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Obituary

PERO M. DJURKOVIĆ

(1908–1981)

On 5 January 1981 died in Belgrade Pero M.Djurković, the retired research counsellor of the Belgrade Observatory and its former director.

Pero Djurković was born in Srpska Trnova (SR Bosna and Herzegovina) in 1908. He graduated from high school in Bijeljina and received in 1932 his degrees from the Belgrade Faculty of Philosophy – Department of Mathematics.

Pero Djurković joined the Belgrade Observatory late in 1932. From 1932 to 1936, jointly with his collegues,he was occupied with the computing of various ephemerides, and sharing duties connected with the Time Service. In the period until the war he devoted himself to the minor planet identification, their observation, calculation of their orbits,as well as to the observation of comets – a speciality he masterd during his nine months sojourn at the Uccle Observatory during 1935/36.

In 1941 he was taken prisoner and remained in captivity in Germany until the liberation by the Allied armies in 1945.

Back in Belgrade in 1945 Djurković joined very actively in the restoring of the Observatory, extensively damaged in the liberation fightings in 1944. Not until 1947 was he, therefore, able to resume the astronomical work proper. In that year, namely, Djurković, conjointly with B. Ševarlić and Z. Brkić, organized the Latitude Service of the Belgrade Observatory. At the same time (1945–1950) he took an active part in the observations with both Transit Instrument and the Zenith-telescope.

But his main merit for the Belgrade Observatory is connected with the organization, during 1950 – 52, and the menagement untll his returement in 1971, of the Double Star Division. The instrument this Division is footing upon, is Zeiss equatorial, with an aperture of 65 cm. and the focal length 1055 cm. Djurković made with equal devotion the observations and the treatment of purely theoretical problems related to he double stars.

Yet, even in this period of his engagement in his main subject – double stars – he found time for other activities of a wider astronomical interest, demonstrating here again his high qualities of a scientific organizer. It was under his direction that regular observations of the solar phenomena were carried out under the IGY project from 1957 to 1959. The Publication No 11 of the Belgrade Observatory with over three hundred pages, containg observational data systematically collected by him during this memorable international undertaking, is the testimony of both Djurković's professional and working capacity.

Let us make a summing-up his fruitful work on the double star visual observations. In a period of 20 years he made over 3200 measurements. We owe him also the discovery of 10 pairs. His pair DJU 3 = 13 Vulpeculae is a real curiosity, its distance being 0".8 and the components' magnitudes 4.6 and 7.8 respectively. The pair met with interest among the observers and is presently systematically measured. Djurković's preference was measuring the most difficult pairs, conscious of their inherent interest and of their being most in demand. This is why he is ranked among the prominent double star observers.

Djurković is the author of over 40 scientific and professional works. He was a member of the IAU Commission 26 (Double Stars).

He took an active part in the Yugoslav National Astronomical Meetings and Conferences. His participation is also to be mentioned in the international meetings: in the Astro-Soviet consultation on the solar research in 1956 in Tbilisi (SSSR); 5th Session of the MGY Committee in 1958 in Moscow, where he headed the Yugoslav MGY national delegation, and several IAU General Assemblies.

Djurković considered it his moral obligation to contribute as much as possible to the popularization of astronomy in Yugoslavia. In this respect he may be regarded as one of the co-founders of the Belgrade's People's Observatory, dedicated to the observations by the amateur astronomers. Likewise he was one of those who lent an active support to the initiative of building a sea-side observatory in the Adriatic island Hvar. He served several terms as member of the Yugoslav National Committee. He was also noted for his socio-political occupation. From 1965 to 1971 he was entrusted with the directorship of the observatory.

Remarkable abilities of organization of the research work as well as worthy results achieved in all the fields of his work and interest, in particular great enthusiasm for observation of Pero Djurković will serve a long time as an example to his younger collegues, with whom he heartily cooperated. With his passing away the Belgrade Observatory lost a collaborator who devotedly served its interests and development for over 40 years.

BULLETIN

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L'OBSERVATOIRE ASTRONOMIQUE DE BELGRADE

№ 132

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PRELIMINARY RESULTS OF THE FLEXURE INVESTIGATION OF THE BELGRADE LARGE VERTICAL CIRCLE IN THE PERIOD 1976–1979

M. Mijatov and DJ. Bozhichkovich

(Received May 3, 1981)

SUMMARY: An account is given of the preliminary results of the flexure determinations of the Large Vertical Circle of the Belgrade Observatory, carried out regularly under the observing program of bright stars in the period 1976–1979. A satisfactory accuracy of the measurements is stated, except for the year 1976, namely ±0".20. Of particular importance is the finding that the flexure of our LVC keeps its properties over longer time intervals. More intense investigations of this parameter is rekomended.

1. Upon completing, late in 1976, the reconstruction of the Large Vertical Circle of the Belgrade Observatory, carried out under the direction of D.S. Usanov (Usanov et al., 1978), we took up, early in 1976, the observation by absolute method of a program of bright stars within the zone +65° to +90° declination (Teleki, Mijatov, 1976). Alongside with these obeservations, regular flexure determinations of the instrument's tube were made as required by absolute method. An account is herein presented of the preliminary results of the flexure determinations executed in the period 1976–1979.

2. The flexure of the LVC was investigated according to Bessel method using a pair of collimators (80/1000 mm.) installed horizontally in the east-west direction. The measurements of the horizontal flexure component b were accomplished either by two observers,whereby one of them had first to secure the alignment of the collimators, after which he made the settings of the movable wire of the main instrument on the cross -wires of the collimators, or, failing two, one single observer carried out all the requisite operations.

Before starting the measurements the indoor and outdoor temperatures, as well as humidity, were read off. Besides, note was taken on the atmospheric conditions (clearness, wind).

The horizontal flexure component was determined on almost each observing night. In addition, several nights were entirely dedicated to the flexure determination in order to establish the variation of this parameter with the time. Thus there were in the period from March 1976 to October 1979 altogether 229 series of flexure determination.

3. Tabele 1 presents the number of flexure determinations according to observers.

Table I

Year	Observers						Total
	MM,DjB	DjB,MM	MM,BK	MM,MD	DjT,BK	BK	
1976	–	– 7	16	9	3	2	37
1977	82	– 1	–	–	–	–	83
1978	25	30 –	–	–	–	–	55
1979	28	24 2	–	–	–	–	54
Total	135	54 10	16	9	3	2	229

Observers: MM-M.Mijatov, DjB-Dj.Božičković, BK-B.Kubičela, MD-M.Dačić i DjT-Dj.Teleki

As apparent from the above Table, the year 1976 is characteristic by the fewness of observations, carried out by a great number of observers. This fact is reflected in lower accuracy of the results from this period.

Table 2 gives the number of flexure determinations according to seasons.

Table II

Year	I-III	IV-VI	VII-IX	X-XII	Total
1976	–	24	13	–	37
1977	21	34	26	2	83
1978	3	5	36	11	55
1979	13	24	17	–	54
Total	37	87	92 ·	13	229

The greatest number of determinations was, quite naturally, effected in the spring-sommer period.

4. The accidental error of a single determination of ϵ_b the horizontal flexure component was derived in two ways: from the difference of two consecutively determined values in the course of a series of measurements of $(b_{ew} - b_{we})$ and from several successive series, executed in the course of those nights which were dedicated solely to the flexure investigation. Tabele 3 presents the mean systematic difference $b_{ew} - b_{we}$ and ϵ_b.

ϵ_b was calculated according to formula:

$$\epsilon_b = 0.625 \frac{\Sigma\,|\Delta|}{n} \qquad (1)$$

where: Δ – the values $(b_{ew} - b_{we})$ freed from the systematic difference $(b_{ew} - b_{we})$ from Table 3, and n the number of differences Δ (equal to the number of series of measurements)

Table III

Year	bEW-BWE	ϵ_b	n
1976	+0.084	±0.387	37
1977	+0.147	±0.245	83
1978	+0.096	±0.200	55
1979	+0.094	±0.163	54

As evident from Table 3, the measurements performed in 1976 are of an inadequate accuracy, as alrady stated in Section 3. As for the remaining years, the accuracy was on the level characteristic of the flexure determination by Bessel method with this type of instruments. It was increasing from year to year due, probably, to the growing experience of observers. For the whole period of measurements we have: $\epsilon_b = \pm 0.''24$, but if the the year 1976 is omitted then $\epsilon_b = \pm 0.''20$.

The accuracy of the successive series, executed in the course of a single night is $\beta_b = \pm 0.''20$, which is in harmony with the result obtained by the formula (1)

It has been found from earlier determinations (Mijatov, 1971–1972) that the principal systematic influences on the flecure determination by Bessel method had their origin in the unsteadiness of the collimators and in the local refraction. The systematic $(b_{ew} - b_{we})$ in Table 3 of the order $0.''1$ indicate that there must have been some shifting of the collimators. It has, in addition, been stated that the effects of the local refraction have at times been very strong.

5. Preliminary data analysis has already that b was dependent on the temperature and, possibly, on the humidity. In order to scrutinize these effects we used the linear relation:

$$b = b_0 + a\,(t - 15°c) + c\,(v - 70\%) \qquad (2)$$

The results obtained hence by the least square method are given in Table 4.

Table IV

Year	bo	a	c	ϵ_o	K	n
1976	+0.710 ± 137	+0.003 ± 32	+0.002 ± 7	±0.40	0.08	23
1977	+0.726 ± 97	+0.089 ± 8	+0.002 ± 4	±0.47	0.79	83
1978	+0.851 ±0.206	+0.018 ± 9	-0.011 ± 5	±0.33	0.49	47
1979	+0.719 ± 71	+0.042 ± 5	-0.005 ± 4	±0.28	0.77	54

The coefficients of a and c in (2) for the year 1976 are uncertain, and the correlation coefficient k is too small. Thus, one cannot judge on the existence of the dependence of b on the temperature and the humidity on the basis of data from 1976. This is a consequence as earlier stated, of an insufficient accuracy of measurements carried out in that year. In the remaining years a distinct influence, that of the temperature in particular and even with a high correlation coefficient, must be stated.

The residuals of the relation (3) do not exhibit any systematical character, hence it can be claimed that no separate seasonal effect, other than the one dependent on temperature, is in existence.

It is of particular importance to point out that b_0 has remained virtually unchanged during the whole period of investigations, which indicates that the flexure of LVC, under the same temperature conditions, does not undergo any significant chages over longer time intervals. This has a particular weght with the absolute declination determinations.

An appreciable variation of b, of the order $0''.4$, during the observing night, has been stated. However, this variation has been determined from the measurements at the beginning and of the observing tour. Bearing in mind that the measurements at the beginning of the observing tour (early in the evening) are rather uncertain, there is no sufficient foundation to treat this variation as an established fact. This view is supported by the circumstance that in the course of several nights, which were dedicated exclusively to the flexure determination, no such variation was perceived. But these measurements were never started early in the evening.

6. It follows from the preliminary flexure investigations of LVC that its horizontal component is, in more recent time, being determined with a satisfactory accuracy. To maintain this precision it is necessary that the measurements are executed by experienced observers. It is also necessary to investigate more closely the eventual systematic effects on the determination of b, on those accomplished in the evening in particular. Considerable temperature effects on the values of b have been stated, but in order to determine it definitely it is necessary to have the measurements more evenly distributed over the year.

Applied in the reductions, the values of b improve the accuracy of the declinations observed. We are confident that the flexure determinations of LVC will contribute to obtaining the most accurate possible declinations of the stars comprised by our observing program.

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Bull. Obs. Astron. Belgrade, N° 132 UDC 521.27

RESULTS OF COMPARISON OF THE BELGRADE AND THE BORDEAUX CATALOGS OF THE NORTHERN PZT STARS

S. Sadžakov, M. Dačić, D. Šaletić
and B. Ševarlić

(Received may 13, 1981)

SUMMARY: Results are presented of comparison the NPZT star catalogs compiled in Belgrade and Bordeaux, systematic differences between them derived and analysed with respect to the right ascension, declination, apparent magnitudes and spectral classes.

INTRODUCTION

The proposal of H. Jasuda (1971) of the Tokyo Observatory to make observation of all stars of the NPZT program with the meridian instruments situated in the northern hemisphere, was adopted by the Commission 8 at the 14th IAU General Assembly in Brighton in 1970 and recommended to all the observatories in possession of such instruments. The undertaking was aimed at bringing into accord catalogs, obtained independently by 14 photographic zenith tubes, or more precisely, to reduce them to the FK4 system. The list, proposed by Yasuda, comprehended 1719 stars, distributed over declinations from $+10°$ to $+60°$, with magnitudes ranging from 5.6^m to 10.2^m. The results of the observations, once completed, should appear in the form od a „Derivation Catalog of the Northern PZT Stars."

