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

BULLETIN
DE L'OBSERVATOIRE ASTRONOMIQUE
DE WILNO

I. ASTRONOMIE
№ 21

BIULETYN
OBSERWATORJUM ASTRONOMICZNEGO
W WILNIE

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

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WŁADYSŁAW DZIEWULSKI.

O ruchu gwiazd typu widmowego A.

On the motion of stars of the spectral type A.

(Komunikat zgłoszony na posiedzeniu w dniu 7.XII 1937 r.).

In this paper two questions are investigated: 1) the ellipsoidal distribution of the peculiar velocities of the A-stars and 2) the internal dislocations of these stars, suggesting a local rotation.

1) In No 12 of this Bulletin the distribution of the peculiar velocities of the B-stars was investigated. Now the A-stars are discussed in the same manner. 407 stars, considered here, are those collected by Ch. Bertaud[1]), with the exception of the Taurus-stream and Ursa major-stream. For this group of stars the solar motion being calculated, the peculiar motions of the stars were received and their galactic coordinates were reckoned.

Let us first consider the distribution of the peculiar motions. As in our previous investigations the three axes ellipsoidal distribution was considered. The sky was divided into regions and the stars moving towards each region were counted. The following zones and regions were chosen:

I	zone from	—15°	to	+15°	in Lat. and every	30°	in Long., on the whole	12 regions
II	„ „	+15	„	+45	„ „ „	„	„ „ „ „ „	12 „
III	„ „	—15	„	—45	„ „ „	„	„ „ „ „ „	12 „
IV	„ „	+45	„	+75	„ „ „	60	„ „ „ „ „	6 „
V	„ „	—45	„	—75	„ „ „	„	„ „ „ „ „	6 „
VI	„ „	+75	„	+90	„ „ —	—	— — — „ „ „	1 „
VII	„ „	—75	„	—90	„ „ —	—	— — — „ „ „	1 „

together 50 regions. Taking the regions of zone I as unity and allowing for the inequality of the areas of different regions, the correcting factors for the number of the vectors in other zones were introduced

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[1]) Bulletin astronomique. Tome VIII. pg. 337. Paris. 1933.

viz. 1.16 for zones II and III, and 1.26 for zones VI and VII. Accordingly the numbers of stars moving in the directions of these regions were multiplied by these factors.

Let: $A x^2 + A_1 y^2 + A_2 z^2 + 2 B y z + 2 B_1 z x + 2 B_2 x y + H = 0$ be the equation of the velocity ellipsoid, where x, y, z are the rectangular galactic coordinates. For the 50 regions we get 50 equations which are resolved by the method of least squares. When the constants are found, the axes (a, b, c) and their directions can be easily determined.

The following table contains the coordinates of each region and the observed number of stars therein. After determining the constants of the ellipsoid we calculate the number of stars in each region and build the differences: Observ. — Calcul. For the direction of the axes of the velocity ellipsoid in the galactic coordinates the following values were found:

a — axis:	$l = 4^\circ.2$	$b = -3^\circ.9$
b — axis:	$l = 93.6$	$b = +8.7$
c — axis:	$l = 298.2$	$b = +80.4$

and for the ratios of the axes:

$$\frac{b}{a} = 0.46 \qquad \frac{c}{a} = 0.53$$

The direction of the greatest axis shows the favoured direction of the star movements.

TABLE I.

Zone	Region	Coordinates λ	Coordinates β	Number of stars Observ.	Number of stars Calc.	O.—C.
I	1	12°.3	+ 1°.3	29	36	— 7
„	2	42.5	— 0.4	10	15	— 5
„	3	77.4	+ 2.6	2	6	— 4
„	4	98.3	— 2.6	5	6	— 1
„	5	144.6	+ 5.3	7	14	— 7
„	6	164.8	— 1.9	22	26	— 4
„	7	195.4	+ 1.0	16	32	—16
„	8	225.9	+ 3.2	16	13	+ 3
„	9	251.8	0.0	16	7	+ 9
„	10	281.3	— 2.4	7	6	+ 1
„	11	315.5	— 7.0	6	10	— 4
„	12	348.6	+ 4.5	20	28	— 8

Zone	Region	Coordinates		Number of stars		O.—C.
		λ	β	Observ.	Calc.	
II	13	7.7°	+25.0°	19	12	+7
„	14	36.2	+26.7	8	8	0
„	15	77.8	+24.5	5	5	0
„	16	110.0	+29.3	6	5	+1
„	17	134.3	+32.2	17	4	+13
„	18	164.9	+27.0	15	13	+2
„	19	200.0	+28.4	19	12	+7
„	20	225.8	+27.3	9	7	+2
„	21	267.4	+21.8	2	3	—1
„	22	288.0	+24.9	3	3	0
„	23	316.3	+28.7	7	5	+2
„	24	347.9	+22.4	20	11	+9
III	25	16.0	—31.7	15	11	+4
„	26	44.0	—29.6	10	7	+3
„	27	69.5	—29.2	6	4	+2
„	28	111.9	—20.5	3	3	0
„	29	139.9	—24.8	9	6	+3
„	30	164.6	—26.2	15	9	+6
„	31	196.8	—26.8	21	11	+10
„	32	222.2	—25.3	6	8	—2
„	33	250 3	—25.9	6	5	+1
„	34	276.1	—35.9	2	3	—1
„	35	328.5	—22.2	3	13	—10
„	36	339.6	—28.2	10	10	0
IV	37	34.4	+58.0	2	5	—3
„	38	94.2	+59.4	2	4	—2
„	39	145.3	+54.0	3	6	—3
„	40	206.8	+58.9	5	5	0
„	41	270.0	+49.6	2	4	—2
„	42	327.0	+61.8	5	4	+1
V	43	35.3	—56.5	9	5	+4
„	44	79.0	—60.0	3	4	—1
„	45	156.8	—55.6	5	5	0
„	46	200.0	—37.5	0	5	—5
„	47	277.4	—52.7	4	5	—1
„	48	334.0	—60.4	2	5	—3
VI	49	0.0	+87.0	3	3	0
VII	50	59.0	—88.9	4	4	0

Assuming, in accordance with *Shapley,* the centre of our Galaxy in the direction of the great star-clouds of Sagittarius, in the galactic longitude 325°, a new system of coordinates is introduced in the Galaxy: the axis ξ directed to the galactic longitude 325°, the η-axis to 55°. Let us consider now the distribution of the velocities of stars in both galactic systems: x, y, z and ξ, η, ζ (the ζ—coordinate is identical with the z—coordinate). Dividing the stars into 4 groups according to their ξ—coordinates, i. e. to their distances from the centre of the galactic system, the mean velocity-components in the ξ, η, ζ—system were found. They are given in table II.

TABLE II.

ξ — coordinate in parsecs	Number of stars	Mean velocity-components km/sec $\frac{d\xi}{dt}$	$\frac{d\eta}{dt}$	$\frac{d\zeta}{dt}$	Velocity km/sec
$\xi > +16$	101	— 9.3	— 12.0	— 5.0	16.0
$+16 \geqq \xi \geqq -11$	106	— 8.3	— 10.2	— 5.5	14.3
$-11 > \xi \geqq -41$	106	— 8.3	— 9.1	— 5.0	13.3
$-41 > \xi$	94	— 8.7	— 8.3	— 4.3	12.7

The mean velocity components for the same groups in the x, y, z—system are as follows:

TABLE III.

