.64	4	36	.780	.67	3
3	.062	.21	6	20	.340	.51	3	37	.786	.69	5
4	.110	.18	5	21	.348	.43	4	38	.794	.82	5
5	.176	.18	6	22	.356	.35	4	39	.800	.76	5
6	.231	.19	2	23	.366	.26	2	40	.806	.72	4
7	.255	.27	4	24	.446	.19	2	41	.812	.65	5
8	.265	.40	4	25	.494	.19	4	42	.819	.60	5
9	.275	.50	4	26	.518	.20	4	43	.825	.52	5
10	.283	.56	4	27	.547	.20	4	44	.831	.47	3
11	.291	.63	5	28	.579	.22	6	45	.838	.37	3
12	.297	.70	5	29	.640	.22	4	46	.847	.32	3
13	.302	.74	5	30	.686	.21	5	47	.854	.25	3
14	.308	.79	4	31	.711	.18	6	48	.864	.21	3
15	.311	.83	4	32	.750	.38	5	49	.874	.22	3
16	.315	.81	7	33	.758	.41	2	50	.896	.22	4
17	.321	.77	6	34	.764	.48	2	51	.969	.18	4

were however used for the determination of the moments of minima. The following moments of heliocentric minima were obtained:

	Primary J. D.	Secondary J. D.	Phase of secondary minimum
			d
Intrafocal exposures . .	2426812.333	2426813.081	$^1/_2$ P — 0.023
Focal exposures	2427534.088	2427534.830	$^1/_2$ P — 0.029

These values suggest that the orbit of CO Laceratae is excentric; the secondary minima do not cut the interval between the two successive primary minima into equal parts, occuring $0^d.03$ before the half period. This is shown in fig. 2 representing the primary (open circles) and secondary (full circles) minima in the time scale five time larger than that of fig. 1; the phases of the secondary minimum are reduced here by $0^p.50$. The value $e \cos \omega$ is negative thus indicating that the longitude of the periastron lies between 90^0 and 270^0. The remarkable asymmetry of the light curves of fig. 2 confirms this assumption. If $90^0 < \omega < 270^0$ the time of decreasing brightness during the primary minimum must be longer than that of of increasing brightness. During the secondary minimum the time of decreasing brightness is shorter. This is in agreement with the observations as shown in fig. 2.

Assuming $\omega = 180^0$ in accordance with Uitterdijk's investigations the excentricity of the orbit of CO Lacertae is found to be 0.03 (the value of „i" is taken from table III given below). This value is equal to that given by Uitterdijk.

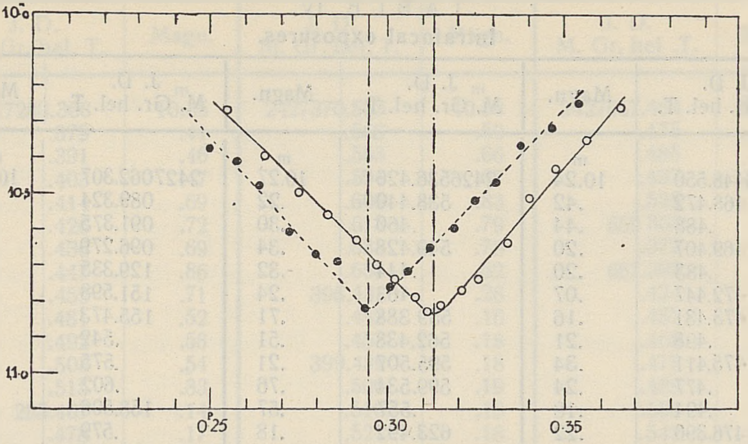


Fig. 2.

The orbital elements of CO Lacertae were deduced assuming the U hypotesis, which is in tolerable good agreement with the present observations. The light curve shows only the clean eclipsing effect, therefore no „rectifications“ were necessary. The influence of the asymmetry of the curves of the obtained elements was eliminated by plotting the points belonging to the descending and ascending branches together and then drawing the normal curve. From the comparison of such curves for primary and secondary minima the value of k = 1.00 was deduced. The other elements were deduced by Russell's method. They are given in table III together with the elements of the light curve. The mean period (the unperturbed sidereal period) given below has been deduced by least square method from Uitterdijk's minima (using only the „Potsdam“ and „Leiden“ epochs) and those of the writer.

TABLE III.
Summary of results.

Light curve.		Orbital elements. Uniform solution.	
Maximum	$10^{m}.20$	Nature of eclipses	partial
Primary minimum	10.82	Lenghth of eclipses	$0^{d}.240$
Secondary minimum	10.82	$1 - \lambda_1 = 1 - \lambda_2$	0.435
Epoch of primary minimum	J. D. 2427534.088	α_0	0.870
		k	1.000
Phase of secondary minimum	$^1/_2P - 0^{d}.029$	i	$87^{\circ}.1$
		$r_1 = r_2$	0.245
Mean period	$1^{d}.5422082$	e. cos ω	-0.029
		J_1 / J_2	1.000
		$L_1 = L_2$	0.500
		$\rho_1 = \rho_2$ $(m_1 = m_2)$	0.19

TABLE IV.
Intrafocal exposures.

J. D. M. Gr. hel. T.	Magn.	J. D. M. Gr. hel. T.	Magn.	J. D. M. Gr. hel. T.	Magn.
	m		m		m
2426448.550	10.24	2426536.426	10.27	2427062.307	10.23
468.472	.42	538.440	.22	089.324	.16
.488	.44	.460	.30	091.375	.31
469.407	.20	549.428	.34	096.279	.16
.483	.20	.444	.32	129.335	.29
472.447	.07	.463	.24	151.598	.73
473.431	.16	559.388	.71	155.473	.75
.498	.21	562.438	.51	.542	.31
475.411	.34	595.507	.21	.575	.30
.477	.24	599.534	.76	.602	.20
.494	.18	.557	.57	158.506	.62
476.390	.22	623.492	.18	.579	.48
479.363	.20	630.422	.40	159.307	.75
.493	.17	980.390	.58	177.425	.23
528.419	.26	.478	.56	.453	.21
.443	.22	981.339	.16	.541	.19
530.429	.20	983.393	.26	.560	.15
.444	.25	987.413	.42	188.354	.21
532.408	.69	.517	.17	.490	.28
.430	.67	2427030.460	.36	189.411	.52
.452	.50	.481	.50	.528	.24
535.450	.56	062.197	.60	208.487	.15

TABLE V.
Focal exposures.