In the implementatiion of this program took part, among others, the observatories in Belgrade (BGD, $\varphi = 44°48'$; $\lambda = -1^h\ 22^m$) and in Bordeaux (BRD, $\varphi =$

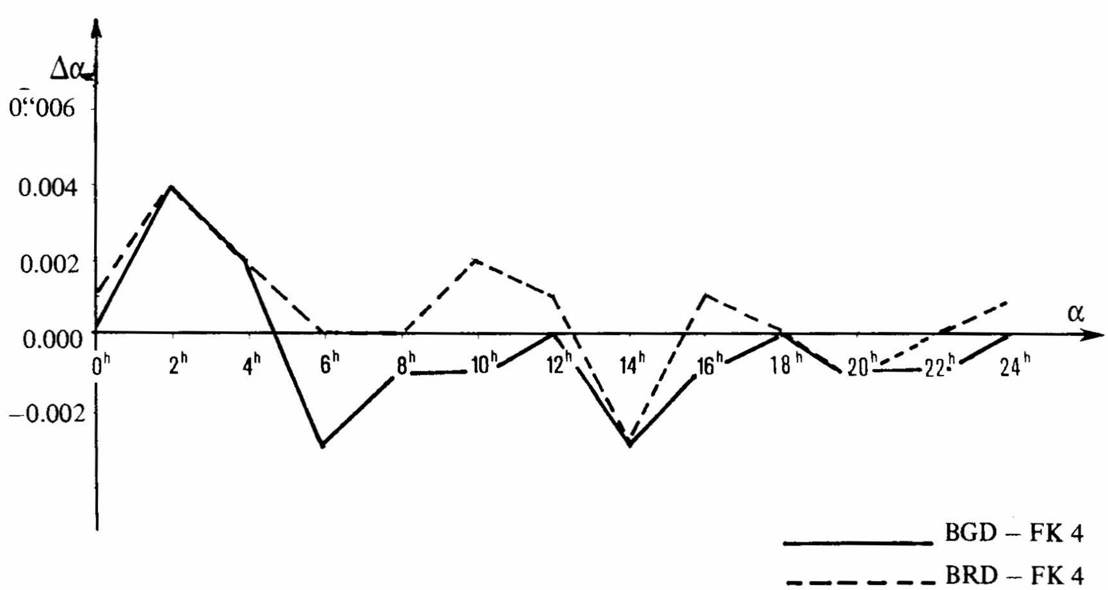

Fig. 1

= 44°50', λ = -$0^h\ 02^m$). Both observatories compiled catalogs, listing stars positions (α, δ) determined by relative method in the FK4 system. Each one of the stars, apearing in these catalogs,was observed 6 times on the average. These are, for the time being, the only published catalogs of this series. At the Belgrade observatory the observations were carried out visually in the classical way, using classical technics, whereas in Bordeaux the „tracking" photoelectric micrometer was applied in observing right ascenisions, but the declinations were observed visually in the standard manner. The accuracy of a single observation of the right ascension amounts to $\epsilon_\alpha \cos\delta = \pm 0^s.032$. in Belgrade and $\epsilon_\alpha \cos\delta = \pm 0.0086$ in Bordeaux. For declinations the respective values are $\epsilon_\delta = \pm 0''.26$ and $\epsilon_\delta = \pm 0''.203$. Mean epoch of observation in Belgrade is 1977.2 for the right ascensions and 1976.8 for de declinations (Sadžakov et al., 1981). The corresponding values related to the Bordeaux observations are 1973.7 and 1973.8 (Mazurier et al. 1977).

Prior to our entering into the work of forming the differences of coordinates as given by the two catalogues, and investigating their characteristics and origin, we derived the differences in coordinates of the reference stars from the BGD and the FK4 catalogs, as well as differences of the BRD and the FK4 catalogs. The differences in right ascension are illustrated in Fig. 1. The two curves in Fig. 1. display a good accordance by their general course. It is evident also that the amount of the differences in α are not negligible. In our view these differences conceal the variations of the systematic errors of the fundamental system itself. No such differences in declination were stated.

Mean differences of coordinates in the two catalogues and the determination of systematic effects in them.

By making use of the proper motions from the catalogue of 1719 stars (Yasuda,1971),star positions were reduced to the epoch of the Belgrade catalogue. Thereupon the differences were formed

$$\Delta\alpha = \alpha_{BGD} - \alpha_{BRD}$$

$$\Delta\delta = \delta_{BGD} - \delta_{BRD}$$

The differences exceeding 3 ϵ which make about 3%, were discarded. (Tables 1 and 2, where ϵ_0 is the error in the derived differences and n the number of stars used for deriving this error).

As is well known, various systematic effects are comprised by these differences. These infuences may be represented in the form:

$$\Delta\alpha = \Delta\alpha_0 + \Delta\alpha_\delta + \Delta\alpha_\alpha + \Delta\alpha_m + \Delta\alpha_{sp}$$

$$\Delta\delta = \Delta\delta_0 + \Delta\delta_\delta + \Delta\delta_\alpha \dagger \Delta\alpha_m + \Delta\alpha_{sp}$$

Table I

in $0^s.0001$ units

α \ δ	10°-20°			35°-38°			39°-45°			47°-52°			53°-59°			10°-59°		
	Δ	ϵ_0	n	Δ	ϵ_0	n	Δ	ϵ_0	n	Δ	ϵ_0	n	Δ	ϵ_0	n	$\Delta\alpha'_\alpha$	ϵ_0	n
$0^h - 2^h$	-65	±71	17	-100	±45	22	20	±39	23	- 49	±31	40	41	±25	30	7	±18	132
$2^h - 4^h$	-41	38	25	22	54	23	-14	24	20	- 5	33	34	-92	40	31	4	18	133
$4^h - 6^h$	21	44	22	-101	43	19	-30	39	22	- 75	32	31	-85	31	30	-25	17	124
$6^h - 8^h$	-66	48	23	- 37	48	23	-74	48	27	-133	36	32	-145	28	28	-68	18	133
$8^h - 10^h$	-28	57	20	- 82	43	19	-11	46	23	-124	28	36	-104	30	32	-45	17	130
$10^h - 12^h$	28	47	18	- 12	47	18	-48	35	19	-195	33	31	- 51	32	31	-36	18	117
$12^h - 14^h$	-47	39	19	- 47	34	20	-21	42	20	- 56	23	23	- 48	34	29	-16	16	111
$14^h - 16^h$	-76	45	24	38	39	18	119	36	19	- 83	23	31	- 95	22	33	- 2	14	125
$16^h - 18^h$	3	42	18	181	44	19	109	35	26	- 75	28	29	- 7	33	34	61	16	126
$18^h - 20^h$	-90	48	29	181	41	20	158	31	26	- 94	32	34	-101	30	33	22	18	142
$20^h - 22^h$	8	23	29	101	46	23	197	39	29	-116	33	33	- 91	31	33	38	16	147
$22^h - 24^h$	-74	35	19	68	43	20	56	50	27	- 5	31	34	11	31	46	46	17	146
$\Delta\alpha_0 + \Delta\alpha_\delta$	-37	13	263	17	14	244	44	±13	281	- 84	9	388	-61	9	390	-31	5	1566

in $0^{s}.001$ units

Table II

δ	10°- 25°			35° - 38°			39° - 45°			47° - 52°			53° - 59°			10° - 59°		
α	Δ	ϵ_0	n	Δ	ϵ_0	n	Δ	ϵ_0	n	Δ	ϵ_0	n	Δ	ϵ_0	n	$\Delta\delta_\alpha$	ϵ_0	n
$0^h - 2^h$	-74	±86	17	85	±73	20	-115	±81	20	- 78	±56	38	19	±79	29	-64	±32	124
$2^h - 4^h$	242	46	21	-11	66	20	271	75	18	25	69	33	86	73	31	75	32	123
$4^h - 6^h$	183	63	21	63	67	16	- 21	89	22	- 50	69	28	44	58	30	0	31	117
$6^h - 8^h$	128	75	22	101	59	21	100	59	30	- 26	63	31	132	51	28	45	27	132
$8^h - 10^h$	130	57	22	-99	56	18	197	68	24	- 28	67	32	66	71	29	19	30	125
$10^h - 12^h$	-56	59	20	11	83	17	-44	55	19	-115	67	30	-31	66	29	-87	30	115
$12^h - 14^h$	75	62	19	- 7	68	21	1	71	20	72	67	23	-64	58	29	-27	29	112
$14^h - 16^h$	-22	89	20	51	106	17	-36	78	19	- 1	58	28	107	60	30	3	33	114
$16^h - 18^h$	- 9	77	22	18	54	23	6	64	24	- 60	68	28	168	65	31	- 6	30	128
$18^h - 20^h$	89	60	30	-10	75	22	86	71	23	- 6	49	33	13	43	32	- 4	26	140
$20^h - 22^h$	126	59	27	-72	73	23	107	63	29	114	55	30	-42	49	32	10	27	141
$22^h - 24^h$	166	79	17	165	62	23	157	70	27	- 61	54	33	-12	44	46	23	27	146
$\Delta\delta_0 + \Delta\delta_\delta$	85	20	258	25	20	241	70	21	275	- 21	18	367	38	17	376	35	9	1517

where the subscripts denote the argument upon which the individual part of the systematic influence is dependent. At first we separated in the customary way the systematic influences ($\Delta\alpha_0 + \Delta\alpha_\delta$) and ($\Delta\delta_0 + \Delta\delta_\delta$), found in the last row of Tables 1. and 2. Next followed the calculation of $\Delta\alpha_\alpha$ and $\Delta\delta_\alpha$, given in the last column of the same Tables, as well as in Figs. 2 and 3.

As illustrated in Fig. 2, representing the values $\Delta\alpha_\alpha$, the inflection points of the curve fall within the intermediary seasons while its extremes take place during the summer (maximum) and the winter (minimum). As here the differences are in question of the seasonal effects in Belgrade and Bordeaux, it is quite possible that they have their origin in the sharp seasonal changes at the former station. Concerning the systematic effects of the $\Delta\delta_\alpha$ tyre, their variation are confined within the +0."1 and – 0."1 limits for the southern stars (the zone +10° to +25° declination) and between the +0."05 to – 0."05 limits for the northern stars (the zone +53° to +59° declination). These values for other zones are negligible.

The systematic effects of the type $\Delta\alpha_\alpha$ and $\Delta\delta_\alpha$ have been submitted to the analysis by means of the Fourier polynomial of the form:

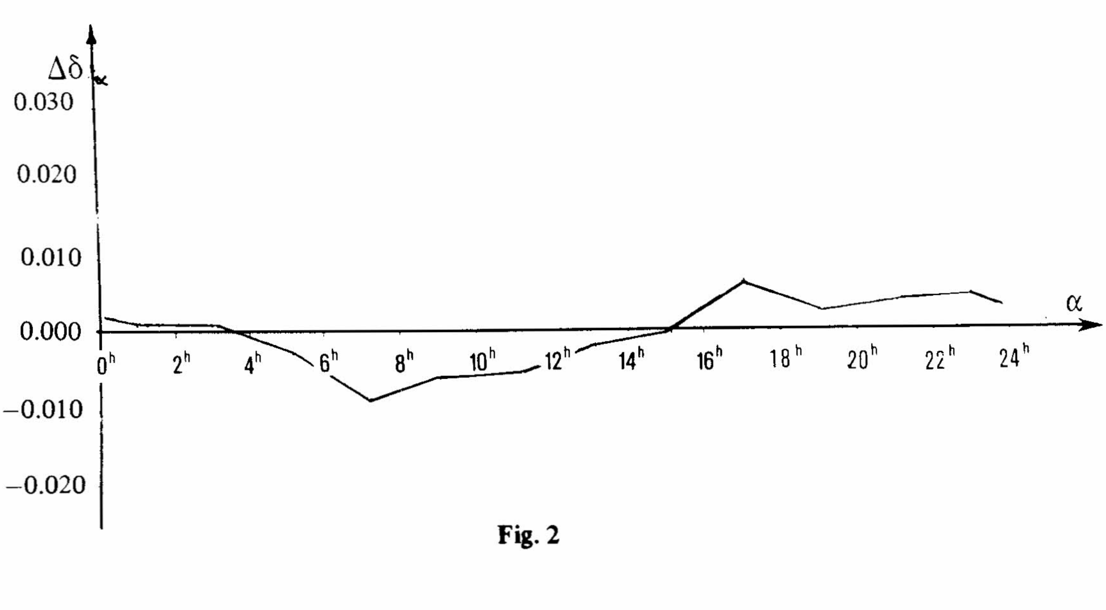

Fig. 2

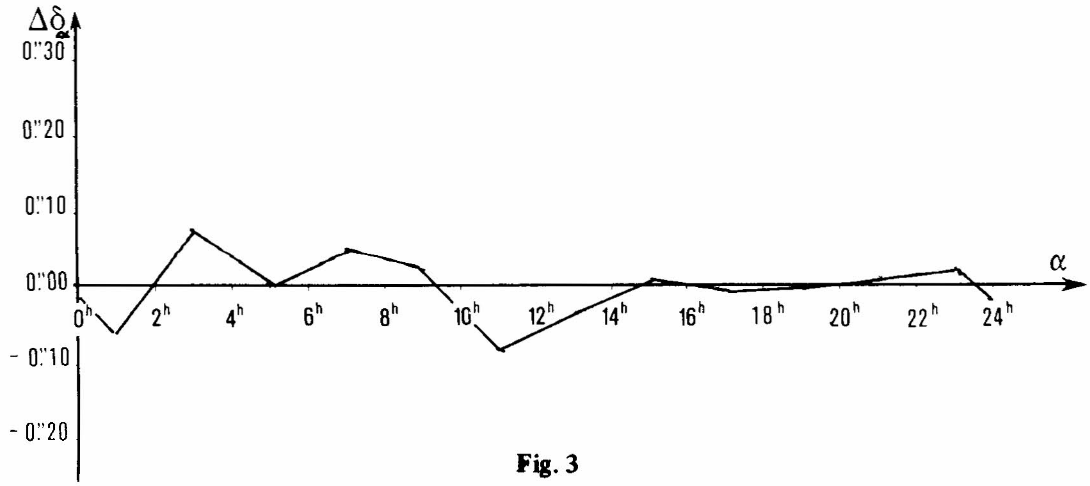

Fig. 3

$$\Delta\alpha_\alpha = A_0 + A_1 \sin\alpha + B_1 \cos\alpha + A_2 \sin 2\alpha + B_2 \cos 2\alpha$$

$$\Delta\delta_\alpha = B_0 + A_1' \sin\alpha + B_1' \cos\alpha + A_2' \sin 2\alpha + B_2' \cos 2\alpha$$

The coefficients Ai, Bi; Ai', Bi' were determined by the least squares method and are given in the Tables 3 and 4.