ξ — coordinate in parsecs	Number of stars	Mean velocity-components km/sec $\frac{dx}{dt}$	$\frac{dy}{dt}$	$\frac{dz}{dt}$	Velocity km/sec
$\xi > +16$	101	— 14.5	— 4.6	— 5.0	16.0
$+16 \geqq \xi \geqq -11$	106	— 12.7	— 3.6	— 5.5	14.3
$-11 > \xi \geqq -41$	106	— 12.0	— 2.9	— 5.0	13.3
$-41 > \xi$	94	— 11.8	— 1.8	— 4.3	12.7

Both tables show a systematic run in the velocity-components. In the last system the x—component of velocity is prevailing, what is obvious, the x—axis pointing to the favoured direction of the star movements, viz. that of the vertex.

We turn to the results, contained in table II; we build the four groups, leaving the ζ—coordinate out of consideration.

TABLE IV.

Group	Coordinates in parsecs		Mean velocity-components relatively to the Sun km/sec.			Mean velocity-components relatively to the geom. centre km/sec.		
	ξ	η	$\frac{d\xi}{dt}$	$\frac{d\eta}{dt}$	$\frac{d\zeta}{dt}$	$\frac{d\xi}{dt}$	$\frac{d\eta}{dt}$	$\frac{d\zeta}{dt}$
I	+ 39.4	+ 29.5	— 9.3	— 12.0	— 5.0	— 0.6	— 2.1	0.0
II	— 7.6	+ 19.4	— 8.3	— 10.2	— 5.5	+ 0.4	— 0.3	— 0.5
III	— 26.6	+ 11.1	— 8.3	— 9.1	— 5.0	+ 0.4	+ 0.8	0.0
IV	— 64.0	+ 12.4	— 8.7	— 8.3	— 4.3	0.0	+ 1.6	+ 0.7

Calculating the velocity of the Sun relatively to the group of A—stars, (the three components are + 8.7, + 9.9, + 5.0), and allowing for the effect of the solar motion, the mean velocities of A—stars relatively to their geometrical centre are obtained (three last columns of table IV). There is a distinct systematic run of the η— component.

In order to eliminate the effect of rotation of the Galaxy, we apply the known formulae for the radial and transverse component of rotation:

$$A\ r \sin 2\ (l - l_0)$$
$$A\ r \cos 2\ (l - l_0) + B\ r$$

where r is the distance of the star, l — its galactic longitude, l_0 — the galactic longitude of the gravitional centre assumed to 325°, A and B — the two constants, whose values are taken from the investigations of *Plaskett* and *Pearce:*

$$A = + 0.0155 \text{ km/sec per parsec}$$
$$B = - 0.0120 \text{ km/sec per parsec.}$$

Table V gives the radial and transverse component of rotation for each group (the value of r is known):

TABLE V.

Group	Radial component of rotation km/sec	Transverse component of rotation km/sec
I	+ 0.73	— 0.38
II	— 0.22	— 0.49
III	— 0.32	— 0.03
IV	— 0.38	+ 0.15

From these values the $\frac{d\xi}{dt}$ and $\frac{d\eta}{dt}$ — components may be determined and substracted from those calculated in table IV. The results are given in table VI.

TABLE VI.

Group	Residual components $\frac{d\xi}{dt}$ (km/sec)	Residual components $\frac{d\eta}{dt}$ (km/sec)
I	— 1.40	— 2.23
II	— 0.13	— 0 29
III	+ 0.20	+ 0.99
IV	— 0.44	+ 1.71

These values indicate a local rotation. The figure gives a graphic representation (fig. 1).

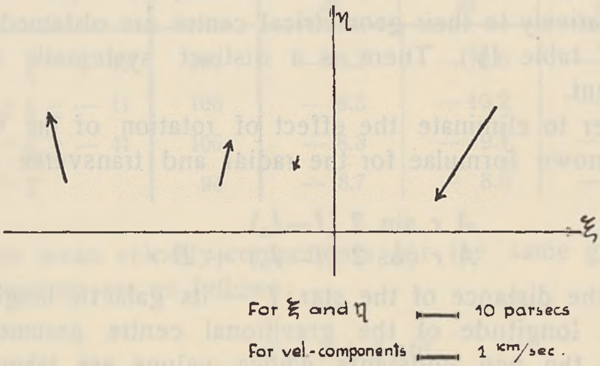

Fig. 1.

Streszczenie.

Praca niniejsza rozpatruje dwa zagadnienia: 1) Zbadanie rozkładu wektorów prędkościowych, jakie zawiera praca Ch. Bertaud dla 407 gwiazd typu widmowego A. Zastosowano rozkład elipsoidalny, wyznaczono kierunki osi elipsoidy oraz stosunki długości tych osi, wreszcie obliczono rozkład teoretyczny. Wyniki zawiera tablica I. 2) Zbadanie względnych przesunięć utworzonych grup z wymienionych gwiazd i wyrażenie przypuszczenia co do istnienia lokalnego wiru.

WŁODZIMIERZ ZONN.

Obserwacje zmiennej zaćmieniowej AK Herculis w fioletowej i czerwonej części widma.

Heterochromatic observations of eclipsing binary AK Herculis.

(Komunikat zgłoszony przez czł. Wł. Dziewulskiego na posiedzeniu w dn. 7.XII.1937).

The aim of the present work was to test the so called „Nordmann-Tikhoff" effect i. e. the unsimultaneous occurence of the minimum of light of different wave-length emitted by the eclipsing binary AK Herculis. Although the existence of such an effect in the case of other eclipsing binaries has been confirmed by numerous investigators[1]), no satisfactory explanation of its origin has been found as yet. It calls therefore for further observations which may throw some new light on the question.

From Mai 4 to September 22 1935 104 exposures with a violet filter (Wratten № 35 D) and 102 exposures with an yellow filter (Wratten № 8 K2) were made with the Zeiss-triplet (d = 15 cm, f = 150 cm) the time of exposure being resp. 8 and 12 min. Lumière „Opta" plates were used for the exposures with a violet filter and Wratten „Hypersensitive Panchromatic" plates for those with an yellow filter. The effective wave-length corresponding to each combination of plate and filter was deduced from the photographs of the stars made with a wire grating in front of the objective. The formula: $\lambda_{eff} = \frac{ag}{2f}$ was used, where a is the separation between the images of the first order, g—the constant of the grating (the distance between the centers of two neighbouring wires) and f—the focal length of the objective. The combination of the „Opta" plate with

[1]) See P. Skoberla Z. f. Ap. 11 p. 1, E. R. Mustel Astr. J. of Soviet Union XI p. 428, J. Hellerich A. N. 256 p. 405 and 261 p. 121, K. Himpel A. N. 261 p. 261, B. Okunew A. N. 234 p. 361 and others.

the violet filter gives $\lambda_{eff} = 4110$ A (V—combination), that of the „Hypersensitive Panchromatic“ plate with the yellow filter $\lambda_{eff} = 6260$ A. (RY = reddish yellow—combination).