J. D. M. Gr. hel. T.	Magn.	J. D. M. Gr. hel. T.	Magn.	J. D. M. Gr. hel. T.	Magn.
	m		m		m
2426973.349	10.28	2427272.439	10.22	2427280.343	10.68
979 302	.14	.463	.24	.356	.68
980.439	.87	273.373	.38	.368	.87
.521	.23	.397	.57	.380	.80
981.288	.28	.410	.68	.392	.64
.449	.21	.423	.54	.403	.71
.594	.22	.434	.76	.415	.60
985.353	.19	.445	.88	.431	.44
986.517	.29	.458	.85	.442	.21
987.473	.16	.469	.83	.453	.28
988.425	.26	274.428	.12	.465	.15
2427062.238	.49	275.374	.24	.476	.21
.428	.18	.385	.32	.488	.30
269.392	.26	.396	.23	.499	.20
.403	31	.407	.19	281.364	.22
.415	.22	.418	.17	.375	.16
.426	.20	.429	.30	.454	.14
.438	.17	279 373	.12	.465	.08
.450	.08	.383	.06	.476	.38
272.394	.14	.394	.19	.488	.09
.405	.29	.440	.33	.498	.23
.429	.24	.491	.13	.510	.27

J. D. M. Gr. hel. T.	Magn.	J. D. M. Gr. hel. T.	Magn.	J. D. M. Gr. hel .T.	Magn.
	m		m		m
2427283.368	10.35	2427370.553	10.38	2427657.464	10.80
.379	.41	.566	.50	.475	.77
.391	.46	.583	.66	.485	.75
.403	.47	.594	.67	.497	.67
.414	.69	.606	.83	.528	.31
.426	.72	.618	.79	659.363	.14
.436	.69	.633	.78	.372	.15
.447	.86	.658	.52	667.399	.31
.459	.71	396.431	.26	.424	.61
.481	.52	.442	.16	.457	.82
.492	.58	.453	.18	.468	.84
.503	.54	399.489	.18	.478	.70
.515	.33	.500	.19	.489	.71
285.467	.14	.510	.16	.503	.50
.478	.17	.521	.18	.542	.44
.489	.31	.532	.28	.553	.22
300.348	.44	635.458	.20	893.425	.90
.359	.36	.469	.24	.435	.84
.410	.77	637.386	.58	.446	.67
.423	.76	.397	.70	.455	.57
.451	.58	.408	.82	916.551	.76
.462	.56	.419	.70	917.308	.77
.474	.50	.430	.68	.319	.69
313.490	.48	.446	.62	.333	.52
.501	.43	.457	.52	.344	.42
.515	.57	.471	.42	.356	.38
.526	.83	638.440	.20	.367	.34
.538	.79	.451	.18	.383	.30
.549	.84	649.418	.17	.393	.26
.561	.80	653.434	.04	920.353	.54
365.327	.15	.445	.12	.362	.60
.339	.20	.456	.20	.372	.79
.350	.26	654.342	.64	.390	.78
.361	.26	.353	.75	.399	.70
.510	.18	.381	.86	.408	.71
.528	.23	.392	.77	.417	.68
367.339	.16	.435	.44	.426	.43
.352	.20	.446	.23	927.329	.72
368.211	.38	.456	.30	.338	.80
.222	.49	657.367	.27	.347	.91
.249	.60	.378	.22	.356	.69
.260	.67	.388	.46	.365	.78
.282	.70	.400	.38	.373	.69
.291	.70	.410	.59	.382	.69
370.323	.12	.422	.64	.391	.48
.491	.25	.432	.73	.400	.41
.524	.31	.443	.63	.408	.45
.539	.37	.453	.64	.417	.37

Streszczenie.

Praca niniejsza zawiera wyniki pomiarów jasności zmiennej zaćmieniowej CO Lacertae na 276 zdjęciach fotograficznych oraz wyznaczone na podstawie tych pomiarow elementy orbity tej gwiazdy. Wszystkie zdjęcia zmierzono na fotometrze termoelektrycznym i następnie zredukowano na podstawie wielkości gwiazd porównania (tab. I), otrzymanych z nawiązania pola badanego do pola B_9 katalogu „Harvard Standard Regions“. Z uzyskanych jasności gwiazdy badanej (tab. IV i V) utworzono grupy według faz i otrzymano średnią krzywą jasności (rys. 1 i tab. II). Wykazuje ona wyraźny efekt ekscentryczności orbity zarówno w przesunięciu fazy minimum wtórnego, jak i w asymetrji krzywej, odpowiadającej minimum głównemu i wtórnemu (rys. 2). Znaleziona stąd ekscentryczność orbity wynosi 0.03. Przez bezpośrednie porównanie krzywej w pobliżu minimum głównego i wtórnego uzyskujemy na k wartość równą 1.00; pozostałe elementy orbity otrzymano metodą Russell’a (tab. III) przy założeniu, że obie gwiazdy posiadają równomiernie świecące tarcze (hypoteza U).

WŁODZIMIERZ ZONN.

Krzywe jasności 17 nowych zmiennych.
The light curves of 17 new variables.

(Komunikat zgłoszony przez czł. Wł. Dziewulskiego na posiedzenin w dn. 29.XI. 1935 r.)

The present paper contains the results of the estimates of magnitudes of 17 new variables on the plates, taken at Wilno Observatory during the time interval 1928—1934 with the Zeiss Astrograph (0 = 15 cm, F = 150 cm) on the ordinary plates, the time of exposure varying from 15 to 30 minutes. The data concerning these stars are given in table I.