The Fourier polynomials, illustrated in Figs. 4 and 5, indicate the existence of both periodical and the seasonal character of the two systematic effects dealt with here.

Some interest must be attached to the existence of a certain correlation between the systematic differences $\Delta\alpha_\delta$ and $\Delta\delta_\delta$ with the derived Belgrade instrumental system (Dačić, 1980), whose parallel values are given in Table 5.

in $0^s.0001$ units

Table III

δ	A_o	A_1	B_1	A_2	B_2	ϵ_o	n
10°-25°	-37 ±13	14 ±18	-12 ±19	-9 ±18	- 9 ±19	±21	263
35°-38°	16 ±13	-114 18	2 ±18	-8 18	-51 19	20	244
37°-45°	37 ±12	-103 16	36 17	-18 17	-18 17	20	281
47°-52°	-85 ± 9	- 6 13	5 13	4 13	13 13	18	388
53°-59°	-63 ± 9	- 24 13	24 13	19 13	42 13	18	390
10°-59°	-33 ± 5	- 4 7	27 7	8 7	0 7	±20	1566

$$\Delta\alpha = A_o + A_1 \sin\alpha + B_1 \cos\alpha + A_2 \sin 2\alpha + B_2 \cos 2\alpha$$

in 0".001 units

Table IV

δ	A'_o	A'_1	B'_1	A'_2	B'_2	ϵ'_o	n
10°-25°	81 ±20	58 ±27	59 ±30	-18 ±28	-41 ±29	±32	258
35°-38°	25 20	6 29	36 29	15 29	20 29	32	241
37°-45°	57 21	22 29	23 31	-26 30	- 4 30	35	275
47°-52°	-18 18	-22 26	-3 26	- 6 26	-15 26	34	367
53°-59°	43 17	10 24	-8 24	48 24	-64 24	33	376
10°-59°	35 9	11 12	16 12	4 12	-27 12	33	1517

$$\Delta\delta = A'_o + A'_1 \sin\alpha + B'_1 \cos\alpha + A'_2 \sin 2\alpha + B'_2 \cos 2\alpha$$

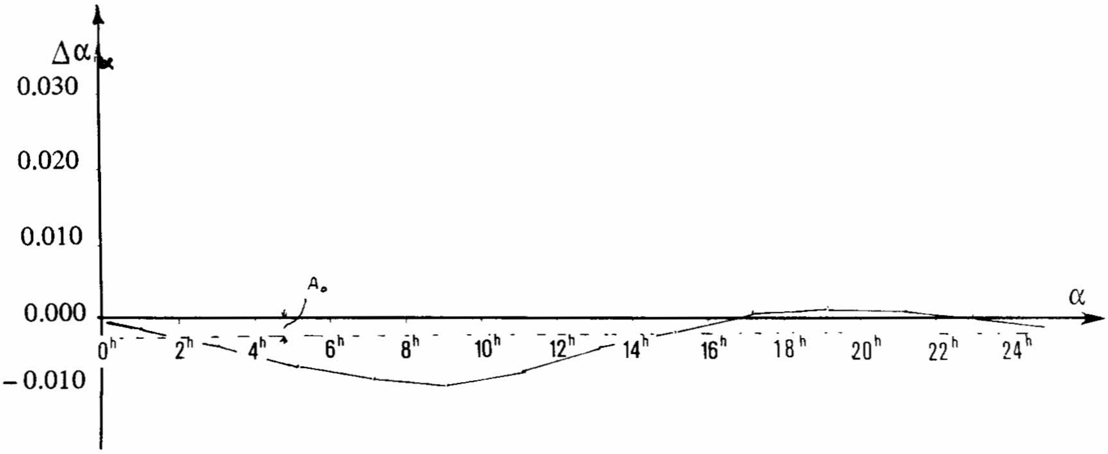

Fig. 4

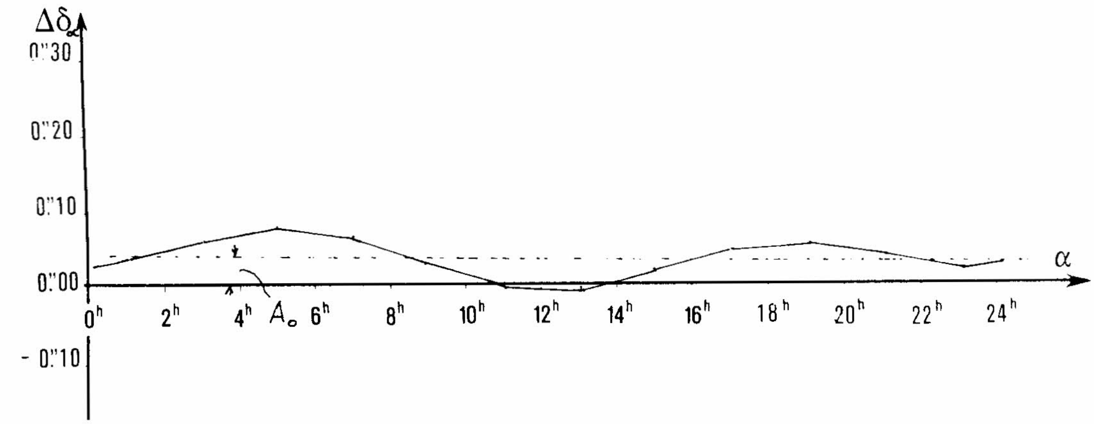

Fig. 5

Table V

Zone	$\Delta\alpha_\delta$	System of LMI in right ascension	$\Delta\delta_\delta$	System of LMI in declination
10°- 25°	-6	+45	+50	+45
35°- 38°	+48	+47	-10	-24
35°- 45°	+75	+40	+35	-61
47°- 52°	-53	-12	-56	-71
53°- 59°	-30	-20	+ 3	+ 5

The values in the second and the third columns are given in $0^s.001$ units, while those in the forth and the fifth columns in 0".001 units. Had they been accounted for in the Belgrade catalogue the systematic effects of the $\Delta\alpha_\delta$ and $\Delta\delta_\delta$ types would evidently have been considerably smaller.

Systematic influences depending on the apparent magnitude and the spectral class.

Upon eliminating the systematic inflences of type $(\Delta\alpha_0 + \Delta\alpha_\delta)$, $(\Delta\delta_0 + \Delta\delta_\delta)$ and $\Delta\alpha_\alpha$ and $\Delta\delta_\alpha$ from the total values $\Delta\alpha$ and $\Delta\delta$ we formed Tables 6 and 7 giving residuals of the stated differences, arranged according to their apparent magnitudes (rows) and the spectral class (columns).

In the last row systematic differences are listed which are dependent on the apparent magnitude ($\Delta\alpha_m$, $\Delta\delta_m$), along with the corresponding values ϵ_0 and n, while the last column gives the systematic differences dependent on the spectral class ($\Delta\alpha_{sp}$, $\Delta\delta_{sp}$), with the corresponding values ϵ_0 and n. The values $\Delta\alpha_{sp}$, $\Delta\delta_{sp}$, are derived step by step after eliminating the quantities $\Delta\alpha_m$, $\Delta\delta_m$ from the original residuals.

The numerical values of the systematic influences $\Delta\alpha_m$, $\Delta\alpha_{sp}$, $\Delta\delta_m$, $\Delta\delta_{sp}$ apear convincing for $\Delta\delta_{sp}$ only, a pronounced variation with the spectral class from O through M being evident. It is hard to say whether the amounts of $\Delta\alpha_m$, $\Delta\delta_m$, $\Delta\alpha_{sp}$ are unambiguosly dependent on the app. magnitude or the spectral class. This conclusion is confirmed by the Abbe's criterion. An earlier analysis of the systematic influences $\Delta\delta_{sp}$ (Sadžain $0^s.0001$ units

Table VI

Sp \ m	$m \leq 6,5$ Δ	ϵ_o	n	6,5 - 7,5 Δ	ϵ_o	n	7,5 - 8,5 Δ	ϵ_o	n	$8,5 < m$ Δ	ϵ_o	n	$\Delta\alpha_{sp}$	ϵ_o	n
0.8	-18	±39	24	51	±28	38	64	±26	46	21	±54	17	38	±17	125
A	29	28	46	10	18	103	-19	15	192	-14	22	82	- 5	10	423
F	-45	45	24	-21	22	84	-36	17	138	25	24	65	-19	11	311
G	33	35	25	7	24	49	7	16	135	- 5	20	71	9	11	280
K,M	-15	24	75	36	17	149	-18	15	177	12	37	26	3	10	427
$\Delta\alpha_m$	- 3	14	194	16	9	423	-12	8	688	3	12	261			

in 0".001 units

Table VII

Sp \ m	$m \leq 6,5$ Δ	ϵ_o	n	6,5 - 7,5 Δ	ϵ_o	n	7,5 - 8,5 Δ	ϵ_o	n	$8,5 < m$ Δ	ϵ_o	n	$\Delta\alpha_{sp}$	ϵ_o	n
0,B	133	±67	21	107	±47	38	-99	±43	44	-21	±78	17	17	±28	120
A	-19	45	47	33	33	102	14	24	186	0	36	78	12	16	413
F	-10	75	24	- 8	35	85	10	29	132	45	49	61	11	20	302
G	24	58	23	10	57	44	-12	30	129	-16	38	68	- 7	20	264
K,M	27	35	76	-66	27	144	-30	26	174	153	58	24	-17	16	418
$\Delta\alpha_m$	22	23	191	- 6	16	413	-11	13	665	20	21	248			

kov et al. 1975) showed also that the blue stars (spectral classes O, B, A) are more shifted towards the zenith than the yellow and red ones.

The values obtained by applying the Abbe's criterion reveal the existence of the systematic influence of this type in the declination but not in the right ascension.

CONCLUSION

1. The existence is confirmed of the systematic differences $\Delta\alpha_\alpha$, $\Delta\alpha_\delta$, $\Delta\delta_\alpha$, $\Delta\delta_\delta$ between the Belgrade and the Bordeaux catalogues, as well as their periodicity. The likelihood is suggested of the greater part of the systematic differences $\Delta\delta_\alpha$, $\Delta\delta_\delta$ to have to be ascribed to the Belgrade instrument system. As far as the systematic differences $\Delta\alpha_\alpha$ and $\Delta\alpha_\delta$ are concerned, at least part of them may originate from the difference in the seasonal effects at the two stations, while a minor part from the epoch difference of the two catalogues.

2. The systematic errors of the $\Delta\delta_{sp}$ type are the latgest for the blue stars, and their variation is distinctly systematic. The parameters obtained by applying the Abbe's criterion furnish confirmation of the systematic character of this influence, dependent on the spectral class, as well as that there is not any convincing dependence on the apparent magnitude.

We take the opportunity to thank Dr. Đ. Teleki for useful suggestions he made in the course of preparation of the manuscript.

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UDC 521.31

ORBITAL ELEMENTS OF VISUAL BINARY SISTEMS Σ 248 = ADS 1786 and Σ 535 = ADS 3174

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(Received May 21, 1981)

SUMMARY: Presented are the orbital elements, ephemerides and some astrophysical data of the visual binary sistems ADS 1786 and ADS 3174.

Binary system Σ 248 = ADS 1786 = IDS 02148N4219
α,δ (1950): $2^h17^m.9$, + 42°33′, 9.6–9.6, Sp. –

From 1832 to 1975 the position angle of this W. Struve's system changed by 66°, with considerable changes in distance.These changes afforded the possibillity of determining a provisional orbit of the system (Fig.1). The orbital elements were derived through the Innes' geometrical elements A, B, F and G. The effect of the precession on the position angle has been neglected. The following data on this pair are also found in the ADS catalogue: proper motion 0″.230 in 177°.3 (Bgd EB), the dynamical parallax is 0″.013 (J. – F) or 0″.027 (R. – M). The masses of the system's components are computed by means of the empirical mass-luminosity relation for the main HR sequence (Popović–Angelov, 1970). The computed values of the absolute brightnes indicate that the spectrum of both components might well be K3. The pair's orbit (Fig. 1) is computer-drawn (WANG 2200) by intermediary of the calculated ephemerides from 1800 to 2040 with the one year step. The observations are denoted in this Fig. by crosslets. The Tables I, II and III present: the observations of this pair with the corresponding residuals O – C, orbital elements, the astrophysical constants as well as the ephemerides of the system from 1975 to 2004. Combell's elements are published in „Circulaire d'Information" No 81, Comm. 26, UAI, 1980.