The magnitudes of the comparison stars were determined from 8 exposures (4 with violet and 4 with yellow filter) made with the grating in front of the objective. The photometric constant of the grating (i e. the difference between the magnitude of the central image and that of the first order) was determined empirically with the aid of the photographs of the stars of early spectral type with well determined magnitudes. This value was found the same for both combinations of plates and filters. As the comparison stars were situated very closely no corrections were applied for the differential extinction and for the position on the plate. All photographs were measured with a thermoelectric photometer of the Wilno Observatory[1]). The magnitudes of the comparison stars are shown in table I (the zero points of both scales of magnitudes are arbitrary).

TABLE I.
Comparison stars.

BD	HD	Sp.	Magnitudes V	Magnitudes RY
+16° 3105	155118	F0	+0.02^m	+0.36^m
16 3120	155526	K0	0.95	0.19
15 3127	—	—	0.63	1.08
16 3123	155676	F8	0.43	0.66
16 3124	155713	G0	1.02	0.96
17 3186	155729	K5	—	− 0.10
16 3128	155924	A2	0.07	+0.76
15 3147	156430	K0	0.02	—
16 3141	—	—	—	0.46

The magnitudes of the variable star were deduced for each exposure separately from the relation between the galvanometer readings and the magnitudes of the comparison stars. The results were grouped accordingly to the phases in 25 normal places, each containing from 2 to 8 observations. The phases, in fractions of the period (ph), the magnitudes (m) and the corresponding numbers of observations (n) are given in table II.

[1]) Described by W. Iwanowska, Wilno Bulletin 17. 1936.

TABLE II.

Normal places.

V curve (4110 A)						RY curve (6260 A)					
ph	m	n	ph	m	n	ph	m	n	ph	m	n
p 0.023	m 0.46	2	p 0.502	m 0.30	5	p 0.010	m 0.67	4	p 0.504	m 0.56	4
.049	.40	3	.535	.31	3	.036	.60	3	.522	.56	4
.073	.31	4	.574	.24	5	.070	.46	4	.546	.52	2
.105	.18	4	.609	.10	3	.093	.40	5	.603	.34	3
.137	.10	4	.634	.08	4	.119	.33	4	.645	.31	5
.172	.06	8	.670	.07	3	.146	.30	5	.672	.30	4
.225	.04	8	.691	.06	5	.179	.28	5	.718	.28	6
.295	.03	7	.757	.07	4	.252	.25	5	.790	.27	4
.344	.08	4	.837	.08	3	.286	.25	4	.845	.32	3
.389	.12	3	.903	.17	3	.334	.27	4	.921	.44	4
.413	.17	4	.947	.26	4	.353	.31	4	.960	.60	6
.447	.24	4	.987	.54	4	.415	.44	4	.986	.64	2
.461	.26	3				.462	.50	4			

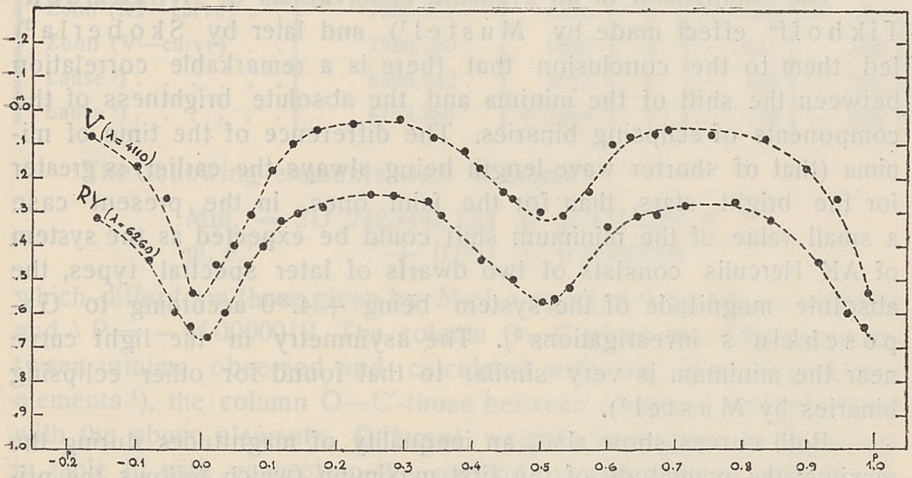

Fig. 1.

Fig. 1 represents the light curve of AK Herculis. The results of the individual exposures are collected in table V. The dispersion of single observations from the normal curve $\left(\sqrt{\frac{[\delta\delta]}{n}}\right)$ amounts to $\pm 0^m061$ for the V—observations and $\pm 0^m044$ for the RY-ones [1]).

[1]) The smaller value of the dispersion of RY—observations is due probably to the greater sizes of the images on RY—photographs.

The moments of the minima were obtained by the well known Pogson's method and are JD 2427980.290 for the V curve and 2427980.292 for the RY—curve. The difference $t_V - t_{RY}$ amounts to—$-0^d.002$ i. e. about - 3 min. As this value does not exceed its mean error (which is in the present case about $\pm 0^d.003$) it can be said that there is no evidence of a shift of one minimum relatively to the other. Near the primary minimum the RY—curve seems to be nearly symmetric, the V—curve however shows a remarkable asymmetry, the descending branch being steeper than the ascending. In other words the part of the eclipsed star which is visible at the beginning of the eclipse is not so red as that visible at the end of eclipse. The two regions of the eclipsed star must differ in color index at least by $0^m.08$.

The secondary minima (which are much more shallow) give the difference $t'_v - t'_{RY} = + 0^d.002$; no remarkable asymmetry of the curves near the secondary minimum was noticed.

The comparison of all available observations of „Nordmann-Tikhoff" effect made by Mustel[1]) and later by Skoberla[2]) led them to the conclusion that there is a remarkable correlation between the shift of the minima and the absolute brightness of the components of eclipsing binaries. The difference of the time of minima (that of shorter wave-length being always the earlier) is greater for the bright stars than for the faint ones. In the present case a small value of the minimum shift could be expected as the system of AK Herculis consists of two dwarfs of later spectral types, the absolute magnitude of the system being $+ 4.^M0$ according to Gaposchkin's investigations[3]). The asymmetry in the light curve near the minimum is very similar to that found for other eclipsing binaries by Mustel[1]).

Both curves show also an inequality of magnitudes during the maxima; the magnitude of the first maximum (which follows the primary minimum) is in both cases smaller by $0^m.02$ than that of the secondary maximum. In the present case it can be hardly explained as a periastron effect as both curves show no perceivable excentricity of the orbit. The same phenomenon can be distinctly seen in Jordan's[4]) photographic curve and must be therefore assumed as real. If the orbit of AK Herculis is circular, this fact could be explained only by slight inequality in brightness of two sides of the components of this system.

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[1]) l. c. [2]) l. c. [3]) Veröffentlichungen Berlin Babelsberg Bd. IX. Hf. 5. S. 55, 1932.
[4]) Allegh. Public. Vol. 7 p. 142 1929.