TABLE I.

Name	α_{1855}	δ_{1855}	Number of examined plates	Discovered by
FI Orionis (107. 1929)	$6^h 15^m 12^s$	$+14^\circ 37'.5$	120	Hoffmeister (A.N.236, 233)
1. 1934 Geminorum	21 46	13 42.3	136	Zonn (A. N. 251, 127)
179. 1935 Gem.	26 4	14 31.8	133	Zonn (A. N. 255, 187)
473. 1934 Gem.	26 16	15 39.5	136	Morgenroth (A. N. 254, 371)
Ross 196 Gem.	31 8	13 21.4	133	Ross (A. J. 882)
105. 1934 Gem.	35 53	16 32.3	136	Morgenroth (A.N. 252, 391)
SVS 601 Cyg.	20 21 37	36 5.1	80	Koulikovsky (V.S. IV, 361)
SVS 478 Cyg. (971. 1935)	23 17	33 39.3	105	A. Beljawsky (V.S. IV, 265)
SVS 479 Cyg.	26 35	34 58.0	105	S. Beljawsky (V.S. IV, 265)
SVS 485 Cyg. (972. 1935)	40 54	34 27.8	105	A. Beljawsky (V.S. IV, 265)
SVS 486 Cyg.	41 4	33 40.2	105	A. Beljawsky (V.S. IV, 265)
V 374 Cyg. (SVS 487)	41 25	34 28.3	107	A. Beljawsky (V.S. IV, 265)
V 375 Cyg. (190. 1935)	41 49	35 21.3	107	Zonn (A. N. 256, 171)
974. 1935 Cyg.	48 0	35 0.8	124	Zonn (A. N. 258, 119)
AK Cephei (SVS 572)	22 23 21	57 28.3	91	Lavdovsky (V. S. IV, 364)
SVS 602 Lac. (224. 1935)	30 53	56 1.1	91	Gitz (V. S. IV, 362)
SVS 634 Cep. (229. 1935)	33 25	56 12.2	91	Gitz (V. S. IV, 362).

A. N. — Astronomische Nachrichten, Kiel.
A. J. — Astronomical Journal, Albany.
B. Z. — Beobachtungs Zirkular, Kiel.
V. S. — Veränderliche Sterne, Gorki (Nishni Novgorod).

The brightness of the comparison stars was determined by means of the fields C_4, B_8 and B_9 of „Harvard Standard Regions" photographed on the same plates. These plates were measured with the thermoelectric photometer of Wilno Observatory. The magnitudes of comparison stars were deduced graphically from the relation between the magnitudes of Harvard stars and the galvanometer readings.

The brightness of the variable stars was measured following Argelander's method. The steps were converted into magnitudes by means of the magnitudes of comparison stars. The majority of the relations between the steps and magnitudes were non-linear and this fact was taken into consideration in the reductions. The mean error of one estimate varied from $\pm$ 0ᵐ.07 to $\pm$ 0ᵐ.09.

FI Orionis (BD + 14°1268). This eclipsing variable is a companion of a double star, as its images on the plates have a remarkable oval shape. The examined plates covered a rather short lapse of time so it was not possible to decide whether it is an optical or a physical pair. The estimates show only three minima: J. D. 2424887.31; 2424958.30 and 2427778.47 giving no information as to the period of the light variation. At J. D. 2426070.40 the star seemed to be fainter than usually.

1.1934 Geminorum (BD + 13°1279). This variable has been erroneously included into W Ursae Majoris type; although some light curves seemed to indicate this type, yet the comparison of all the estimates shows, that it is an irregular variable with very rapid changes of brightness, the light range being about $0^m.3$. This fact was confirmed also by thermoelectric measurements. The variable is of K_5 type. The comparison stars used here were:

B. D.	+13°1274	13°1277	13°1278	13°1283
Magn.	$10^m.19$	$9^m.68$	$10^m.32$	$9^m.59$

179. 1935 Geminorum. This is a long period irregular variable. From J. D. 2425264 to 2425330 its brightness was practically constant ($12^m.45$) the short period fluctuations being about $0^m.2$. From 2425980 to 2426095 it was at the same average brightness. At 2427157 and 2427159 it was a little fainter than usually ($12^m.6$). From 2427400 to 2427460 it was near $12^m.6$. At 2427478 and 2427508 it became very faint ($13^m.1$), and at 2427697 bright ($12^m.4$) again. It shew then an almost steady increase of brightness, attaining at 2427870 the value $12^m.1$. A similar character of the light variation of this star was found also by O. Morgenroth (B. Z. Nr. 18, 1935). The map of the examined region and the magnitudes of the comparison stars are given in fig. 1 and table II.

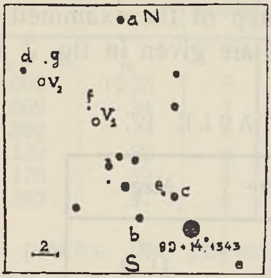


Fig. 1.

TABLE II.

Name	Magn.	Name	Magn.
	m		m
a	11.80	f	13.43
b	12.09	g	.46
c	.10	V_1	179. 1935 Gem.
d	.80	(V_2	AZ Gem.)
e	.97		

473. 1934 Geminorum (H. D. Ext. 259888; Sp. A.; Mag. 11.8). The light curve of this eclipsing binary is given in fig. 2. The coordinates of the normal places are given in table III, the phases being computed from the formula: phase $= 0^{d^{-1}}.61854$ (J. D. — 2425000). The

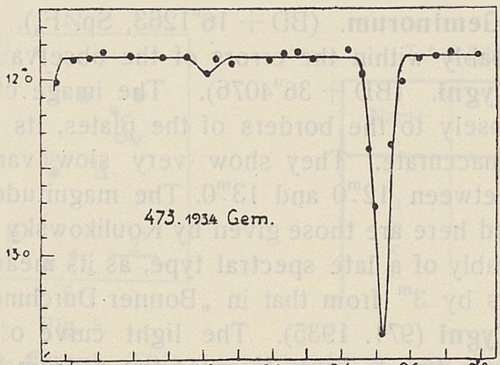


Fig. 2.