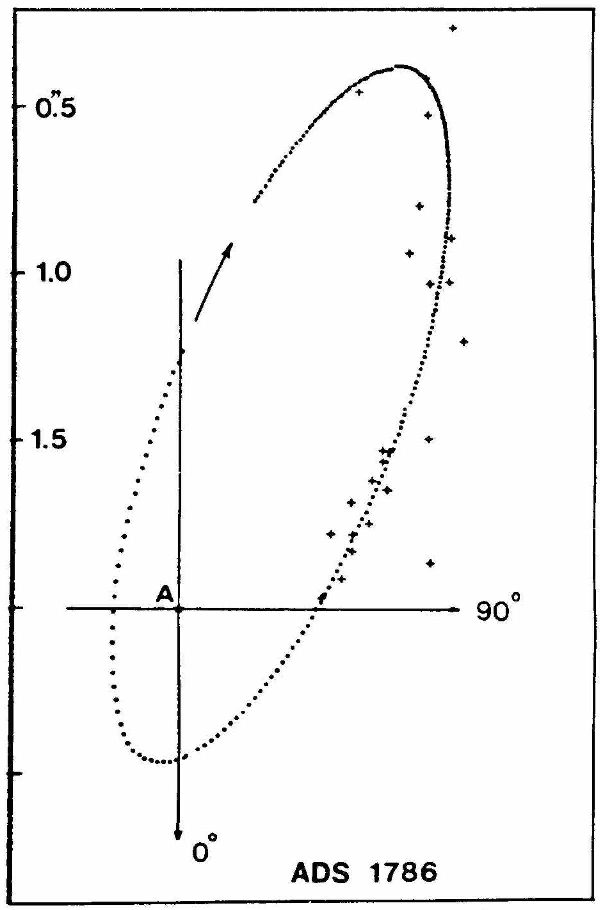

Fig. 1

Table I
Measurements of the pair ADS 1786 and 0–C

t	θ_t	ρ	n	Observer	0 − C	
1832.13	161°.0	1".64	4		−0°.6	−0".03
1869.99	155.3	1.76	4		+0.3	± .00
1879.61	155.1	1.93	1	Cin	+1.7	+ .21
1894.50	153.8	1.65	3	HΣ	+3.2	+ .02
1902.74	149.7	1.40	1	Hu	+0.9	− .16
1904.91	147.6	1.26	1	β	−0.8	− .28
1911.12	143.9	1.38	5	Dob2,Fox3	−3.0	− .09
1923.32	142.9	1.22	9	A2,Gr05,Gcb2	−0.7	− .10
1927.788	140.8	1.27	4	GΣ	−1.4	+ .01
1944.64	133.6	1.16	3	Voûte	−1.6	− .17
1954.806	127.6	0.77	3	Djk	−0.9	− .03
1956.69	128.8	0.76	3	Cou	+1.9	− .01
1958.93	126.6	0.74	3	Cou	+1.8	+ .01
1959.79	125.1	0.90	2	VBs	+1.1	+ .18
1961.81	120.3	0.70	3	Bz	−1.5	+ .02
1962.79	120.9	0.70	5	hz	+0.3	+ .04
1962.874	122.8	0.59	4	Wor	+2.3	− .07
1963.00	124.7	0.69	3	Cou	+4.3	+ .03
1967.445	114.5	0.61	3	DZ	+0.3	+ .04
1967.728	117.1	0.49	1	Djk	+3.5	− .08
1969.10	113.2	0.56	4	hz	+1.9	+ .02
1970.837	108.2	0.54	4	Wor	+0.2	+ .03
1973.231	100.5	0.48	3	Wor	−2.2	+ .01
1973.749	100.6	0.76	1	OLE	−0.9	+ .30
1975.851	94.6	0.41	3	Wor	−1.3	−0.02

Table II
Elements of the orbital motion and astrophisical quantities of the ADS 1786

P = 258^J.97	A = 0".936	M_A = +6^m.47
n = 1°.39012	B = −0.479	M_B = +6.47
T = 2011.57	F = −0.601	
e = 0.626	G = −0.212	$\mathfrak{M}_A$ = 0.87 $\mathfrak{M}_\odot$
a = 1".155	C = ∓0.478	$\mathfrak{M}_B$ = 0.87 $\mathfrak{M}_\odot$
i = 111°.40	H = ∓0.963	
ω = 206.41	t(Ω) = 1824.20	a = 48.1 A.U
Ω = 163.16	t(℧) = 2008.07	dp = 0".024

Table III
Ephemeris of the binary ADS 1786

1975.0	98°.2	0".44	1990.0	38°.5	0".35
1976.0	95.4	0.43	1991.0	34.2	0.35
1977.0	92.4	0.41	1992.0	30.1	0.36
1978.0	89.2	0.40	1993.0	26.2	0.37
1979.0	85.8	0.39	1994.0	22.4	0.38
1980.0	82.2	0.38	1995.0	18.8	0.39
1981.0	78.3	0.36	1996.0	15.4	0.40
1982.0	74.3	0.36	1997.0	12.2	0.41
1983.0	70.0	0.35	1998.0	9.2	0.42
1984.0	65.6	0.34	1999.0	6.2	0.43
1985.0	61.2	0.34	2000.0	3.5	0.44
1986.0	56.6	0.34	2001.0	0.8	0.45
1987.0	52.0	0.34	2002.0	358.2	0.46
1988.0	47.4	0.34	2003.2	355.7	0.46
1989.0	42.9	0.34	2004.0	353.2	0.46

Binary system Σ 535 = ADS 3174 = IDS 04178N1109
α, δ (1950): $4^h20^m.5$, + 11°16', $7^m.1$–$8^m.6$, Sp_A = A2

The position angle of this pair changed by 62° while ρ declined by approximately 0".9 in the period from 1931 to 1980. Its orbital motion is strongly pronounced (Fig. 2), affording the derivation of a preliminary orbit. Currently ρ exhibits a tendency of a slight declining but, according to the calculated preliminary elements, is not expected to descend lower than 0"84. Cambell's elements are derived from the Innes' geometrical elements A, B, F, G. The position angle is not corrected for the effect of precession. The components' masses, given in Table V are calculated by using the empirical relation, characteristic of the stars lying below the main sequence of the HR diagram (Popović-Angelov, 1970). A better accordance of the observed spectrum and the calculated absolute brightness of the A component is thereby achieved than would be the case if A component were considered as belonging to the main sequence. The computed absolute magnitude M_A = + + $3^m.1$ would entail the A7 cpectrum for the sub-main sequence stars, which is not quite in accordance with the observed A2 spectrum.

Table IV
Measurements of the pair ADS 3174 and 0–C

t	θ_t	ρ	n	Observer	0 – C
1831.34	353°.9	1".95	5	Σ	+3°.3 +0".16
1841.96	347.4	2.02	2	OΣ	-0.1 + .24
1843.10	349.8	1.79	2	Gsh	+2.6 + .01
1847.40	344.2	1.90	3	Da	-1.[illegible] + .13
1862.99	342.4	1.74	5	Δ	+1.0 ± .00
1870.01	339.6	1.74	2	Δ	+0.3 + .01
1878.76	336.4	1.60	1	Δ	-0.2 - .10
1887.19	336.4	1.86	1	Cel	+2.5 + .18
1888.14	334.5	1.52	3	Hl	+0.9 - .15
1891.01	332.4	1.70	19	Nis4,Spl5	-0.2 + .04
1891.42	331.9	1.65	3	HΣ	+2.4 - .01
1893.14	329.4	1.56	3	Maw	-2.5 - .10
1895.92	331.2	1.69	2	Collins	+0.2 + .04
1896.11	331.5	1.59	1	Cel	+0.6 - .06
1898.08	329.3	1.58	2	A	-1.0 - .06
1901.59	329.0	1.71	5	Lohl, Hul, Frederickl, Kqs02	-0.1 + .08
1902.41	323.6	1.68	7	Bowyer	-5.2 + .06
1902.9	324.5	1.61	15	Gr0	-4.1 - .01
1905.70	327.1	1.82	9	Frml,Doo8	-0.5 + .21
1910.74	324.0	1.59	28	Dob3,Hasl, Lau2,Fox3, Wz3,Vou4, Gr012	-1.8 ± .00
1914.17	322.7	1.52	18	Stol,VBs3, Dob2,Ph16, Rabe4,FBn2	-1.9 - .05
1918.15	323.1	1.47	9	Ptt3,Dob2, Ph14	±0.0 - .08
1921.41	320.6	1.52	19	Lv6,Chan5, Gr03,Guil, Nv11,Dob3	-1.2 - .01
1923.16	320.1	1.51	16	Lv4,Gcb2, B4,Kpz2, Gau2,Berm2	-1.1 - .01
1926.17	317.6	1.33	2	Fatou	-2.4 - .18
1929.86	318.3	1.52	4	Bz	-0.2 + .03
1934.90	312.7	1.57	4	Bz	-3.7 + .11
1936.20	311.0	1.26	2	Giacobini	-4.8 - .19
1942.70	312.5	1.53	3	Voûte	-0.4 + .12
1949.45	309.2	1.43	3	Prêtre	-0.6 + .06
1954.166	306.19	1.408	6	Rabe	-1.2 + .07
1956.178	305.36	1.390	4	Rabe	-1.0 + .06
1957.85	304.9	1.42	3	Wor	-0.6 + .10
1958.10	306.6	1.36	3	Gou	+1.2 + .05
1961.03	304.4	1.27	5	VBs	+0.6 -0.02
1961.878	305.5	1.39	4	Bos	+2.2 +0.10
1962.15	302.9	1.28	3	hz	-0.3 ± .00
1964.12	297.9	1.24	3	Bz	-4.2 - .03
1964.948	299.5	1.25	5	Walker Jr.	-2.1 - .01
1965.976	304.1	1.11	1	Walker Jr.	+3.1 - .15
1965.998	301.3	1.15	2	DZ	+0.3 - .11
1966.058	299.9	1.10	1	Walker Jr.	-1.1 - .16
1966.117	299.1	1.10	2	Djk	-1.8 - .16
1966.153	296.0	1.04	1	GP	-4.9 - .22
1970.019	301.5	1.36	4	Wor	+2.8 + .13
1974.81	294.4	1.18	2	OLE	-1.3 + .01
1975.06	295.3	1.25	4	Muller	-0.2 + .06
1980.888	291.9	1.10	3	GP	+0.2 - .05
1980.892	291.5	1.09	1	DZ	-0.2 -0.06

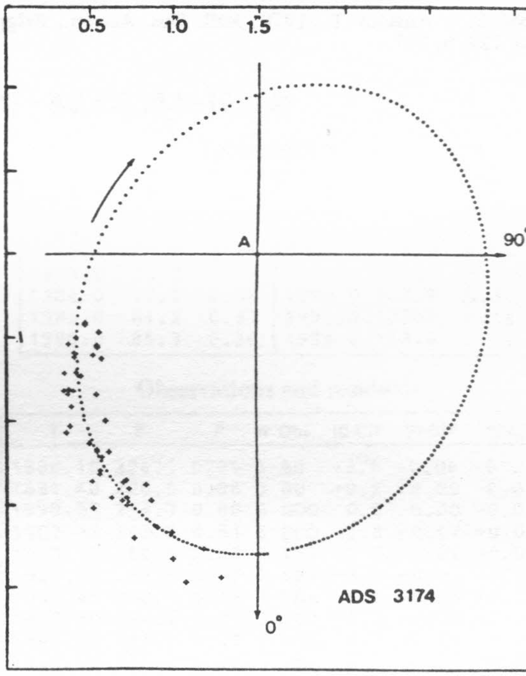

Fig. 2

The orbit (Fig. 2) is computer-drawn using ephemeris from 1790 to 2459 with a three years step. The observations from Table IV and here are marked by crosslets. The Tables IV,V and VI give the observations and the corresponding residuals O – C, orbital elements, astrophysical constants and ephemeris from 1981 to 2000. Cambell's elements are published in „Circulaire d'Information" No 84, Comm. 26, UAI 1981.

The folowing data on this pair can also be found in the ADS catalogue: the dynamical parallax is 0".024 (J. – F.) or 0".021 (R. – M.); the proper motion is given as 0".06 in 180°.

Table V
Elements of the orbital motion and astrophysical quantities of the ADS 3174

$P = 681^{\circ}.95$	$A = -1''.2071$	$M_A = +3^{m}.10$
$n = 0^{\circ}.5279$	$B = -0.4785$	$M_B = +4.60$
$T = 2064.60$	$F = -0.7828$	
$e = 0.319$	$G = +1.1971$	$\mathfrak{M}_A = 1.02\,\mathfrak{M}_{\odot}$
$a = 1''.510$	$C = \mp 0.7201$	$\mathfrak{M}_B = 0.84\,\mathfrak{M}_{\odot}$
$i = 142^{\circ}.97$	$H = \pm 0.5554$	
$\omega = 307.64$	$t(\Omega) = 2116.56$	$a = 94.4$ A.U
$\Omega = 155.32$	$t(\mho) = 1886.16$	$dp = 0''.016$

Table VI
Ephemeris of the pair ADS 3174

1981.0	$291^{\circ}.6$	$1''.15$	1991.0	$284^{\circ}.2$	$1''.08$
1982.0	290.9	1.14	1992.0	283.4	1.07
1983.0	290.2	1.14	1993.0	282.6	1.06
1984.0	289.5	1.13	1994.0	281.8	1.06
1985.0	288.8	1.12	1995.0	281.0	1.05
1986.0	288.0	1.11	1996.0	280.2	1.04
1987.0	287.3	1.11	1997.0	279.3	1.04
1988.0	286.5	1.10	1998.0	278.5	1.03
1989.0	285.8	1.09	1999.0	277.6	1.02
1990.0	285.0	1.08	2000.0	276.7	1.01

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Bull. Obs. Astron. Belgrade, N° 132 UDC 521.31

ORBITS OF FOUR VISUAL BINARIES

D. J. Zulević

(Receivod 20 June 1981)

SUMMARY: Orbits and dynamical paralleces are presented for four visual binary sistems: ADS 1371, ADS 7758, ADS 11989 and ADS 16877. Celculeted positions are compared with observations and ephemerides are given for each system.