In order to obtain the corrected elements of the light variation I resolved by the least squares method all series of observations accessible to me. The data for the solution are given in Table III.

TABLE III.

Author	Minimum observed J. D.	Epoch	Weight	O—C	O—C′
				d	d
Esch [1])	2422977.254	—5849	1	—0.001	—0.004
Jordan [2])	4112.413	3156	4	— .001	— .001
Kordylewski [3]) . . .	4949.555	1170	1	— .002	.000
McLaughlin [4]). . . .	5442.738	0	3	.000	+ .004
Wasiutyński [5]) . . .	6141.196	+1657	3	— .004	+ .002
Gadomski [6])	7563.397	5031	2	— .019	— .009
Lause [7])	7624.523	5176	1	— .013	— .003
Zonn (visual) [8]) . . .	7860.162	5735	1	— .005	+ .006
Zonn (RY—curve) . .	7980.292	6020	3	— .009	+ .002
Zonn (V—curve) . .	7980.290	6020	3	— .011	.000
Lause [9]) . . . . . , .	8398.442	7012	1	— .009	+ .003
Lause [9])	8753.356	+7854	1	— .016	— .003

The following elements were obtained:

$$\text{Min.} = \text{JD}\ 2425442.734 + 0^{d}.4215209\ \text{E}$$
$$\text{m. e.} \qquad \pm 0.001 \pm 0.0000003$$

which differ from those given by McLaughlin [4]) by $\Delta E_0 = -0^{d}.004$ and $\Delta P = -0^{d}.0000012$. The column O—C gives the differences between minima observed and calculated with the McLaughlin's elements [4]), the column O—C′-those between observed and calculated with the above elements. Different weights were given to the values in table III with respect to the method of observations and to the number of them. There is no evidence of the changes of the period of AK Herculis.

[1]) B. Z. № 22, 1922.
[2]) Allegh. Publications Vol. 7 p. 142, 1929.
[3]) Crac. Circ. 25, 1927.
[4]) A. J. 920, 1929.
[5]) Warsaw Repr. 11, 1931.
[6]) B. Z. № 16, 1935.
[7]) A. N. 254, p. 374, 1935.
[8]) Unpublished.
[9]) A. N. 266, p. 20, 1938.

The computation of the orbital elements of this eclipsing binary was based on the RY—curve alone. The V—curve shows an asymmetry near the minimum and was therefore used only for the determination of the J_1/J_2 value.

The orbital elements of AK Herculis were obtained by well known Russell's method assuming the U—hypothesis which is in tolerably good agreement with the observations. They are given in table IV together with the elements of the light curve.

The J_1/J_2 values for both wave-lengths may be utilized for the approximate determination of the spectral type of one component if the spectrum of the other is known.

TABLE IV.
Summary of results.

Orbital elements
Uniform solution.

Nature of eclipses		patrial
Ratio of axes of stars k		0.63
Maximum obscuration α_0		0.58
Inclination of orbit i		68°.8
Major semi-axes of components	a_1	0.473
	a_2	0.298
Minor semi-axes of components	b_1	0.406
	b_2	0.256
Ratio of surface brightness J_1/J_2	λ 4110	0.37
	λ 6260	0.66
Difference in magnitudes $\Delta m = m_2 - m_1$	λ 4110	-0^m08
	λ 6260	$+0^m54$
Spectral type	larger component	G2
	smaller component	F8
if $\mu_1 = \mu_2$ Mean density of components	ρ_1	0.49 ☉
	ρ_2	1.94 ☉
Mass of both components $\mu_1 + \mu_2$ [1]		0.20 ☉
Major semi-axes of components [1]	a_1	246.10³ km
	a_2	155.10³ km

Licht curves.

	λ 4110	λ 6260
	m	m
Primary minimum	0.55	0.68
Secondary minimum	0.31	0.57
Primary maximum	0.04	0.25
Secondary maximum	0.06	0.27
Epoch of primary minimum	J. D. 2427980.290	2427980.292
Period	$0^d.4215209$	

[1]) This value was computed from $a_1 \sin i = 452110$ km and $f = 0.0208$ ☉ found by Sanford (l. c.).

If we assume that the smaller component is of spectral type F8, the larger must be of type G2. If the larger star is of type F8 the smaller one must be of type F3. The first assumption seems to be much more probable as accordingly to Sanford's[1]) spectroscopic observations the star of type F8 is eclipsed during the primary minimum; hence the F8 star is that of larger surface brightness, i. e. the smaller one.

The present observations show some discrepancies with Sanford's spectroscopic observations of AK Herculis. He noticed that the secondary spectrum was not observed; hence followed that, the magnitudes of both stars differ considerably. The present results however show, that this difference is rather small, especially for the light of short wave-length.

TABLE V.

V-magnitudes				RY-magnitudes			
J. D.	Magn.	J. D.	Magn.	J. D.	Magn.	J. D.	Magn.
	m		m		m		m
2427927.5213	0.15	2427952.4901	0.44	2427927.5092	0.22	2427952.4819	0.60
.5269	.09	955.4490	.31	.5147	.30	.4984	.54
928.4833	.28	.4660	.16	928.4938	.25	955.4573	.46
.4886	.21	.4802	.10	932.4286	.58	.4653	.32
933.4653	.18	956.4356	.25	933.4827	.60	.4881	.21
.4726	.35	.4520	.22	.4917	.58	967.3964	.44
.5084	.52	.4586	.32	.4997	.61	.4044	.40
935.4318	.25	.4826	.40	.5242	.61	.4384	.54
.4391	.20	967.4117	.16	935.4065	.61	.4468	.59
.4686	.10	.4176	.27	.4481	.28	968.4004	.30
.4762	.12	.4544	.24	.4585	.33	.4143	.34
.5019	.08	.4603	.07	.4842	.27	972.3895	.28
.5082	.06	968.4307	.00	.4930	.31	.3981	.23
937.3782	.11	.4623	.19	.5215	.27	.4203	.25
.3858	.05	972.4062	.01	937.3595	.32	.4248	.34
.4789	.30	.4119	.08	.3688	.28	.4356	.34
.4848	.29	.4443	.08	.4869	.52	977.3893	.45
.5112	.37	.4413	.07	.5032	.53	.4143	.26
943.4027	.37	.4574	.18	.5192	.49	.4208	.29
.4096	.26	977.3980	.06	948.4547	.45	.4440	.21
948.4456	.20	4050	.08	.4713	.65	.4524	.23
.4636	.25	.4286	.09	.4856	.52	.4674	.22
.4939	.26	.3355	.04	951.4201	.54	979.3832	.25
951.4288	.28	.4602	.05	.4371	.53	.3918	.38
.4454	.34	.4804	.00	.4538	.37	.4149	.50
.4621	.02	979.3995	.24	.4778	.29	.4402	.67
.4694	.14	.4061	.10	.4944	.30	.4571	.64
.4860	.09	.4238	.20	952.4404	.39	981.4315	.26
952.4576	.52	.4315	.30	.4491	.59	986.3925	.44
.4649	.45	.4488	.62	.4731	.70	.4092	.53

[1]) Ap. J. 79, p. 93 (= Mount Wilson Contr. 483), 1934.