TABLE III.

Phase	Magn.	Number of obser-vations	Phase	Magn.	Number of obser-vations	Phase	Magn.	Number of obser-vations
p	m		p	m		p	m	
0.014	11.97	8	0.424	11.84	7	0.633	11.89	6
.046	.89	10	.466	.98	7	.681	.88	7
.092	.92	8	.486	12.40	3	.721	.85	5
.196	.90	6	.497	.73	3	.798	.87	11
.240	.86	6	.516	13.46	4	.893	.88	9
.280	.85	8	.542	12.38	3	.961	.87	8
.325	.89	8	.583	.02	6			

reciprocal period was taken from the value of the period given in B. Z. Nr. 37, 1935. The star is at maximum 11^m87 at primary minimum 13^m46 and at secondary minimum 11^m95. The eclipses are partial, their duration amounting to 7^h5. The map of the examined region and the magnitudes of comparison stars are given in fig. 3 and table IV.

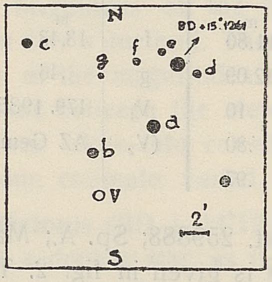


Fig. 3.

TABLE IV.

Name	Magn.
	m
a	11.10
b	.95
c	12.35
d	.70
e	13.00
f	.30
g	.75

Ross 196 Geminorum. This star seems to be of constant brightness.

105. 1934 Geminorum. (BD + 16°1263, Sp. F_8). The variations of light are probably within the errors of the observations.

SVS 601 Cygni. (BD + 36°4076). The image of this star was situated very closely to the borders of the plates, its estimates were therefore very inaccurate. They show very slow variations of the light intensity between 12^m0 and 13^m0. The magnitudes of the comparison stars used here are those given by Koulikowsky (V. S. IV, 361). This star is probably of a late spectral type, as its mean photographic magnitude differs by 3^m from that in „Bonner Durchmusterung".

SVS 478 Cygni (971. 1935). The light curve of this δ Cephei variable is given in fig. 4. Table V gives the coordinates of the nor-

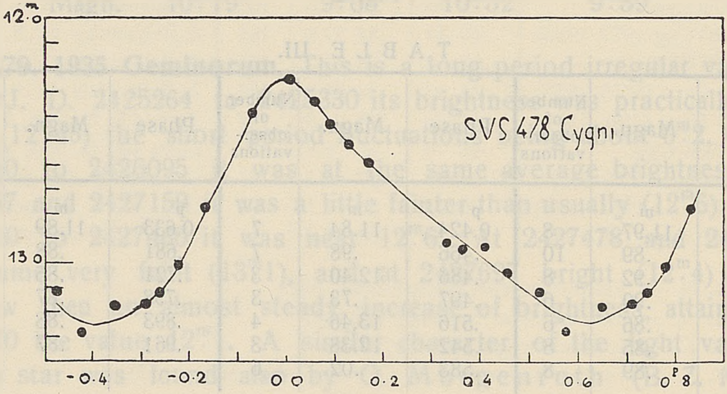


Fig. 4.

TABLE V.

Phase	Magn.	Number of observations	Phase	Magn.	Number of observations	Phase	Magn.	Number of observations
p	m		p	m		p	m	
0.007	12.25	5	0.363	12.95	7	0.708	13.17	5
.059	.34	7	.412	.93	8	.737	.12	7
.092	.44	6	.462	13.04	9	.778	.01	6
.132	.52	4	.522	.12	7	.836	12.78	5
.170	.59	6	.575	.28	10	.927	.39	2
.333	.92	6	.647	.18	5			

mal places, the phases being computed by means of the elements given in B. Z. Nr. 1, 1936. The brightness at maximum is $12^{m}.25$ and at minimum $13^{m}.25$. The value (M-m)/P amounts to 0.40. The observations give two normal maxima J. D. 2425154.282 and 2426141.216, the corrected elements obtained from them being:

$$\text{Max.} = \text{J. D. } 2425149.670 + 4^{d}.61184\,E.$$

The map of the examined region and the magnitudes of the comparison stars are given in fig. 5 and table VI.

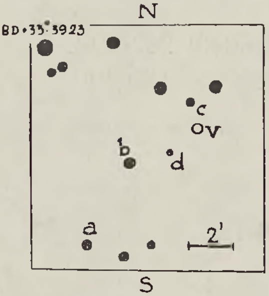


Fig. 5.

TABLE VI.

Name	Magn.
	m
a	12.00
b	.63
c	.97
d	13.57

SVS 479 Cygni. This is probably a long period irregular variable. Only one series J. D. 2425125—2425242 shows the increase of brightness from $13^{m}.7$ to $12^{m}.3$ (fig. 6); the other series viz.

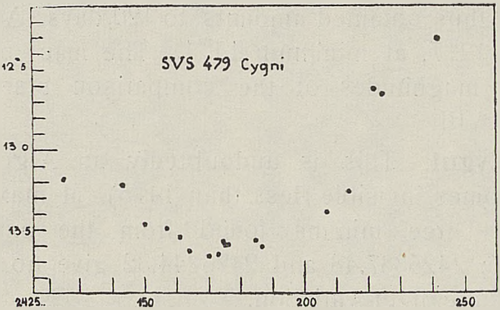


Fig. 6.

J. D. 2425870 — 2425920 and 2426090 — 2426270 give its magnitude near $13^m_{\cdot}0$ with the fluctuations of the order of $0^m_{\cdot}4$. The map of the examined region and the magnitudes of the comparison stars are given in fig. 7 and table VII.