Orbits for four visual binaries have bean computed using the methods of Thiele-Innes. Dynamical parallaxes were computed by the method of Baize and Romani (1946) with magnitudes spectral types taken from the Lick Index Cataloque of Visuel Double Stars, 1961. o (1963). The relevant information is in Tables I. II. III. i IV.

Table I

ADS 1371 = IDS 01384N5637 = BU 453,10.1–10. 4,65

P = 180.44		A = + 0"5333
n = 1.9951	Ω = 33°9	B = + 0.4733
T = 1791.53	ω = 13°5	F = − 0.3633
a = 0"73	π_{dyn} = 0"021	G = + 0.2360
e = 0.31	$\Sigma \mathfrak{M}_{AB}$ = 1.29 ⊙	C = ± 0.1408
i = 55°7	a = 34.8 U.A.	H = ∓ 0.5864

Ephemerides

T	P	ρ	T	P	ρ
1981.0	66°3	0"41	1987.0	89°7	0"36
1982.0	69.8	0.40	1988.0	94.3	0.35
1983.0	73.4	0.39	1989.0	99.0	0.34
1984.0	77.2	0.38	1990.0	103.8	0.34
1985.0	81.2	0.37	1991.0	108.7	0.34
1986.0	85.3	0.36	1992.0	113.6	0.34

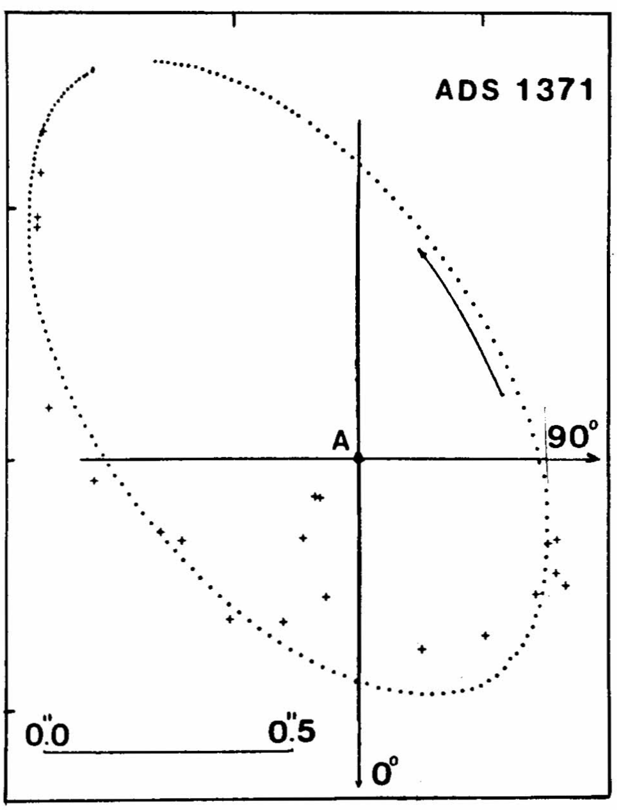

Fig. 1

Observations and residuals

T	P	ρ	n	Obs.	(0-C)P	(0-C)P	(0-C)ρ
1880.10	224°1	0"91	3	BU	+3°6	+0"06	-0"03
1891.60	228.5	0.86	3	BU	+0.2	+0.00	-0.03
1899.95	234.7	0.80	3	DOO	0.0	0.00	-0.02
1903.73	233.2	0.81	3	DOO	-4.8	-0.07	+0.03
1923.70	260.5	0.63	2	VBs	-3.9	-0.04	+0.09
1929.73	274.3	0.53	3	VBs	-3.2	-0.03	+0.06
1935.45	290.3	0.42	3	VBs	-4.5	-0.03	+0.00
1937.50	294.8	0.39	3	VBs	-7.0	-0.05	-0.01
1944.90	321.2	0.41	2	VBs	-7.7	-0.05	+0.02
1948.79	335.2	0.36	3	VBs	-7.5	-0.05	-0.05
1950.95	345.9	0.28	3	BAZ	-3.8	-0.03	-0.14
1951.8	(306,)	(0.12)	2	VBs	(352.7)	—	(0.42)
1954.58	(312)	(0.11)	3	VBs	(0.6)	—	(0.45)
1958.03	322.3	0.20	1	B	+54.5	+0.47	-0.29
1960.74	17.9	0.40	4	WOR	+1.6	+0.01	-0.09
1966.873	35.4	0.43	4	WALK	+5.3	+0.05	-0.08
1974.0	52.9	0.44	2	ZUL	+6.5	+0.05	-0.04
1976.70	60.3	0.45	1	ZUL	+6.9	+0.05	-0.00
1978.29	58.4	0.48	2	ZUL	+0.5	+0.00	+0.04
1980.90	65.9	0.40	1	ZUL	-0.1	-0.00	+0.01
1980.90	68.2	0.42	1	GP	+2.2	+0.02	+0.01

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Table II
ADS 7758 = IDS 10195N2468 = STF 1429, 9.0–9.0, G5

P = 1280.68	Ω = 113°9	A = −0"855
n = 0.2811	ω = 0°0	B = +1.920
T = 2170.15		F = +0.583
a = 2"10	π dyn = 0"014	G = +0.265
e = 0.28	$\Sigma \mathfrak{M}_{AB}$ = 2.1 ⊙	C = +2.000
i = 107°7	a = 150.0 U.A.	H = ±0.000

Observations and residuals

T	P	ρ	mag.	n	Obs.	(O-C)P	(O-C)P	(O-C)ρ
1827.29	272°2	1"48	8.3-8.3	2	STF	+1°1	+0"03	+0"01
1833.26	267.4	1.58	8.5-8.8	1	STF	-2.7	-0.07	+0.15
1857.33	267.9	1.11	8.1-8.5	2	SE	+2.7	+0.06	-0.13
1869.17	262.4	1.19		4	D	+0.3	+0.01	+0.04
1879.33	262.0	0.88		2	HL	+2.9	+0.05	-0.18
1881.32	257.1	1.09		1	BIG	-1.3	-0.02	+0.04
1885.34	257.3	0.99		3	HL	+0.2	0.00	-0.03
1889.52	256.2	1.03		4	SP	+0.6	+0.1	+0.04
1891.34	254.0	1.00		2	STH	-0.9	-0.02	+0.03
1891.78	254.6	0.96		4	SP	-0.1	0.00	-0.01
1893.27	250.6	1.19		2	TUR	-3.5	-0.06	+0.23
1897.29	252.5	0.87		2	BRS	0.0	0.0	-0.06
1897.31	246.4	0.80		1	BOW	-6.1	-0.10	-0.12
1898.19	251.1	0.83		3	BOW	-1.0	-0.02	-0.09
1899.16	250.1	0.95		3	BOW	-1.6	+0.03	+0.04
1899.29	256.0	0.77		1	L	+4.4	+0.07	-0.14
1900.24	252.2	0.75		1	L	+1.0	+0.02	-0.15
1900.30	257.2	0.96		2	BOW	+6.0	+0.09	+0.06
1900.31	249.0	0.97		1	BRY	-2.2	-0.03	+0.07
1901.30	249.7	0.99		4	BOW	-1.0	-0.02	+0.09
1901.32	248.2	0.65		1	L	-2.5	-0.04	-0.25
1902.34	254.6	0.92		2	BOW	+4.3	+0.07	+0.03
1903.20	259.8	0.82		3	BOW	+10.0	+0.15	-0.06
1903.39	249.3	0.88	8.5-8.6	1	VBs	-0.5	-0.01	-0.11
1904.28	256.0	1.06		3	BOW	+6.6	+0.10	+0.18
1905.21	250.2	1.02		2	BOW	+1.3	+0.02	+0.15
1906.23	245.6	0.98		1	DRM	-2.8	-0.04	+0.12
1908.16	252.3	0.91		3	HZ	+4.8	+0.07	+0.06
1908.26	246.6	0.74		2	BOW	-0.8	.0.01	-0.11
1909.24	244.1	0.78		1	A	-2.8	-0.04	-0.06
1909.28	248.6	0.81		4	BOW	+1.7	+0.02	-0.03
1910.05	246.6	0.77		3	Doo	+0.1	0.00	-0.06
1910.27	249.0	0.79		1	LAU	+2.6	+0.04	-0.04
1912.13	244.0	0.82		3	FOX	-1.4	-0.02	0.00
1912.28	246.3	0.62		2	BOW	+1-0	+0.01	-0.20
1912.31	243.2	0.60		2	DOB	-2.1	-0.03	-0.22
1914.23	250.6	0.76		2	DOB	+6.4	+0.09	-0.04
1914.82	242.4	0.59		2	RAB	-1.5	-0.02	-0.21
1915.08	288.6	1.57		3	PHL	+44.9	+0.63	+0.77
1915.24	244.8	0.81		3	VBs	+1.2	+0.02	+0.01
1918.24	237.6	0.71	0.2	1	A	-4.3	-0.06	-0.07
1921.13	237.4	0.72		2	VBs	-2.7	-0.04	-0.04
1922.37	234.8	0.66		3	FUR	-4.5	-0.06	-0.09
1924.26	238.6	0.74	0.1	4	B	+0.5	+0.01	0.00
1925.37	242.3	0.37		2	DOB	+5.0	+0.06	-0.36
1926.27	236.1	0.65		5	FAT	-0.6	-0.01	-0.08
1927.16	233.0	0.69		1	FUR	-3.1	-0.04	-0.03
1927.20	231.7	0.58		1	FUR	-4.3	-0.05	-0.14
1927.21	238.6	0.59		1	FUR	+2.6	+0.3	-0.13
1927.22	237.4	0.79		1	FAT	+1-4	+0.02	+0.07
1927.23	235.2	0.76		1	FUR	-0.8	-0.01	+0.04
1927.24	239.3	0.82		1	FUR	+3.3	+0.04	+0.10
1927.31	232.8	0.68		1	FUR	-3.2	-0.04	-0.04
1927.32	230.7	0.59		4	RAB	-5.3	-0.07	-0.13
1927.36	234.7	0.65		2	STG	-1.3	-0.02	-0.07
1928.21	234.5	0.70		2	STG	-0.8	-0.01	-0.01
1928.30	239.3	0.69		1	FAT	+4.0	+0.05	-0.03
1930.44	228.9	0.61		3	BOW	-4.9	-0.06	-0.09
1933.31	232.5	0.70	8.7-8.9	4	B	+0.9	+0.01	+0.01
1934.21	228°1	0"64	8.9-8.9	3	VBs	-2°8	-0"03	-0"04
1934.32	232.8	0.64		4	BAZ	+2.0	+0.02	-0.04
1936.33	228.2	0.69		5	RAB	-1.0	-0.01	+0.02
1938.02	229.0	0.63		5	DUR	+1.2	+0.01	-0.03
1938.35	228.5	0.56		5	RAB	+0.9	+0.01	-0.10
1939.30	222.4	0.63		5	RAB	-4.4	-0.05	-0.02
1939.58	226.2	0.65		4	BAZ	-0.4	0.00	-0.01
1940.33	233.2	0.57		5	RAB	+7.3	+0.08	-0.8
1942.20	229.4	0.70		3	VOU	+5.2	+0.06	+0.06
1942.23	225.2	0.75	8.9-8.9	1	ARD	+0.9	+0.01	+0.10
1942.34	219.9	0.58		3	DUR	-4.3	-0.05	-0.06
1942.36	223.3	0.76		3	RAB	-0.9	-0.01	+0.12
1944.02	215.7	0.61	8.9-8.9	2	VBS	-7.0	-0.07	-0.03
1944.33	223.8	0.83		3	RAB	+1-4	+0.02	+0.19
1946.25	217.5	0.73		2	ARD	-3.2	-0.04	+0.10
1947.54	225.5	0.66		3	NEW	+6.0	+0.06	+0.04
1949.28	215.0	0.56		7	RAB	-2.9	-0.03	-0.06
1949.33	216.5	0.66	0.0	3	BAZ	-1.3	-0.01	+0.04
1950.18	213.0	0.68		1	DOM	-4.0	-0.04	+0.06
1950.18	214.5	0.52	8.7-8.7	2	MRZ	-2.5	-0.03	-0.09
1951.02	211.6	0.61		4	VBs	-4.6	-0.05	-0.00
1951.1	213.9	0.53	8.7-8.7	2	MRZ	-2.2	-0.02	-0.08
1951.22	215.2	0.58		2	DOM	-0.8	-0.01	-0.03
1951.31	215.4	0.52		6	RAB	-0.5	-0.01	-0.09
1952.30	217.5	0.57		1	DOM	+2.6	+0.03	-0.04
1953.16	212.5	0.60		2	DOM	-1.6	-0.02	-0.01
1953.31	211.6	0.54		6	RAB	-2.3	- .02	-0.07
1954.33	211.6	0.50		5	RAB	-1.3	-0.01	-0.10
1955.19	209.2	0.65		4	MOR	-2.9	-0.03	+0.05
1955.31	210.4	0.63	8.2-8.4	4	BAZ	-1.5	-0.02	+0.03
1955.31	208.4	0.53		6	RAB	-3.5	-0.04	-0.07
1956.22	208.7	0.54	8.7-8.7	3	COU	-2.3	-0.02	-0.06
1956.33	209.8	0.50	8.9-8.9	6	RAB	-1.1	-0.01	-0.10
1958.04	209.6	0.67	9.0-9.1	1	B	+0.4	+0.00	+0.07
1958.26	208.1	0.66	8.7-8.7	3	COU	-0.9	-0.01	+0.06
1958.31	206.4	0.45	9.0-9.2	1	B	-2.5	-0.03	-0.15
1958.52	204.6	0.66	0.0	2	WOR	-4.1	-0.04	+0.06
1959.20	207.5	0.75		7	HEI	-0.5	-0.00	+0.16
1960.26	206.2	0.58		6	HEI	-0.7	-0.01	-0.01
1961.14	202.9	0.62		3	VBs	-3.1	-0.03	+0.03
1961.25	204.7	0.56	8.8-8.8	3	DJU	-1.2	-0.01	-0.03
1962.14	204.7	0.52	9.1-9.2	4	B	-0.2	0.00	-0.07
1962.33	204.8	0.50	0.0	4	HLN	0.0	0.00	-0.09
1963.14	204.1	0.51	0.0	4	WOR	+0.2	+0.00	-0.08
1964.3	197.9	0.66		5	HEI	-4.8	-0.05	+0.07
1964.57	201.5	0.54	8.6-8.6	3	COU	-1.0	-0.01	-0.05
1966.31	197.9	0.54	0.2	3	WOR	-2.7	-0.03	-0.05
1966.32	199.9	0.63	0.3	3	WOR	-0.7	-0.01	+0.04
1966.33	199.5	0.64	8.9-9.0	3	BAZ	-1.1	-0.01	+0.05
1969.20	191.1	0.58		4	HEI	-6.4	-0.07	-0.01
1970.94	194.1	0.58	8.6-8.6	3	COU	-1.6	-0.02	-0.01
1971.17	192.7	0.46		2	VBs	-2.8	-0.03	-0.13
1973.75	189.2	0.63	0.1	4	WOR	-3.6	-0.04	+0.04
1973.87	190.7	0.48	0.2	3	BEH	-2.0	-0.02	-0.11
1976.14	191.4	0.67	9.0-9.0	1	ZUL	+1.1	+0.01	+0.08
1976.20	187.8	0.64		1	MUL	-2.4	-0.02	+0.05
1977.19	187.9	0.63		3	HEI	-1.4	-0.01	+0.04
1981.29	182.3	0.63	8.8-8.8	3	ZUL	-2.7	-0.03	+0.03
1981.30	184.4	0.64		3	GP	-0.6	-0.01	+0.04