V-magnitudes				RY-magnitudes			
J. D.	Magn.	J. D.	Magn.	J. D.	Magn.	J. D.	Magn.
	m		m		m		m
2427979.4655	0.39	2428001.4322	0.00	2427986.4655	0.23	2428036.3669	0.58
981.4156	.03	004.4139	.09	.4734	.24	.3824	.40
.4229	.13	4400	.14	989.3993	.38	.4064	.26
.4569	.07	.4465	.01	.4212	.36	037.3482	.29
986.4069	.23	.4704	.08	.4299	.32	.3659	.46
.4514	.09	.4768	.15	.4472	.26	042.2914	.40
.4579	.09	.4836	.14	993.4011	.43	.3140	.29
.4787	.08	036.4160	—.02	.4091	.36	044.3225	.39
.4831	—.10	.4342	.15	.4307	.30	.3343	.50
989.4069	.06	037.3228	.10	.4393	.29	.3447	.63
.4130	.01	.3343	.10	.4532	.26	047.2998	.57
.4380	.06	.3399	.14	.4747	.31	.3150	.64
.4554	.08	042.3229	.04	.4823	.24	.3449	.46
993.3869	.31	.3361	.12	2428001.3739	.71	.3518	.40
.3935	.23	.3420	.05	.3993	.45	065.2846	.35
.4161	.06	.3532	.03	.4243	.40	.2966	.36
.4219	—.02	044.3512	.58	004.3816	.30	067.2630	.26
.4462	.06	047.3224	.40	.4320	.28	.2750	.28
.4601	.04	.3335	.36	.4556	.28	068.2692	.29
.4671	.07	.3386	.38	.4636	.27	.2801	.26
2428001.4094	.09	065.2600	.30	.4970	.48		
.4160	.16	067.2993	.18	036.3384	.63		

Streszczenie.

Celem niniejszej pracy było stwierdzenie niejednoczesności następowania momentów minimum w czerwonym i fioletowym świetle (t. zw. efekt „Nordmanna-Tichowa“) w gwieździe zaćmieniowej AK Herculis. W tym celu wykonano 104 zdjęcia tej gwiazdy przez fioletowy filtr i 102 zdjęcia przez żółty, używając do pierwszego filtru klisz „Opta“ Lumière, do drugiego zaś — klisz „Hypersensitive Panchromatic“ Wratten'a. Efektywne długości fal obu kombinacyj filtru i klisz wynosiły 4110 A i 6260 A. Zdjęć dokonano na astrokamerze Zeissa (d = '5 cm, f = 150 cm) i mierzono następnie na fotometrze termoelektycznym. Jasności gwiazd porównania wyznaczono na podstawie zdjęć z siatką dyfrakcyjną, nałożoną na objektyw kamery (tabl. I). Jasności tych użyto następnie do wyznaczenia jasności gwiazdy zmiennej na kliszach. Z poszczególnych obserwacyj (tabl. V) utworzono następnie grupy podług faz i otrzymano krzywe średnie (tabl. II i ryc. 1). Badanie krzywych tych w pobliżu minimum wykazało, że przesunięcie minimów względem siebie jest bardzo małe, wynoszące $0^{d}.002$; wartość ta jest mniejsza, niż błąd średni wyznaczonych momentów. Krzywej, odpowiadającej λ 6260 A, użyto następnie do

wyznaczenia elementów orbity układu AK Herculis (tabl. IV). Stosowano tu metodę Russell'a w założeniu, że obie gwiazdy posiadają równomiernie świecące tarczę (t. zw. hypoteza U). Zestawienie tych elementów z obserwacjami spektroskopowemi Sanforda pozwoliło znaleźć bezwzględne wartości rozmiarów obu składników i ich masę. Porównanie ze sobą krzywych, odpowiadających obu długościom fali światła obserwowanego, wykazało, że typy widmowe składników AK Herculis różnią się od siebie. Jeżeli przyjmiemy, iż mniejszy składnik ma typ widmowy F8, typ większego składnika winien być G2.

Zestawienie momentów minimum, wyznaczonych z obserwacyj różnych autorów (tabl. III), pozwoliło znaleźć nowe elementy zmian jasności AK Herculis:

$$\text{Min.} = \text{JD } 2425442.734 + 0^d.4215209 \text{ E}$$
$$\text{bł. śr.} \quad \pm 0.001 \quad \pm 0.0000003$$

WŁODZIMIERZ ZONN.

Fotograficzne obserwacje ζ Aurigae w czasie zaćmienia 1937 r.

Photographic observations of ζ Aurigae during the eclipse in 1937.

(Komunikat zgłoszony przez czł. Wł. Dziewulskiego na posiedzeniu w dn. 17.XII.1937).

The geometrical and meteorological conditions for the observations of this remarkable binary during the recent eclipse were at Wilno extremely bad. Some photographs were obtained only near the time of the first partial phase, the second one was not observed. The results are published now in the hope that they may be of some use to the other investigators.

This stars was photographed with the Zeiss triplet camera (d = 15 cm, f = 150 cm) with a violet filter, using a wire grating on the front of the objective. 15 intrafocal exposures were made on Agfa „Astro" plates, the time of exposure being 15 min. They were measured on Wilno thermoelectric microphotometer, using a diaphragm transmitting only a light from the central part of the star images. All the measurements were reduced graphically assuming the photometric constant of the grating to $0^{m}.98$, the latter being found empirically. Thus obtained magnitudes of ζ Aurigae and those of the comparison stars are given in tables I and II.

The effective wave-length of present combination of filter and plate amounted to ca 4100 A.

TABLE I.

Magnitudes of ζ Aurigae.

J. D.	Magn.	Remarkes	J. D.	Magn.	Remarkes
	m			m	
2428631.276	5.10	Clear sky	2428644.285	4.92	Dimly
283	.03	„	645.360	5.20	Ci near the photographed field
632.307	.10	„	.372	.27	
635.290	.05	„	647.295	.94	Dimly
.300	.10	„	.324	.91	„
636.288	.10	„	648.403	.87	Ci near the photographed field
.299	.07	„			
637.296	.08	„	655.310	6.00	Clear sky

T A B L E II.

Magnitudes of the comparison stars.

Star	m	Star	m
ε Aur	[3.50]	B. D. + 42°1170	6.59
B. D. + 42°1081	5.61	42 1142	7.17
43 1116	.91	43 1147	.24
41 1044	6.09	41 1050	.25

S t r e s z c z e n i e.

Fotograficzne obserwacje ζ Aurigae w czasie ostatniego zaćmienia w 1937 r. były wykonywane w wyjątkowo niepomyślnych warunkach co do położenia gwiazdy i warunków meteorologicznych w Wilnie. Obserwowano tylko gałęź malejących jasności tej gwiazdy. Wyniki podano w tabl. I. Wyznaczone jednocześnie jasności gwiazd porównania podano w tabl. II.

WŁADYSŁAW DZIEWULSKI i WILHELMINA IWANOWSKA.