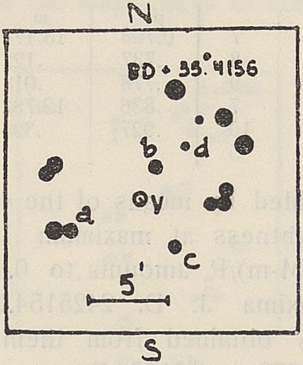


Fig. 7.

TABLE VII.

Name	Magn.
a	$12^m.00$
b	.85
c	13.40
d	.80

SVS 485 Cygni (972.1935). This variable is of Mira type. Its light curve (fig. 8) shows the following moments of maxima and minima:

Maxima: J. D. 2424155; 2426090; 2426215.
Minima: 2425210; 2425925; 2426190.

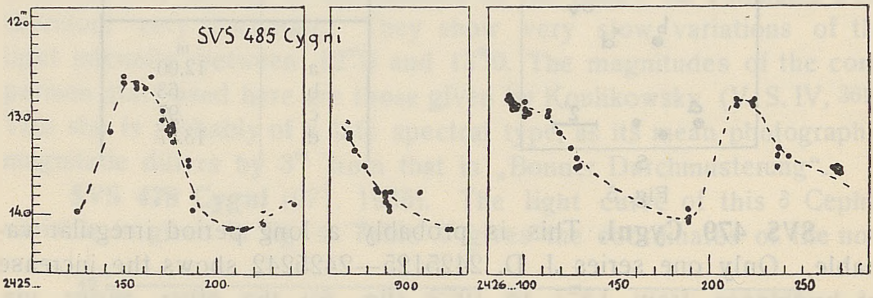


Fig. 8.

The period thus obtained amounts to 120 days. At maximum this variable is near $12^m_{\cdot}7$, at minimum $14^m_{\cdot}1$. The map of the examined region and the magnitudes of the comparison stars are given in fig. 9 and table VIII.

SVS 486 Cygni. This is undoubtedly an Algol variable. At minimum it becomes invisible (less than $14^m_{\cdot}5$), at maximum its magnitude is $12^m_{\cdot}5$. Three minima found from the examined plates: J. D. 2425157.36; 2425387.48 and 2426244.32 give no information as to the period of the light variation,

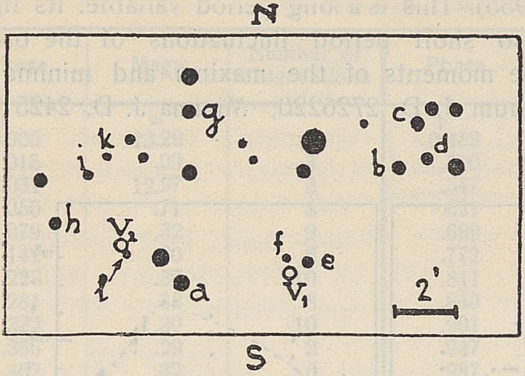


Fig. 9.

TABLE VIII.

Name	Magn.
a	$12^{\mathrm{m}}.33$
b	.78
c	.85
d	13.35
e	.48
f	14.16
V_1	SVS 485 Cyg.

V 374 Cygni (SVS 487). This Algol variable exhibits extremely rapid variations of brightness. The duration of the eclipse is $0^{\mathrm{p}}.07$, that of the total phase $0^{\mathrm{p}}.03$. At maximum it is $13^{\mathrm{m}}.02$, at minimum $14^{\mathrm{m}}.08$. No secondary minimum was found. Owing to the rapidity of the light variations and to the scarcity of observations during the eclipses the normal places could not be calculated with sufficient iaccuracy, therefore all the observations are represented graphically in fig. 10. The phases were computed by the aid of the formula given in B. Z. Nr. 1, 19. The present observations give two moments of normal minima J. D. 2425182.914 and 2426011.607. The corrected elements are therefore: Min. = J. D. 2425157.416 + $4^{\mathrm{d}}.24970$ E. The map of the examined region and the magnitudes of the comparison stars are given in fig. 9 and table IX.

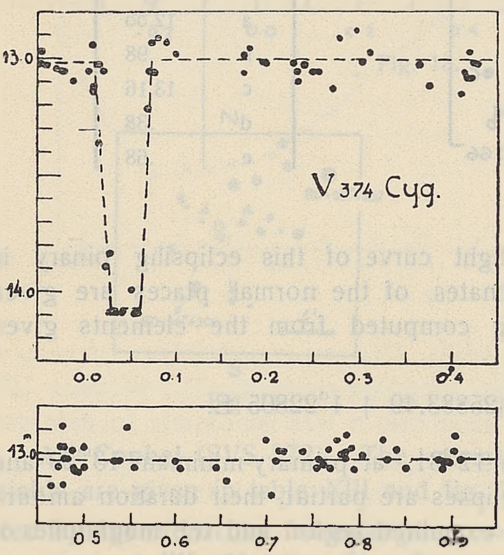


Fig 10.

TABLE IX.

Name	Magn.
g	$12^{\mathrm{m}}.89$
h	13.06
i	.34
k	.90
l	14.10
V_2	V 374 Cyg.

V 375 Cygni (190.1935). This is a long period variable. Its light curve (fig. 11) shows also short period fluctuations of the order of $0^m.4$ probably real. The moments of the maxima and minima of its brightness are: Maximum J. D. 2726220; Minima J. D. 2425170, 2425900 and 2426090.

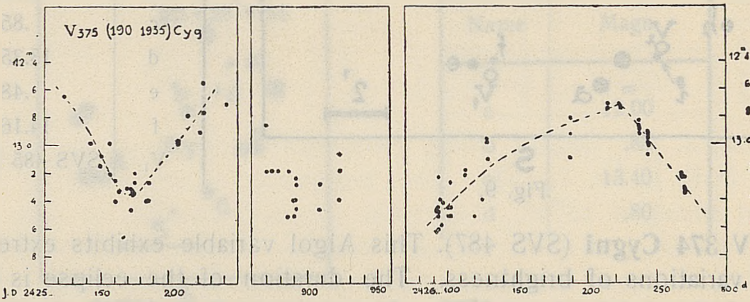


Fig. 11.