Ephemerides

T	P	ρ	T	P	ρ
1980.0	186°3	0"60	1992.0	174°8	0"64
1982.0	184.3	0.60	1994.0	173.1	0.64
1984.0	182.4	0.61	1996.0	171.3	0.65
1986.0	180.4	0.61	1998.0	169.6	0.66
1988.0	178.5	0.62	2000.0	168.0	0.67
1990.0	176.7	0.62	2002.0	166.4	0.68

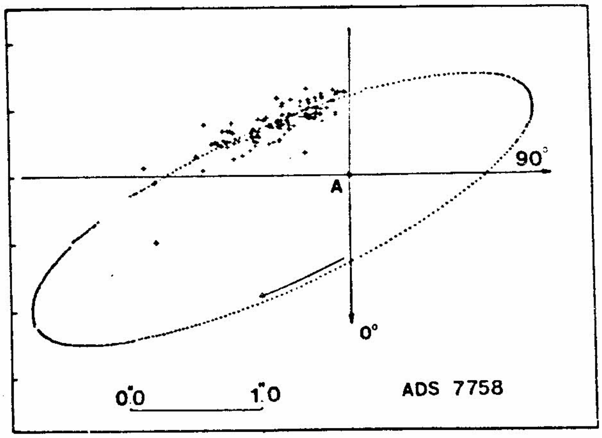

Fig. 2

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Table III

ADS 11989 = IDS 18584S2141 = H 126, 7.5–7.8, GO

P = 356,44	Ω = 55,510	A = +0.7200
n = 1.010	ω = 89.5	B = −0.4750
T = 1896.51	π_{dyn} = 0.024	F = −0.7150
a = 1.37	$\Sigma \mathfrak{M}_{AB}$ = 1.5 ⊙	G = −1.0600
e = 0.44	a = 57.1 U.A.	C = +1.0116
i = 132.4		H = ∓0.0088

Observations and residuals

T	P	ρ	mag.	n	Obs.	(0-C)P	(0-C)P	(0-C)ρ
1801.67	very close							
1873.00	40°+	1.″0+		1	BU	+4.″9	+0.″07	+0.″21
1879.53	22.$\bar{4}$	0.8$\bar{3}$		2	CinO	-06	-0.01	+0.15
1890.48	353.2	0.58		3	BU	+2.0	+0.02	+0.06
1891.51	349.3	0.48		3	BU	+2.0	+0.02	-0.03
1891.51	331.6	0.35		6	BAR	-15.7	-0.14	-0.16
1896.73	317.5	0.44		2	A	-8.1	-0.07	-0.04
1897.75	310.7	0.56		IN	SEE	-10.6	-0.09	+0.08
1898.46	312.8	0.51		3	A	-5.5	-0.05	+0.02
1899.55	310.0	0.51		2	A	-3.7	-0.03	+0.02
1900.75	303.2	0.40	7.8-7.8	3	HU	-5.6	-0.05	-0.10
1900.77	289.7	0.50		IN	SOLA	-18.9	-0.16	+0.02
1901.55	300.9	0.43		2	A	-4.7	-0.04	-0.07
1903.41	295.4	0.48		2	A	-3.1	-0.03	-0.04
1908.72	279.0	0.64		6	MCO	-2.2	-0.02	+0.05
1909.62	276.4	0.70		3	A1,OL2	-2.4	-0.03	+0.09

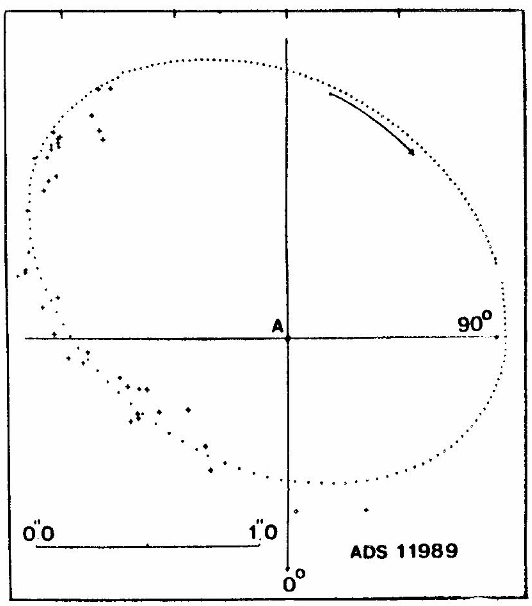

Fig. 3

T	P	ρ	mag.	n	Obs.	(O-C)P	(O-C)P	(O-C)ρ
1911.62	275.0	0.60		4	A	+1-4	+0.02	-0.04
1914.60	267.8	0,76		4	A2,I2	+0.9	+0.01	+0.07
1919.62	259.4	0.82		2	A	+1.7	+0.02	+0.04
1921.90	255.5	0.75		6	VBs	+1-4	+0.02	-0.07
1924.42	252.6	0.96		5	VOU4,δ1	+2.1	+0.03	+0.10
1925.33	250.8	0.92		4	VOU	+1.5	+0.02	+0.05
1926.40	249.8	0.92		4	B2,A2	+1.9	+0.03	+0.03
1931.62	244.8	0.94		3	VBs	+3.0	+0.05	-0.02
1939.99	235.5	1.05	7.5-7.8	3	B	+1.9	+0.04	-0.01
1947.33	228.9	1.04		3	B	+1.4	+0.03	-0.09
1948.66	225.0	1.18		5	RAB	-1.4	-0.03	+0.04
1949.71	226.6	1.05	7.8-8.0	4	B	+1.0	+0.02	-0.09
1949.73	222.7	1.14		5	RAB	-2.9	-0.06	-0.01
1950.72	220.6	1.15		5	RAB	-4.2	-0.09	0.00
1951.70	219.0	1.14		4	RAB	-5.1	-0.10	-0.02
1952.79	218.1	1.21		3	RAB	-5.2	-0.11	+0.04
1953.68	224.6	1.04	7.5-7.5	2	CHURMS	+1.9	+0.04	-0.13
1953.77	217.4	1.17		5	RAB	-5.2	-0.11	0.00
1954.74	220.5	1.17		6	RAB	-1.4	-0.03	-0.01
1955.71	218.2	1.17		5	RAB	-3.1	-0.06	-0.02
1956.72	218.8	1.15		5	RAB	-1.7	-0.04	-0.04
1975.17	209.4	1.05		3	ZUL	+1.0	+0.02	-0.21
1975.72	209.4	1.10		4	WOR	+1.4	+0.03	-0.17
1976.54	209.4	1.18		2	HLD	+1-9	+0.04	-0.09
1981.30	205.0	1.28		2	ZUL	+0.4	+0.01	+0.00
1981.30	204.1	1.27		2	GP	-0.5	-0.01	-0.01

Ephemerides

T	P	ρ	T	P	ρ
1980.0	205°4	1"28	1992.0	198°1	1"29
1982.0	204.1	1.28	1994.0	196.9	1.29
1984.0	202.9	1.28	1996.0	195.7	1.29
1986.0	201.7	1.28	1998.0	194.5	1.29
1988.0	200.5	1.29	2000.0	193.3	1.29
1990.0	199.3	1.29	2002.0	192.1	1.29

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Table IV
ADS 16877 = IDS 23526N4453 = STT 500 AB, 6.3–7.2, B9

P = 351.22	Ω = 157.1	A = -0.3790
n = 1.0250	ω = 0.0	B = +0.1600
T = 2103.29		F = -0.1222
a = 0.41	π_{dyn} = 0.004	G = -0.2890
e = 0.39	$\sum \mathfrak{M}_{AB}$ = 8.7 ⊙	C = 0.0000
i = 40.3	a = 102.5U.A.	H = ±0.2652

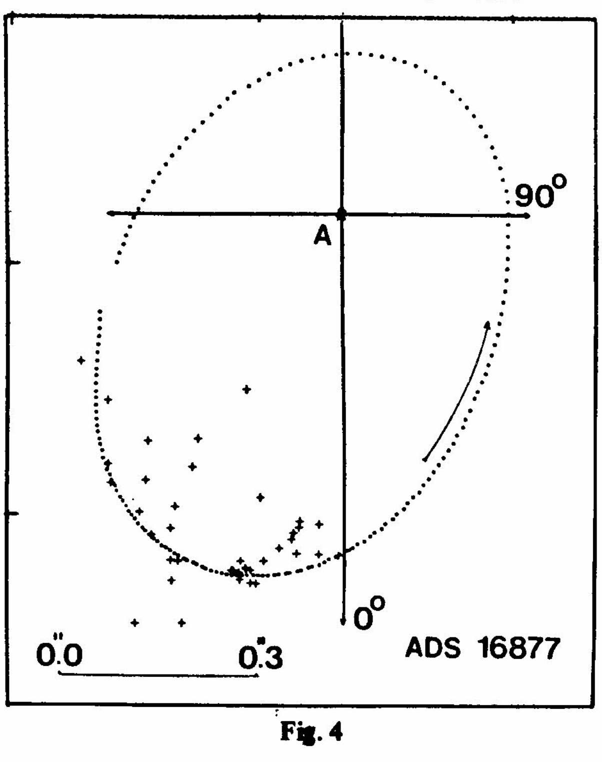

Fig. 4

Observations and residuals

T	P	ρ	mag	n	Obs.	(O-C)P	(O-C)P	(O-C)ρ
1845.24	299°4	0"45		2	STT	-0°1	-0"00	+0"02
1852.82	308.5	0.45		2	STT	+4.2	+0.03	+0.00
1873.52	319.5	0.45		7	D	+4.3	+0.04	-0.06
1879.80	316.5	0.52		3	HL	-1.6	-0.01	0.00
1883.2	326.7	0.40		6	EN	+7.1	+0.07	-0.13
1888.91	322.6	0.50		3	HL	+0.5	0.00	-0.04
1888.95	317.6	0.53		6	SP	-4.5	-0.04	-0.01
1889.80	319.3	0.53		2	H	-3.2	-0.03	-0.01
1898.62	325.8	0.54		3	HU	-0.2	-0.00	-0.01
1902.09	333.0	0.69		3	DOO	+5.6	+0.05	+0.13
1905.61	330.4	0.30		1	FRH	+1.6	+0.01	-0.26
1908.35	329.5	0.51		12	PRZ4,FUR2, DOB3,VBs	-0.3	0.00	-0.05
1910.15	328.6	0.44		4	DOB	-1.9	-0.02	-0.12
1913.07	330.6	0.54		10	.Neuj3, VOU5,FOX2	-1.0	-0.01	-0.03
1914.97	343.3	0.44		1	RAB	+10.9	+0.11	-0.13
1916.53	334.0	0.58		6	FOX3,DOO3	+1.0	+0.01	+0.01
1923.30	334.6	0.61		5	A2,MAG3	-0.9	-0.01	+0.04
1924.50	328.4	0.56		4	Gr0	-7.5	-0.07	-0.01
1925.58	333.4	0.58		7	KPZ1, DOB2,RAB4	-2.9	-0.03	+0.01
1932.71	338.6	0.66		1	HINTze	-0.4	0.00	+0.09
1943.76	344.5	0.55		3	VBs	+1.4	+0.01	-0.02
1948.82	342.0	0.56		7	RAB	-3.1	-0.03	0.00
1949.79	342.7	0.56		7	RAB	-2.7	-0.03	0.00
1950.88	342.2	0.56		6	RAB	-3.6	-0.04	+0.00
1951.87	342.7	0.56		8	RAB	-3.6	-0.03	+0.00
1952.92	343.5	0.56		6	RAB	-3.2	-0.03	+0.00
1953.88	343.4	0.54		9	RAB	-3.6	-0.04	-0.02
1954.89	344.3	0.55		9	RAB	-3.1	-0.03	+0.01
1955.86	343.8	0.57		7	RAB	-4.0	-0.04	+0.02
1955.86	345.1	0.55		3	MUL	-2.7	-0.03	+0.00
1957.88	345.4	0.57		8	RAB	-3.2	-0.03	+0.02
1958.43	346.8	0.53		4	B	-2.1	-0.02	-0.02
1959-84	351.5	0.46		9	Gr0	+2.1	+0.02	-0.09
1961.76	348.3	0.51		4	B	-1.9	-0.02	-0.04
1961.81	350.7	0.48		1	HLD	+0.5	+0.00	-0.07