Obserwacje wizualne gwiazdy zmiennej VZ Cygni.

Visual observations of the variable star VZ Cygni.

(Komunikat zgłoszony na posiedzeniu w dniu 7.XII 1937 r.).

This variable star was observed with the 150 mm short focus refractor (the magnifying power 20). W. Iwanowska observed since February 27th 1930 till August 23d 1934 and collected 206 observations, Wł. Dziewulski made 485 observations since September 15th 1929 till July 6th 1937.

For reference the following stars were used (the magnitudes are taken from the B. D. catalogue):

TABLE I.

Star	B. D.	Steps		Magnitudes calculated	
		W. Iw.	Wł. Dz.	W. Iw.	Wł. Dz.
B. D. + 41°4299	$8^m.2$	8.3	14.0	$8^m.22$	$8^m.21$
„ + 42 4230	8.7	4.1	6.7	8.67	8.68
„ + 42 4225	9.1	0.0	0.0	9.12	9.11

Both observers used occasionally, especially at the beginning of the work, some other stars for reference; the steps and the magnitudes of these stars were determined by comparison with the given above stars.

For the starting point the elements of Robinson [1]):

$$\text{Max.} = \text{J. D. } 2420642.129 + 4^d.864691\ E$$

were assumed.

All observations, expressed in units of our steps and magnitudes, were grouped according to the phase.

[1]) Annals of Harvard College Observatory, Vol. 90, No 2. 1933.

TABLE II.

n	Phase	Steps	Magn.	n	Phase	Steps	Magn.
Obs. W. Iwanowska.							
15	$0^{d}.100$	6.75	8.39	14	$2^{d}.428$	3.83	8.70
„	0.469	6.26	8.44	„	2.663	3.58	8.73
„	0.790	6.45	8.42	„	2.952	3.50	8.74
„	1.195	6.07	8.46	„	3.279	2.19	8.88
„	1.523	4.84	8.59	15	3.676	1.98	8.90
„	1.821	3.85	8.70	„	4.327	4.72	8.61
„	2.143	3.70	8.72	„	4.657	6.00	8.47
Obs. Wł. Dziewulski.							
30	0.079	9.43	8.50	30	2.417	5.27	8.77
„	0.350	8.97	8.53	„	2.682	5.41	8.76
„	0.670	7.84	8.61	„	2.975	5.74	8.74
„	0.997	7.06	8.66	„	3.251	4.94	8.79
„	1.308	6.83	8.67	„	3.467	4.41	8.83
„	1.561	6.65	8.68	33	3.805	5.38	8.76
„	1.820	6.07	8.72	„	4.235	6.45	8.69
„	2.119	6.17	8.71	30	4.553	7.97	8.60

The mean error of one observation amounts in our steps: $\pm 1^{st}.48$ (W. Iw.) and $\pm 2^{st}.11$ (Wł. Dz.), or in magnitudes: $\pm 0^{m}.16$ (W. Iw.) and $\pm 0^{m}.14$ (Wł. Dz.). The curve of brightness was carefully studied near the maximum and the minimum. In the scale of W. Iw. the brightness oscillates between: $5^{st}.75$ and $2^{st}.0$, the oscillations corresponding to $8^{m}.39$ and $8^{m}.90$ with the amplitude $0^{m}.51$. In the scale of Wł. Dz. the brightness oscillates between: $9^{st}.6$ and $4^{st}.0$, what corresponds to $8^{m}.49$ and $8^{m}.85$ with the amplitude $0^{m}.36$.

The mean epoch of the maximum, calculated with the above elements, viz.:

J. D. 2427029.468 needs a correction of 0.146 days from the observations of W. Iw. and

J. D. 2427433.238 needs a correction of 0.078 days from the observations of Wł. Dz.

Hence the epoch of maximum derived from the observations of W. Iw. is J. D. 2427029.614 and that derived from the observations of Wł. Dz. is J. D. 2427433.316.

From the observations of W. Iw. the difference between maximum and minimum is: $M - m = 1\overset{d}{.}33$, and from those of Wł. Dz.: $M - m = 1\overset{d}{.}44$.

Streszczenie.

Obserwowaliśmy gwiazdę zmienną VZ Cygni w czasie od 27 lutego 1930 r. do 23 sierpnia 1934 r. (Iw. — 206 obserwacyj) i w czasie od 15 września 1929 r. do 6 lipca 1937 r. (Dz. — 485 obserwacyj). Wszystkie obserwacje wyraziliśmy w jednostkach naszej skali i w wielkościach w odniesieniu do katalogu B. D.

Opierając się na elementach Robinsona, ułożyliśmy obserwacje według faz i utworzyliśmy miejsca normalne; zawiera je tablica II.

Momenty maximum, obliczone na podstawie elementów Robinsona, wymagają poprawek: + 0.146 (Iw.) i + 0.078 (Dz.). Po uwzględnieniu tych poprawek średnie momenty maximum wynoszą:

J. D. 2427029.614 (Iw.)

i J. D. 2427433.316 (Dz.).

WILHELMINA IWANOWSKA i WŁADYSŁAW DZIEWULSKI.

Obserwacje wizualne gwiazdy zmiennej BG Lacertae.

Visual observations of the variable star BG Lacertae.

(Komunikat zgłoszony na posiedzieniu w dniu 7.XII 1937 r.).

This variable star was observed with the 150 mm short focus refractor (the magnifying power 20). Wł. Dziewulski observed from Mai 7th 1932 till July 6th 1937 and made 371 observations, W. Iwanowska observed since Mai 14th 1932 till August 23d 1934 and collected 141 observations.

For reference the following stars were used, their magnitudes were taken from the B. D. catalogue.

TABLE I.

Stars	B. D.	Steps		Magnitudes calculated	
		W. Iw.	Wł. Dz.	W. Iw.	Wł. Dz.
B. D. + 43°4116	7.8 m	13.3	20.9	7.91 m	8.00 m
„ + 42 4264	8.8	5.7	12.0	8.55	8.44
„ + 42 4268	8.7	—	6.6	—	8.71
„ + 42 4263	8.9	0.0	0.0	9.04	9.04

W. Iwanowska did not use the star B. D. + 42°4268.

For the starting point the elements of Wachmann[1]):

$$\text{Max.} = \text{J. D. } 2426213.459 + 5^{d}.33191\, E$$

were assumed.

All observations, expressed in units of our steps and magnitudes, were grouped according to the phase.

[1]) Astronomische Nachrichten. Bd. 255, pg 366. 1935.