The period seems to be about 180 days. The map of the examined region and the magnitudes of the comparison stars are given in fig. 12 and table X.

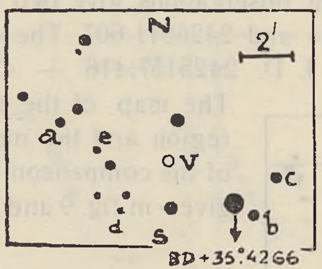


Fig. 12.

TABLE X.

Name	Magn.
a	^{m} 12.55
b	.98
c	13.16
d	.38
e	.68

974.1935 Cygni. The light curve of this eclipsing binary is given in fig. 13. The coordinates of the normal places are given in table XI, the phases being computed from the elements given in A. N. 258,119:

$$\text{Min.} = \text{J. D. } 2425883.49 + 1^d.22805 \text{ E.}$$

The star is at maximum $12^m.31$, at primary minimum $13^m.29$ and at secondary $12^m.43$. The eclipses are partial, their duration amounting to $6^h.0$. The map of the examined region and the magnitudes of the comparison stars are given in fig. 14 and table XII.

TABLE XI.

Phase	Magn.	Number of observations	Phase	Magn.	Number of observatons
p	m		p	m	
0.005	13.29	2	0.489	12.41	6
.015	.09	3	.520	.42	6
.031	12.97	3	.547	.31	5
.050	.71	5	.621	.29	7
.079	.32	9	.699	.29	7
.142	.30	6	.772	.33	6
.223	.32	10	.811	.28	6
.281	.33	8	.840	.34	4
.322	.30	10	.901	.30	4
.366	.29	2	.947	.75	4
.462	.32	6	.987	13.13	5

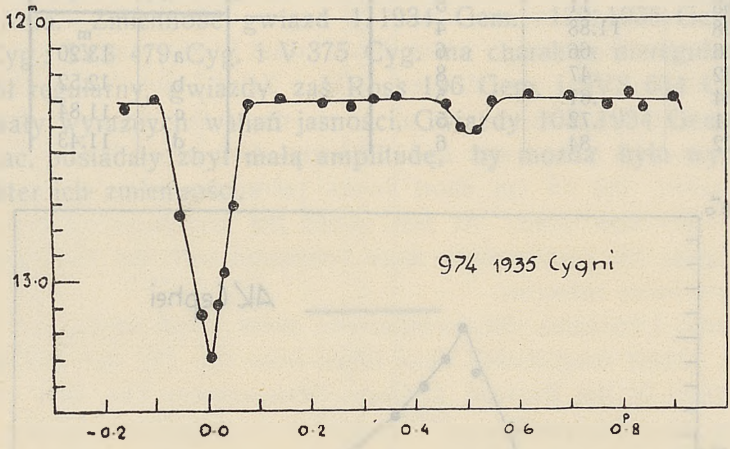


Fig. 13.

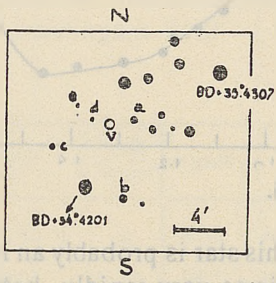


Fig. 14.

TABLE XII.

Name	Magn.
	m
a	12.15
b	.45
c	13.07
d	.17
e	.43

AK Cephei (SVS 572). The normal places of this δ Cephei variable are given in table XIII and fig. 15, the phases being computed by the aid of the formula: phase $= 0^{d^{-1}}.138124$ (J.D.—2427000); the reciprocal period is taken from the value of period given in B. Z.

Nr. 22, 1935. The light curve is typical for a δ Cephei variable. The brightness at maximum is $12^m_.46$, at minimum $13^m_.50$. The value (M-m)/P amounts to 0.33. The observations give the following moments of two normal maxima: J. D. 2427273.26 and 2427787.29. The comparison stars used here were those, used by Lavdovsky (V. S. IV, 364); their magnitudes are given in table XIV.

TABLE XIII.

Phase	Magn.	Number of observations
p	m	
0.041	12.08	9
.088	.24	4
.143	.32	11
.187	.36	8
.209	.41	5
.296	.46	4
.392	.48	6
.460	.51	6
.598	.11	5
.628	11.88	4
.706	.66	6
.732	.47	8
.764	.61	5
.811	.72	5
.872	.84	6

TABLE XIV.

Name	Magn.
	m
a	13.20
b	12.52
c	11.84
d	11.43

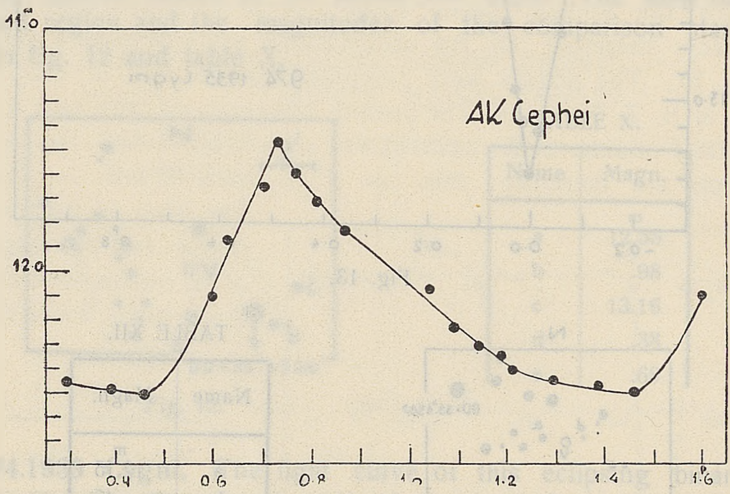


Fig. 15.

SVS 692 Lacertae (224.1935). This star is probably an irregular variable. Its brightness oscillates, sometimes very rapidly, between $12^m_.8$ and $13^m_.2$. The ranges are so small that it was impossible to determine the exact character of the light variation.

SVS 634 Cephei (229.1935). The light of this star seems to be constant.