T	P	ρ	mag.	n	Obs.	(O-C)P	(O-C)P	(O-C)ρ
1962.80	345.9	0.57		3	HEI	-4.7	-0.04	+0.03
1963.85	351.8	0.51		4	WOR	+0.7	+0.01	-0.03
1069.85	350.2	0.49		2	COU	-3.4	-0.03	-0.04
197110	351.3	0.47		3	BAZ	-2.9	-0.03	-0.06
1971.83	355.1	0.46		3	WOR	+0.7	+0.01	-0.07
1975.72	355.2	0.51		1	ZUL	-1.0	-0.01	-0.01
1980.90	358.9	0.51		1	ZUL	+0.4	+0.00	+0.00

Ephemerides

T	P	ρ	T	P	ρ
1981-0	358°6	0"51	1993.0	4"5	0"48
1983.0	359.5	0.51	1995.0	5.6	0.47
1985.0	0.5	0.50	1997.0	6.7	0.47
1987.0	1.5	0.50	1999.0	7.8	0.46
1989.0	2.5	0.49	2001.0	9.0	0.46
1991.0	3.5	0.49	2003.0	10.2	0.45

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ORBITES DE TROIS ETOLLES DOUBLES VISUELLES (ADS 674 = A 921AB, ADS 1345 = A 1 et ADS 1393 = HU804)

V. Erceg

(Recu le 28.7.81.)

RÉSUMÉ: On donne les éléments des orbites, les masses, les magnitudes absolues et les parallaxes dynamiques orbitales de trois étoiles doubles visuelles, les éléments étant determinés en utilisant la méthode de Thiele-Innes Van den Bos.

ORBITE DE ADS 674 = A 921AB

Pos. (1950): $00^h\ 46^m\!.2$; +57° 03' Mgn.: 9.3 – 9.8; Type sp. –

Tableau I
Eléments orbitaux, les quantités astrophysiques et les constantes

P = 123.18 ans		
n = 2°9226		
T = 1869.99	A = −0"0400	$\pi_{dyn.orb}$ = 0"004
e = 0.48	B = −0"1300	M_A = 2.6
a = 0".167	F = +0"1550	M_B = 3.1
i = 36°.02	G = −0"0600	$\mathfrak{M}_A$ = 1.76 ☉
Ω = 151°.01	C = +0"0968	$\mathfrak{M}_B$ = 1.56 ☉
ω = 99°.66	H = ∓0"0165	a = 36.8 U.A.
$T_{\Omega,\mho}$ = 1978.0;2003.8		

Tableau II
Ephémérides

t	θ°	ρ"	t	θ°	ρ"
1981.0	160.8	0.12	1986.0	184.8	0.10
1982.0	164.7	0.12	1987.0	191.5	0.09
1983.0	169.0	0.11	1988.0	199.1	0.08
1984.0	173.7	0.11	1989.0	207.7	0.08
1985.0	178.9	0.10	1990.0	217.3	0.08

Tableau III
Observations et les résidus

t	θ_o°	ρ_o''	Obs.	n	Références	$(O\text{-}C)_\theta^\circ$	$(O\text{-}C)_\rho''$
1905.620	38.9	0.17	A	3	Lick Obs.Bul.V.4,N.4, 1906.	+6.5	−0.01
1915.700	47.2	0.21	A	2	Lick Obs.Bul.V.14, N.62,1929	−2.0	+0.02
1925.820	60.4	0.19	A	1	Lick Obs.Bul.V.14, N.62,1929	−4.2	−0.01
1929.710	71.8	0.17	A	2	Lick Obs.Bul.V.16, N.96	+1.6	−0.03
1947.010	98.3	0.20	VBS	6	Pub.Yerkes Obs.V.9, Pt.1	+3.6	0.00
1958.030	110.6	0.21	B	1	-"-	−0.3	+0.02
1958.090	108.2	0.21	B	1	-"-	−2.8	+0.02
1962.320	120.3	0.18	B	4	Astr.J.V68,582	+2.5	−0.01
1962.960	111.	0.21	COU	2	J.Obs.V.46,155	−7.	+0.03
1964.775	128.3	0.17	WOR	4	Pub.US Naval Obs. V.22, Pt. 2	+6.3	−0.01

ORBITE DE ADS 1345 = A 1

α, δ (1950): 01^h 39^{m}9; –07° 00' Mgns. : 8.5 – 9.0; Type sp. F2

Tableau I
Eléments orbitaux, les quantités astrophysiques et les constantes

P = 298.83 ans		
n = 1°.2047	A = +0".0825	π_{dyn} = 0".008
T = 1879.36	B = +0".5100	M_A = 3.1
e = 0.51	F = −0".4800	M_B = 3.6
a = 0".525	G = +0".0395	$\mathfrak{M}_A$ = 1.570
i = 25°.8	C = ±0".1959	$\mathfrak{M}_B$ = 1.400
Ω = 24°.0	H = ±0.1180	a = 64.0 U.A
ω = 58°.9		
$T_{\Omega,\mho}$ = 2231.6,1930.2		

Tableau II
Ephémérides

t	θ°	ρ"	t	θ°	ρ"
1981.0	240.0	0.73	1986.0	242.3	0.74
1982.0	240.4	0.74	1987.0	242.8	0.75
1983.0	240.9	0.74	1988.0	243.2	0.75
1984.0	241.4	0.74	1989.0	243.7	0.75
1985.0	241.9	0.74	1990.0	244.2	0.75

Tableau III
Observations et les résidus

	t	θ_O°	ρ_O''	Obs.	n	References	$(O\text{-}C)_\theta^{\circ}$	$(O\text{-}C)_\rho''$
1.	1899.78	165.2	0.31	A	3	Astron.Nachr.V.152,161	+8.9	+0.01
2.	1902.75	172.5	0.38	A	4	Lick Obs.Bul.V.14,62,1929	+8.4	+ 6
3.	1915.70	189.6	0.46	A	2	Lick Obs.Bul.V.14,62,1929	+0.4	+ 5
4.	1920.14	193.7	0.41	A	3	Lick Obs.Bul.V.14,62,1929	−1.7	− 3
5.	1926.03	199.2	0.44	A	2	Lick Obs.Bul.V.14,62,1929	−3.3	− 4
6.	1928.97	204.2	0.44	A	2	Lick Obs.Bul.V.14,62,1929	−1.4	− 6
7.	1929.62	207.2	0.56	VOU	3	Ann.Bosscha Obs.Lemb.V.6,Pt.1	+1.0	+ 5
8.	1929.78	201.8	0.51	VBS	2	Pub.Yerkes Obs.V.8,47	−4.6	0
9.	1939.91	208.7	0.52	A	2	Lick Obs.Bul.V.18,109	−6.7	− 5
10.	1933.69	208.0	0.53	KUI	1	Astrophys.J.Supp.V.6,1.	−2.1	0
11.	1934.96	210.0	0.53	B	4	Union Obs.Circ.N.100,481	−0.8	− 1
12.	1936.71	211.5	0.61	SMW	4	Ann.Bosscha Obs.V.9,Pt.1	−1.3	+ 6
13.	1938.59	212.4	0.54	VOU	4	Ann.Bosscha Obs.Lemb.V.6,Pt.4	−1.9	− 2
14.	1942.61	217.9	0.55	VOU	3	Manuscript,See J.Obs.V.38,109	+0.4	− 3
15.	1943.30	216.4	0.58	BAZ	3	J.Obs.V.28,1	−1.6	− 1
16.	1947.70	217.1	0.51	JEF	1	Unpublished	−4.1	− 10
17.	1948.17	220.0	0.54	B	4	Union Obst.Circ.N.111,13	−1.5	− 7
18.	1948.71	218.1	0.75	VBS	2	Pub.Yerkes Obs.V.8,159	−3.8	+ 14
19.	1952.26	222.3	0.57	B	3	Union Obs.Circ.N.113,185	−1.9	− 6
20.	1957.61	226.1	0.69	VBS	3	Pub.Yerkes Obs.V.9,Pt.2	−1.5	+ 4
21.	1957.73	226.7	0.60	B	3	Astrophys.J.Supp.V.4,N36,45	−0.9	− 5
22.	1958.94	229.5	0.59	COU	3	J.Obs.V.42,17	+1.2	− 7
23.	1959.87	226.3	0.56	KNP	3	Union Obs.Circ.N.119,331	−2.6	− 10
24.	1959.92	225.8	0.78	HEI	4	Astron.Nachr.V.285,249	−3.1	+ 12
25.	1961.67	227.3*	0.74	B	4	Astron.J.V.67,555	−2.6	+ 7
26.	1961.72	228.6	0.62	WOR	3	Pub.US Naval Obs.V.18,Pt.6	−1.4	− 5
27.	1962.72	239.0	0.72	VBS	1	Comm.Lunar Plan.Lab.V.3,N.51	+8.5	+ 5
28.	1962.94	234.4	0.70	VBS	1	Comm.Lunar Plan.Lab.V.3,N.51	+3.8	+ 2
29.	1962.96	232.7	0.68	VBS	1	Comm.Lunar Plan.Lab.V.3,N.51	+2.0	0
30.	1963.65	235.3	0.76	VBS	5	Contr.N.180,Kitt Peak N.O.	+4.3	+ 8
31.	1964.83	235.3	0.85	VBS	2	Comm.Lunar Plan.Lab.V.3,N.51	+3.6	+ 17

32.	1965.94	235.8*	0.69	NBG	5	Republic Obs.Circ.N.125,105	+3.5	0
33.	1969.20	232.1	0.63	WAK	3	Pub.US Naval Obs.V.22,Pt.5,1972	-2.0	- 7
34.	1971.21	234.2	0.87	WAK	3	Pub.US Naval Obs.V.22,Pt.5,1972	-0.9	+ 17
35.	1971.67	237.7	0.67	WOR	4	Pub.US Naval Obs.V.24,Pt.6,1978	+2.4	- 4
36.	1974.81	236.1	0.74	HEI	3	Astrophys.J.Supp.V.29 315,1975	-0.8	+ 2
37.	1977.92	237.4	0.72	HLN	1	Pub.Astr.Soc.Pacific,V.90,463, 1978	-1.1	0
38.	1978.85	239.3	0.67	HEI	3	Unpublished	+0.4	- 6
39.	1980.90	238.4	0.64	DZ	1	Bul.Astr.Obs.Belgrade,N.131,1981	-1.5	-0.09

* Quadrant change

ORBITE DE ADS 1393 = HU804

Pos. (1950): $01^{h}\ 43^{m}.3$; + 33° 28' Mgn.: 8.5 – 10.3; Type sp. F2

Tableau I
Eléments orbitaux, les quantités astrophysiques et les constantes

P = 610.17 ans		
n = $0^{\circ}.5900$	A = +0".2380	$\pi_{dyn.orb.}$ = 0".003
T = 1874.81	B = -0".2600	M_A = 1.1
e = 0.21	F = +0".2297	M_B = 2.9
a = 0".380	G = +0".2770	$\mathfrak{M}_A$ = 2.67⊙
i = 29.5	C = ∓0".1420	$\mathfrak{M}_B$ = 1.64⊙
Ω = $87^{\circ}.14$	H = ∓0".1221	a = 126.7 U.A.
ω = $229^{\circ}.30$		
$T_{\Omega,\mho}$ = 2062.1;1819.1		

Tableau II
Ephémérides

t	θ°	ρ''	t	θ°	ρ''
1981.0	46.6	0.34	1986.0	49.3	0.34
1982.0	47,3	0.34	1987.0	50.4	0.34
1983.0	47,9	0.34	1988.0	51.0	0.35
1984.0	48.6	0.34	1989.0	51.5	0.35
1985.0	49.2	0.34	1990.0	52.2	0.35