TABLE II.

n	Phase	Steps	Magn.	n	Phase	Steps	Magn.
	Obs. W. Iwanowska.						
10	$0^d.162$	8.30	8.33	11	$2^d.853$	4.07	8.69
„	0.556	7.95	8.36	10	3.329	4.20	8.68
„	0.859	8.10	8.35	„	3.727	4.77	8.63
„	1.113	7.60	8.39	„	4.101	3.95	8.70
„	1.372	6.88	8.45	„	4 484	5.19	8.60
„	1.864	6.33	8 50	„	4.754	6.01	8.53
„	2.373	4.99	8.61	„	5.153	8.10	8.35
	Obs. Wł. Dziewulski.						
20	0.144	12.54	8.41	20	2.647	8.70	8.61
„	0.383	13.77	8.35	„	2.979	9.40	8.57
„	0.679	12.30	8.43	18	3.298	7.96	8.64
„	0.928	12.33	8.42	„	3.620	8.90	8.60
„	1.156	11.94	8.44	„	4.140	6.64	8.71
„	1.422	11.29	8.48	19	4.292	6.85	8.70
„	1.735	10.46	8.52	20	4.556	9.94	8.54
‚,	1.981	10.22	8.53	„	4.852	11.44	8.47
„	2.294	9.80	8.55	„	5.184	11.82	8.45

The mean error of one observation amounts in our steps: $\pm 1^{st}.18$ (W. Iw.) and $\pm 3^{st}.16$ (Wł. Dz.), or in magnitudes: $\pm 0^m.10$ (W. Iw.) and $\pm 0^m.16$ (Wł. Dz.).

We studied with special care the curve of brightness near the maximum and the minimum. In the scale of W. Iw. the brightness oscillates between $8^{st}.3$ and $3^{st}.7$, what corresponds to $8^m.33$ and $8^m.73$ with the amplitude $0^m.40$. In the scale of Wł. Dz. the brightness oscillates between $13^{st}.8$ and $6^{st}.4$, corresponding to $8^m.35$ and $8^m.72$ with the amplitude $0^m.37$.

The mean epoch of the maximum, calculated with the above elements, viz.:

J. D. 2427258.513 needs a correction of 0.248 days from the observations of W. Iw. and

J. D. 2427727.721 needs a correction of 0.228 days from the observations of Wł. Dz.

Hence the epoch of maximum is J. D. 2427258.761 according to the observations of W. Iw. and J. D. 2427727.949 according to the observations of Wł. Dz.

It follows from the observations of Wł. Dz. that the difference between the maximum and the minimum is: $M - m = 1^d.33$; the number of observations of W. Iwanowska near the minimum is inadequate for the difference $M - m$ to be found with accuracy.

Streszczenie.

Obserwowaliśmy gwiazdę zmienną BG Lacertae w czasie od 14 maja 1932 r. do 23 sierpnia 1934 r. (Iw. — 141 obserwacyj) i w czasie od 7 maja 1932 r. do 6 lipca 1937 r. (Dz. — 371 obserwacyj). Wszystkie obserwacje wyraziliśmy w jednostkach naszej skali i w wielkościach w odniesieniu do katalogu B. D.

Opierając się na elementach Wachmanna, ułożyliśmy obserwacje według faz i utworzyliśmy miejsca normalne; zawiera je tablica II.

Momenty maximum, obliczone na podstawie elementów Wachmanna, wymagają poprawek: + 0.248 (Iw.) i + 0.228 (Dz.). Po uwzględnieniu tych poprawek średnie momenty maximum wynoszą:

J. D. 2427258.761 (Iw.)
i J. D. 2427727.949 (Dz.).

WŁADYSŁAW DZIEWULSKI.

Obserwacje wizualne gwiazdy zmiennej SU Draconis.

Visual observations of the variable star SU Draconis.

(Komunikat zgłoszony na posiedzeniu w dniu 7.XII 1937 r.).

This variable star was observed with the 150 mm short focus refractor (the magnifying power 20) since March 29th 1932 till November 6th 1937. On the whole 630 observations were collected.

For reference the following stars were used, their magnitudes (with exception of the two weakest) were taken from the B. D. catalogue. Three stars *c*, *d* und *e* were mainly used.

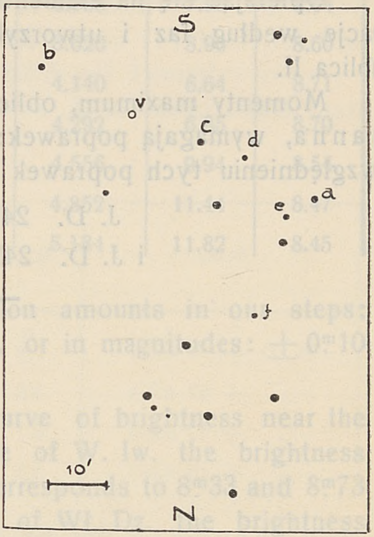

Fig. 1.

TABLE I.

Star	Magn. B. D.	Steps	Magnitudes calculated
a = B.D. + 68 660	8.7	24.3	8.72
b = „ + 67 708	8.8	23.9	8.74
c = „ + 68 655	9.0	16.3	9.07
d = „ + 68 657	9.4	9.5	9.36
e = — — —	—	0.4	9.76
f = — — —	—	0.0	9.78

For the starting point the elements of Florja[1]) namely:

$$\text{Max.} = \text{J. D. } 2420605.7569 + 0.66041926\,E$$

were assumed.

All observations, expressed in units of our steps and magnitudes, were grouped according to the phase to the normal places.

[1]) Veränderliche Sterne. Verein v. Fr. d. Astronomie in Gorki. Bd. IV. pg. 204.

TABLE II.

n	Phase	Steps	Magn.	n	Phase	Steps	Magn.
	d				d		
30	0.0108	14.37	9.15	30	0.3723	7.71	9.44
„	0.0369	13.78	9.18	„	0.4209	7.37	9.46
„	0.0758	12.31	9.24	„	0.4575	7.31	9.46
„	0.1132	10.70	9.31	„	0.4881	7.21	9.46
„	0.1523	10.36	9.33	„	0.5213	6.97	9.47
„	0.1796	8.73	9.40	„	0.5456	6.77	9.48
„	0.2101	8.55	9.41	„	0.5708	6.43	9.50
„	0.2395	8.44	9.41	„	0.5992	7.79	9.44
„	0.2674	8.21	9.42	„	0.6215	9.59	9.36
„	0.3006	7.92	9.43	„	0.6541	11.94	9.26
„	0.3327	8.12	9.42				

The mean error of one observation amounts in our steps: $\pm 2^{st}.21$, or in magnitudes: $\pm 0^{m}.10$, the mean error of the normal place: $\pm 0^{st}.40$ or $\pm 0^{m}.02$. The curve of brightness was carefully studied near the maximum and the minimum. The brightness oscillates between $14^{st}.47$ and $6^{st}.26$, corresponding to $9^{m}.15$ and $9^{m}.51$ with the amplitude $0^{m}.36$.

The mean epoch of the maximum, calculated with the above elements, viz. J. D. 2427882.2563 needs a correction of 0.0082 days. Hence the epoch of maximum is

J. D. 2427882.2645

according to our observations. The difference between the maximum and the minimum is: $M - m = 0^{d}.112$.

To the table, given by N. Florja and extended by F. Kępiński and M. Kowalczewski[1]), the moments of maxima received from later observations may be added.

TABLE III.