Streszczenie.

Praca niniejsza zawiera wyniki ocen jasności 17 nowych gwiazd zmiennych na kliszach wileńskich. Jasności gwiazd porównania uzyskano przy pomocy jednoczesnych zdjęć pól badanych oraz pól C_4, B_8 i B_9 z katalogu „Harvard Standard Regions", przyczem zdjęcia te zmierzono na fotometrze termoelektrycznym. Natomiast oceny jasności gwiazd zmiennych wykonano według metody Argelander'a, zamieniając następnie stopnie na wielkości na podstawie otrzymanych wielkości gwiazd porównania. Uzyskane w ten sposób krzywe dla gwiazd SVS 478 Cyg. i AK Cephei wykazują przynależność ich do typu δ Cephei, gwiazdy 473.1934 Gem., SVS 486 Cyg. i 974.1935 Cyg. należą do typu Algola, wreszcie gwiazda SVS 485 Cyg. — do typu Mira. Zmienność gwiazd 1.1934 Gem., 179.1935 Gem, SVS 601 Cyg., SVS 479 Cyg. i V 375 Cyg. ma charakter nieregularny lub nawpół regularny, gwiazdy zaś Ross 196 Gem. i SVS 634 Cep. nie zdradzały wyraźnych wahań jasności. Gwiazdy 105.1934 Gem. i SVS 602 Lac. posiadały zbyt małą amplitudę, by można było wyznaczyć charakter ich zmienności.

WŁADYSŁAW DZIEWULSKI.

Obserwacje wizualne Nowej (DQ) Herkulesa.
Visual observations of Nova (DQ) Herculis.

(Komunikat zgłoszony na posiedzeniu w dniu 29.XI. 1935 r.).

As the weather at Wilno after the discovery of Nova Herculis was bad, the observations could be begun only on December 24-th 1934. At the beginning, when Nova was bright, the observations were made with the naked eye; later a Zeiss' binocular with 6-fold magnification was used and at some days the observations were made both with naked eye and with the binocular. When the star was weeker, the 15 cm short focus refractor (with a magnifying power: 20) was used. At last, when the brightness of Nova was rising again, the observations were continued with the binocular and the short focus refractor.

Table I contains the comparison stars used during the observations. Their magnitudes were taken from the N^{os} 898 and 899 of the Bulletin of the Harvard College Observatory. The first column contains the designation of the star; it is generally arbitrary, only the two last stars (namely m and p) are denoted according to Harvard Bulletin 899. The second column contains the name or B. D. number of the star, the third column — their magnitude.

TABLE I.

Design.	Star	Magn.	Design.	Star	Magn.	Design.	Star	Magn.
α	α Cyg	1.31	a	+ 45°2635	6.28	g	+ 45°2654	9.06
γ	γ Dra	2.14	b	45 2643	7.29	h	45 2656	10.30
δ	δ Cyg	2.97	c	46 2426	7.30	k	45 2655	10.44
ι	ι Her	3.75	d	45 2652	8.22	m	m	10.61
λ	+ 43°2892	4.96	e	45 2662	8 40	p	p	11.40
μ	45 2638	5.56	f	45 2666	8.96			

The observations are given in three tables, the successive columns containing the moments of observations, expressed in J. D. for the mean heliocentric Greenwich time, the comparisons with the stars given in table I and the deduced magnitudes.

TABLE II.

Obervations with the naked eye		
J. D. M. Gr. hel. T.	Comparisons	Magn.
2427		
796.167	α 9 N 6 δ	2.2
799.170	α 9 N 5 δ	2.2
799.302	α 9 N 5 δ	2.2
801.167	γ 4 N = δ, N 7 ι	2.9
802.369	δ 2 N 5 ι	3.2:
803.172	α 8 N 4 δ	2.2
803.244	α 8 N 5 δ	2.2
804.159	α 10 N 2 δ	2.4
806.178	α 12 N 2 δ	2.5
809.255	α 10 N = γ, N 3 δ	2.4
810.300	α 10 N = γ, N 4 δ	2.4
811.189	α 10 N 1 γ, N 4 δ	2.3
812.175	α 10 N = γ, N 4 δ	2.3
814.168	α 12 N = γ, N 3 δ	2.4
827.221	γ 3 N	2.7:
858.249	γ 3 N = δ, N 8 ι	2.8
865.291	δ 6 N 3 ι	3.4
865.402	δ 6 N 3 ι	3.4
870.315	δ 8 N 1 ι	3.6
870.412	N = ι	3.7
871.350	N = ι	3.7
871.367	δ 9 N 1 ι	3.7
889.382	ι 4 N 6 λ	4.2
889.407	ι 5 N 6 λ	4.4
889.452	ι 5 N 5 λ	4.4
892 343	ι 8 N 2 λ	4.8
892.383	ι 8 N 2 λ	4.8
892.413	ι 7 N 3 λ	4.6

Observations with Zeiss' binocular		
J. D. M. Gr. hel. T.	Comparisons	Magn.
2427		
871.351	δ 8 N 2 ι	3.6
871.367	δ 7 N 3 ι	3.5
872.383	δ 8 N 2 ι	3.6
876.288	δ 9 N 2 ι	3.6
876.392	δ 9 N 2 ι	3.6
878.393	ι 1 N 8 λ	3.9
879.367	ι 2 N 8 λ	4.0
881.392	λ 1 N 8 μ	5.0
889.383	ι 6 N 4 λ	4.5
889.406	ι 4 N 6 λ	4.2
889.453	ι 4 N 6 λ	4.2
891.316	λ 1 N 10 μ	5.0
891.338	ι 8 N 2 λ	4.8
891.407	N = λ	5.0
892.319	λ 1 N 10 μ	5.0
892.344	N = λ	5.0
892.361	ι 8 N 2 λ	4.8
893.290	ι 6 N 4 λ	4.6
893.392	ι 7 N 3 λ	4.6

TABLE III.

Observations made with the refractor		
J. D. M. Gr. hel. T.	Comparisons	Magn.
2427		
898.412	d 6 N 2 e	8.4
898.442	c 8 N, d 6 N 2 e, N 4 f	8.4
899.327	d 6 N 3 e, N 5 f	8.4
899.348	d 6 N 3 e, N 5 f	8.4
899.379	c 9 N, d 6 N 3 e, N 4 f	8.4
899.420	d 7 N 2 e, N 3 f	8.5
909.356	g 3 N 3 h	9.7
910.344	g 4 N 2 h	9.9
911.303	g 6 N, h 1 N	10.3
912.306	h 3 N 1 k	10.4
914.348	h 4 N = k	10.4
914.428	h 4 N 1 k	10.4
915.423	k 2 N 1 m, N 5 p	10.6
955.434	f 3 N 1 g	9.0
956.374	e 1 N 4 f	8.5
956.421	e 1 N 4 f	8.5
957.374	d 7 N 1 e	8.4
957.420	d 7 N 1 e	8.4
957.452	N = e	8.4
958.401	d 8 N 2 e	8.4
958.430	d 8 N 2 e	8.4
961.392	d 7 N 3 e	8.4
961.451	d 7 N 4 e	8.3
963.381	d 7 N 4 e	8.3
964.403	d 6 N 4 e	8.3
964.458	d 6 N 5 e	8.3
965.395	d 7 N 4 e	8.3
967.384	d 6 N 4 e	8.3
967.433	d 4 N 9 e	8.3
968.402	d 4 N 6 e	8.3
968.427	d 3 N 6 e	8.3
973.394	c 4 N = d, N 8 e	8.2
976.398	a 8 N, b 2 N 2 c	7.2
976.447	a 8 N, b 3 N 1 c	7.3
977.394	a 8 N, b 2 N 1 c	7.2
977.444	a 8 N, b 2 N = c	7.3
978.398	a 9 N, b 3 N 1 c	7.3
978.450	b 4 N, c 2 N 6 d	7.4
979.442	c 2 N 7 d	7.5
981.418	c 2 N 8 d	7.5
983.408	c 1 N 7 d	7.4
983.448	c 1 N 8 d	7.4
985.407	c 2 N 6 d	7.5
985.444	c 3 N 5 d	7.6
986.390	c 2 N 6 d	7.5
986.450	c 3 N 6 d	7.6
989.403	c 2 N 7 d	7.5
989.427	c 2 N 7 d	7.5
993.392	c 2 N 7 d	7.5
993.426	c 2 N 7 d	7.5

TABLE IV.

Observations with Zeiss' binocular			Obs rvations with the refractor		
J. D. M. Gr. hel. T.	Comparisons	Magn.	J. D. M. Gr. hel. T.	Comparisons	Magn.
2428			2428		
004.372	a 6 N 1 b	7.2			
006.402	a 5 N 2 b	7.0	006.401	c 3 N 7 d	7.6
012.367	a 3 N 6 b, N 7 c	6.6			
017.355	a 3 N 5 b, N 7 c	6.7			
021.339	a 4 N 5 b, N 7 c	6.7			
023.361	a 4 N 5 b, N 7 c	6.7			
024.371	a 3 N 5 b, N 7 c	6.7			
034.334	a 3 N 6 b	6.6			
035.334	a 3 N 6 b	6.6			
042.357	a 3 N 5 b	6.7	042.358	a 7 N 2 b	7.1
044.329	a 2 N 6 b	6.5	044.328	a 5 N 3 b	6.9
047.323	a 2 N 6 b	6.5	047.324	a 3 N 5 b	6.7
047.315	a 3 N 5 b	6.7	047.415	a 4 N 4 b	6.8
048.342	a 3 N 5 b	6.7	048.342	a 4 N 4 b	6.8
048.402	a 4 N 4 b	6.8			
			052.401	a 3 N 5 b	6.7
059.277	a 3 N 5 b	6.7	059.278	a 3 N 4 b	6.7
065.356	a 3 N 5 b	6.7	065.357	a 3 N 5 b	6.7
066.316	a 2 N 6 b	6.5	066.317	a 3 N 5 b	6.7
067.322	a 2 N 6 b	6.5	067.323	a 3 N 6 b	6.6
068.318	a 3 N 6 b	6.6	068.319	a 3 N 6 b	6.6
068.404	a 3 N 6 b	6.6	068.405	a 3 N 6 b	6.6
070.310	a 4 N 5 b	6.7	070.417	a 4 N 5 b	6.7
074,335	a 4 N 5 b	6.7	074.336	a 4 N 5 b	6.7
075.389	a 4 N 5 b	6.7	075.390	a 4 N 5 b	6 7
077.344	a 3 N 6 b	6.6	077.344	a 4 N 5 b	6.7
078.347	a 5 N 4 b	6.8	078.347	a 4 N 5 b	6.7
082.333	a 4 N 5 b	6.7	082.333	a 4 N 5 b	6.7
110.231	a 4 N 5 b	6.7	110.230	a 3 N 5 b	6.7
121.233	a 5 N 2 b	7.0	121.232	a 5 N 2 b	7.0
123.303	a 4 N 4 b	6 8	123.302	a 5 N 3 b	6.9
124.306	a 5 N 3 b	6.9	124.306	a 6 N 2 b	7.0
126 383	a 5 N 4 b	6 8	126.383	a 5 N 3 b	6.9
127.258	a 5 N 3 b	6.9	127.258	a 4 N 4 b	6.8
			174.187	a 4 N 4 b	6.8

Streszczenie.

Praca niniejsza obejmuje obserwacje Nowej Herkulesa, wykonane gołem okiem, zapomocą lornetki Zeissa, czy wreszcie zapomocą lunety krótkoogniskowej o średnicy objektywu 150 cm. Tablica I zawiera listę gwiazd porównania, do których nawiązywano obserwacje, by wyznaczyć wielkości Nowej. Tablice II, III i IV zawierają zarówno same porównania, jak i wyliczone wielkości.

SOMMAIRE.