Author	n	Method	Maximum hel. obs. J. D.	O. — C.
Enebo	305	vis.	2418251.3591	— 0.0031
Sperra	455	vis.	18394.6736	+ 0.0004
Ginori	76	vis.	19451.3499	+ 0.0059
Martin-Plummer . . .	67	phg.	19724.7589	+ 0.0013
Jordan	334	phg.	20688.3088	— 0.0005
Strashny	178	phg.	26258.9548	+ 0.0090
Florja I.	154	vis.	26322.3536	+ 0.0076
Kukarkin	71	vis.	26540.2710	— 0.0134
Florja II	74	vis.	26583.8783	+ 0.0063
Florja III	200	vis.	26929.9310	— 0.0007
Kępiński-Kowalczewski .	176	phg.	27151.1668	— 0.0054
Sołovjev	159	vis.	27486.665	— 0.0002
Dziewulski	630	vis.	27882.2645	+ 0.0082
Opalski[2])	144	phg.	28036.1386	+ 0.0046

[1]) Institut d'Astronomie pratique. Ecole Pol. Varsovie. Publ. Nr 13. Warszawa. 1934.
[2]) „ „ „ „ „ „ „ „ 19 „ 1938.

Streszczenie.

Gwiazdę zmienną SU Draconis obserwowałem od 29 marca 1932 r. do 6 listopada 1937 r. i zebrałem 630 obserwacyj. Wszystkie obserwacje wyraziłem w jednostkach swej skali i w wielkościach w odniesieniu do katalogu B. D.

Opierając się na elementach Florji, ułożyłem obserwacje według faz i utworzyłem miejsca normalne; zawiera je tablica II.

Moment maximum, obliczony na podstawie elementów Florji, wymaga poprawki: + 0.0082. Po uwzględnieniu tej poprawki średni moment maximum wynosi:

J. D. 2427882.2645.

WŁADYSŁAW DZIEWULSKI.

O jasności komety 1937-f (Finsler).

On the brightness of the comet 1937-f (Finsler).

(Komunikat zgłoszony na posiedzeniu w dniu 7.XII 1937 r.).

This comet was observed at Gierkany (130 km north-east from Wilno) with a Zeiss' binocular with 6-fold magnification from July 21 till August 19 1937. During the observations the focal and extrafocal images of the comet were compared with similar images of the stars. When focal images were observed, the brightness of the nucleus was compared with that of the stars.

Table I contains the comparison stars used during the observations. The brightnesses of the stars were taken from the Henry Draper Catalogue.

TABLE I.

Design.	Name and B. D.		Magn.	Design.	Name and B. D.		Magn.
a		+54° 684	4.98	q	3 Dra =	+67° 714	5.48
b		54 693	5.82	r	8 Dra =	66 778	5.27
c	9 Cam =	66 358	4.38	s	74 UMa =	59 1444	5.44
d		73 274	5.38	δ	δ UMa =	57 1363	3.44
e	19 H Cam =	79 169	5.16	t	24 CVn =	49 2227	4.63
f		73 280	5.76	u		46 1868	5.89
g	24 H Cam =	77 266	4.75	v		31 2547	5.81
h	23 H Cam =	79 212	5.60	w		31 2540	6.55
k		76 310	5.73	x	9 Boo =	28 2278	5.18
m	9 H Dra =	76 393	5.04	y		29 2464	5.84
n	27 UMa =	72 466	5.39	z	12 Boo =	25 2737	4.82
p	ϰ Dra =	70 703	3.88				

Table II includes the observations and the resulting magnitudes of the comet.

TABLE II.

Date	M. astr. Gr. T.	Focal estimates	Magn.	Extrafocal estimates	Magn.
1937	h m				
21 VII	9 17	a 6 ☄ 1 b	5.7	a 3 ☄ 3 b	5.4
29 VII	8 51	c 8 ☄ 2 d	5 2	c 5 ☄ 5 d	4.9
31 VII	9 15	d 2 ☄ 2 f	5.5	e 2 ☄ 3 d	5.2
1 VIII	8 55	g 1 ☄ 6 h	4 9	☄ 2 g	4.5
2 VIII	8 43	g 2 ☄ 5 k	5.0	☄ 2 g	4.5
3 VIII	8 15	m 3 ☄ 3 n	5.2		
7 VIII	9 10	p 5 ☄ 3 q	4.9	p 3 ☄ 5 q	4.5
8 VIII	8 08	p 3 ☄ 6 r	4.4	p 2 ☄ 7 r	4.2
9 VIII	8 50	ò 6 ☄ 12 s	4.1	ò 3 ☄ 15 s	3.8
12 VIII	8 16	t 5 ☄ 5 u	5.3	t 2 ☄ 8 u	4.9
13 VIII	8 12	t 4 ☄ 5 u	5.2	☄ 1 t	4.5
17 VIII	7 58	v 3 ☄ 5 w	6.1	v 2 ☄ 6 w	6.0
18 VIII	8 14	x 4 ☄ 4 y	5.5	x 2 ☄ 6 y	5.3
19 VIII	7 38	z 4 ☄ 4 x	5.0	z = ☄	4.8

Streszczenie.

Obserwacje jasności komety wykonano w Gierkanach (w woj. wileńskiem), odległych o 130 km od Wilna w kierunku północno-wschodnim. Obserwowano lornetką Zeissa zarówno obrazy ogniskowe, jak i pozaogniskowe. Tablica I zawiera spis gwiazd porównania, tablica II — obserwacje.

WŁADYSŁAW DZIEWULSKI.

Obserwacje meteorów.

Observations of meteors.

(Komunikat zgłoszony na posiedzeniu w dniu 7.XII 1937 r.).

During the observations of variable stras in 1937 I occasionally observed the meteors. The details of the observations are given below.

№	Date	M. Greenwich T. civil.	Beginning		End		Magnitude	Duration
			α	δ	α	δ		
	1937	h m s	h m	°	h m	°	m	s
1	31 III	20 34 35	3 10	+ 57	1 50	+ 66	2	2
2	6 IV	21 18 12	17 40	+ 55	20 50	+ 60	— 1	4
3	8 IV	21 05 50	4 10	+ 48	3 10	+ 44	4	1
4	14 IV	0 10 45	13 20	+ 10	13 50	— 3	2	2
5	5 V	22 52 10	15 20	+ 65	9 40	+ 63	2	2
6	7 VI	23 02 36	19 10	+ 33	20 15	+ 44	3	2
7	7 VIII	22 05 10	6 10	+ 70	12 50	+ 70	1	1
8	7 VIII	22 43 15	15 40	+ 75	16 35	+ 22	1	1
9	8 VIII	21 07 12	6 40	+ 50	13 30	+ 63	2	1
10	8 VIII	21 28 05	14 05	+ 22	14 50	+ 17	3	1
11	10 VIII	21 29 40	1 30	+ 50	23 40	+ 33	3	1
12	28 VIII	20 33 20	2 10	+ 55	2 00	+ 40	3	2
13	1 IX	21 51 38	16 05	+ 52	12 20	+ 57	2	2
14	11 X	22 21 23	23 40	+ 52	21 40	+ 33	1	2

Streszczenie.

W czasie obserwacyj gwiazd zmiennych przygodnie obserwowałem meteory. Wykaz ich zawiera powyżej podana tablica.

SOMMAIRE.