Tableau III
Observations et les résidus

t	θ_{o}°	ρ_{o}''	Obs.	n	References	$(0\text{-}C)_{\theta}^{\circ}$	$(0\text{-}C)_{\rho}''$
1903.620	337.6	0.27	HU	2	Lick Obs.Bul.V.3,95	-3.1	0.000
1921.670	0.2	0.30	A	2	Lick Obs.Bul.V.11,58	+1.6	+0.03
1923.696	2.4	0.28	VBS	2	Pub.Yerkes Obs.V.5,Ptl	+1.8	+0.01
1928.830	2.1	0.28	VBS	1	Pub.Yerkes Obs.V.8,159	-3.3	0.00
1930.690	3.2	0.24	VBS	1	Pub.Yerkes Obs.V.8,159	-4.0	-0,04
1937.670	13.2	0.30	VBS	1	Pub.Yerkes Obs.V.8,159	-0.4	+0.02
1946.00	20.9	0.26	VBS	1	Pub.Yerkes Obs.V.8,159	+0.1	-0.03
1946.810	20.4	0.30	VBS	1	Pub.Yerkes Obs.V.8,159	-1.1	+0.01
1951.810	24.1	0.23	VBS	1	Pub.Yerkes Obs.V.9,Pt.2	-1.5	-0.07
1958.660	34.2	0.32	B	3	Pub.Yerkes Obs.V.9,Pt.1	+3.2	+0.01
1961.910	36.4	0.29	B	3	AstronJ.V.67,555	+3.0	-0.02
1964.549	35.0	0.31	WOR	3	Pub.US Naval Obs.V.22,Pt.2.	-0.4	0.00
1967.850	35.3	0.30	COU	2	J.Obs.V.51,337	-2.5	-0.02
1971.830	37.7	0.36	MUL	1	Astron Astropys.Supp.V.23,205, 1976	-2.9	+0.04
1976.900	51.6	0.34	HEI	3	Astrophys.J.Supp.V.37,343,1978	+7.6	+0.01

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MICROMETER MEASURES OF DOUBLE STARS

(Series 33)

D. J. Zulević

(Received January 10, 1981)

SUMMARY: Presented here are 289 measures of 134 Double Stars made with 65/1055 cm refractor of Belgrade Observatory.

The present list is a continuation of the published series of measures of double stars in Belgrade, made in the period 1980. 103 – 1980. 902. In the Table I of measures the columns give: ADS number, double star designation, multiple, postition for 1900 (IDS), epoch omitting the century, position angle, separation, estimated magnitudes, number of nights and notes. An asterisk in the secind column indicates that there is a note at the end of Table I.

In the present work the distribution of 289 mesures of distances is as folows:

ρ<0"50	0"50<ρ≤1"00	1"00<ρ≤1"50	1"50<ρ≤2"00	ρ>2"00	Σ
28	146	57	33	25	289
9,6%	50.5%	19.7%	11.1%	8.8%	100%

Table I

Micrometer measures of double stars

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
61	STT 3062 00010N5753		80.902	289°1	1"34	6.4-7.5	1	Baize, 1958: -0°2, - 0"09
102	STF 2 00038N7910		80.678	26.2	0.62	6.8-7.1	1	
			80.881	21.7	0.62		1	
			80.779	23.9	0.62		2	Heintz, 1952: -4°9, +0"01
147	BU 255 00067N2752		80.897	71.6	0.50		1	Changed 27° since 1875

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
202	ES 865	AB	80.810	80°2	1″67	9.5-9.6	1	
	00106N5200		80.881	77.5	1.60		1	
			80.845	78.9	1.63		2	Changed 133° since 1910
207	STF 13		80.678	60.3	0.91	6.7-7.2	1	
	00106N7624		80.881	59.9	0.88		1	
			80.902	59.8	0.85		1	
			80.820	60.0	0.88		3	Heintz,1960: +3°1, +0″02
220	STF 19		80.678	141.6	2.07	7.0-9.2	1	
	00115N3604		80.790	139.3	2.24		1	
			80.793	139.6	2.17		1	
			80.815	140.4	2.24		1	
			80.829	140.2	2.27		1	
			80.781	140.2	2.20		5	Changed 7° since 1836
221	STT 4		80.678	172.1	0.57	8.5-8.9	1	
	00115N3556		80.711	173.0	0.57		1	
			80.695	172.6	0.57		2	Muller,1957: +1°6, +0″03
256	HJ 1015		80.728	302.5	5.73	9.1-9.6	1	Changed 25° since 1896
	00135N2512							
283	HJ 1018		80.825	90.5	1.44	8.6-9.2	1	
	00154N6707		80.881	87.7	1.40		1	
			80.853	89.1	1.42		2	Muller,1957: +2°8, -0″03
293	STT 6		80.892	151.3	0.48	7.5-8.5	1	Muller,1954: 0°0, -0″14
	00158N6627							
434	STT 12		80.892	182.9	0.52	5.5-5.8	1	Heintz,1963: -0°2, -0″05
	00262N5358							
684	BU 232		80.678	239.5	0.81	8.5-9.0	1	
	00448N5005		80.711	237.5	0.72		1	
			80.695	238.5	0.76		2	Baize,1964: +1°9, -0″07
755	STF 73		80.678	258.7	0.64	6.1-6.7	1	
	00496N2305		80.891	260.8	0.59		1	
			80.784	259.8	0.62		2	Muller,1957: -2°5, 0″0
862	STT 21		80.881	177.2	0.76	6.7-8.0	1	
	00573N4650		80.892	175.8	0.64		1	
			80.902	172.9	0.63		1	
			80.892	175.3	0.68		3	Heintz,1966: +0°2, -0″21
999	BU 1100		80.892	207.7	0.41	8.3-8.3	1	Muller,1954: +0°5, -0″08 Zulević,1972: -0°9, -0″17
	01084N6025							
1345	A 1		80.897	238.4	0.64	8.5-9.0	1	
	01374S0676							Changed 73° since 1899
1371	BU 453		80.897	65.9	0.40	10.1-10.4	1	
	01384N5637							Baize,1973: +7°1, -0″18
1548	A 819	AB	80.728	189.0	0.58	8.2-8.7	1	
	01513N3032		80.810	189.4	0.59		1	
			80.769	189.2	0.59		2	Zulević,1980: -3°8, -0″08
1709	STF 228		80.815	268.2	0.97	6.4-7.3	1	
	02076N4701		80.881	267.2	0.96		1	
			80.892	268.0	0.96		1	
			80.863	267.8	0.96		3	Heintz,1954: +1°1, -0″09
1737	STF 234	AB	80.815	235.9	0.87	8.5-9.4	1	
	02100N6053		80.825	235.8	0.85		1	
			80.892	235.5	0.82		1	
			80.844	235.7	0.85		3	Baize,1955: -4°6, -0″04

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
2034	STT 43 02349N2612		80.900	9°.0	0".75	7.2-8.8	1	Heintz,1962: +1°.2, -0".27
2122	STF 305 02418N1857	AB	80.810	310.1	3.47	7.4-8.3	1	Rabe,1961: +1°.0, -0".18
2377	STT 50 03027N7110	AB	80.825	346.4	1.09	8.5-8.5	1	
			80.889	348.1	1.09		1	
			80.857	347.2	1.09		2	Popović,1972: +0°.2, +0".02
2416	STF 367 03089N0022		80.147	143.1	0.97	8.9-8.9	1	Heintz,1963: -0°.3, -0".03
2436	STT 52 03088N6517	AB	80.892	71.7	0.49	6.9-7.5	1	
			80.895	72.8	0.53		1	
			80.893	72.2	0.51		2	Heintz,1963: +4°.2, +0".07
2446	STT 53 03113N3816		80.711	262.0	0.70	7.7-8.5	1	
			80.810	264.7	0.82		1	
			80.815	265.0	0.83		1	
			80.900	265.1	0.82		1	
			80.809	264.2	0.79		4	Rabe,1948: -1°.1, -0".06
2612	STF 400 03268N5942	AB	80.825	258.5	1.03	6.9-7.9	1	
			80.889	258.0	1.04		1	
			80.895	258.4	1.02		1	
			80.870	258.3	1.03		3	Baize,1952: -0°.6, -0".24
2630	A 1535 03294N4201		80.895	318.6	0.45	9.0-9.4	1	Morel,1969: +3°.6, -0".11 Heintz,1969: +10°.6. -0".16
2799	STT 65 03443N2557		80.900	211.0	0.80	6.3-6.0	1	Wierzbinski,1957: +2°.2, +0".19
2959	STF 483 03574N3914		80.895	78.4	0.81	7.4-8.9	1	Couteau,1958: +2°.7, -0".10
2980	A 1710 03595N4309		80.889	335.7	0.39	8.3-8.3	1	Heintz,1969: +14°.1, -0".07
2995	STT 531 04009N3749		80.139	3.3	1.35	7.3-9.0	1	
			80.711	11.2	1.32		1	
			80.810	5.1	1.37		1	
			80.815	9.9	1.46		1	
			80.619	7.4	1.37		4	Rabe,1961: +5°.0, -0".09
3082	STT 77 04096N3127		80.139	271.9	0.78	8.2-8.2	1	
			80.147	269.1	0.71		1	
			80.143	270.5	0.75		2	Muller,1956: +0°.3, -0".02
3098	STF 511 04095N5832		80.889	115.6	0.37	7.4-7.9	1	Heintz,1969: +10°.3, -0".03
3174	STF 535 04178N1109		80.889	291.4	1.08	7.0-8.5	1	
			80.895	291.6	1.09		1	
			80.892	291.5	1.09		2	Changed 63° since 1831
3264	STF 544 04244N1525		80.108	23.1	1.65	5.8-8.3	1	
			80.810	18.6	1.68		1	
			80.815	18.0	1.70		1	
			80.578	19.9	1.68		3	Kuiper,1937: +3°.2, -0".11
3390	STF 577 04355N3719		80.103	20.0	1.07	8.5-8.5	1	
			80.124	22.2	1.17		1	
			80.139	17.2	1.10		1	
			80.122	19.8	1.11			
3614	HZ 445 04558N2041		80.889	266.5	0.36	8.6-8.9	1	Baize,1957: -4°.1, -0".05

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
3956	STF 677		80.141	153°.5	0".93	7.9-8.2	1	
	05153N6317		80.147	155.1	0.87		1	
			80.171	153.3	0.90		1	
			80.810	157.1	0.97		1	
			80.815	159.1	0.97		1	
			80.419	155.6	0.93		5	Heintz,1962: -2°.5, -0".10
4076	A 1034		80.895	150.4	0.48	8.5-9.0	1	Heintz,1963: +5°.4, -0".10
	05208N7044							
5400	STF 948	AB	80.139	81.9	1.63	5.3-6.2	1	
	06374N5933		80.810	80.1	1.64		1	
			80.815	79.9	1.67		1	
			80.588	80.6	1.61		3	Brosche,1957: +2°.1, -0".08
5400	STF 948		80.810	310.3	8.91	5.3-8.3	1	No change since 1831
	06374N5933							
5447	STT 156		80.141	242.8	0.53	6.7-7.2	1	
	06416N1818		80.147	243.7	0.58		1	
			80.144	243.2	0.56			
5469	A 2731		80.141	55.6	0.98	8.7-9.5	1	
	06432N0744		80.889	56.1	0.97		1	
			80.515	55.8	0.98		2	Muller,1957: -4°.9, +0".03
5535	A 513		80.890	235.7	0.34	9.6-9.7	1	Heintz,1963: +1°.8, -0".17
	06466N2465							
5871	STF 1037	AB	80.139	320.7	1.20	7.2-7.2	1	
	07066N2724		80.147	320.1	1.25		1	
			80.143	320.4	1.23		2	Karmel,1939: -0°.3, -0".08
6117	STF 1093		80.141	182.2	0.70	8.8-8.8	1	
	07227N4971		80.171	184.3	0.73		1	
			80.237	185.8	0.72		1	
			80.183	184.1	0.72		3	Baize, 1958: -5°.5, -0".03
6175	STF 1110	AB	80.139	97.3	1.94	2.0-2.9	1	
	07282N3166		80.147	100.1	1.93		1	
			80.810	97.9	2.40		1	
			80.365	98.4	2.09		3	Rabe,1958: +4°.2, -0".15
6276	STT 177		80.141	169.2	0.38	8.0-9.0	1	
	07350N3740		80.890	167.4	0.38		1	
			80.895	166.8	0.45		1	
			80.645	167.8	0.40		3	Muller,1977: -10°.4, 0".0
6347	HO 247		80.141	220.2	0.35	8.0-8.5	1	
	07402N2122		80.890	221.2	0.34		1	
			80.895	220.5	0.38		1	
			80.645	220.6	0.36		3	Heintz,1962: -14°.9, +0".03
6650	STF 1196	AB	80.147	276.8	0.83	5.6-6.3	1	
	08065N1757		80.890	275.5	0.82		1	
			80.895	273.0	0.76		1	
			80.644	275.1	0.80		3	Gasteyer,1954: -0°.8, 0".0
7054	A 1584		80.141	176.2	0.30	8.2-8.2	1	Heintz,1966: +17°.6, +0".02
	08456N5480							Heintz,1980: -5°.1, +0".10
								Zulević,1973: +17°.2, -0".03
7067	STF 1280		80.128	114.6	1.28	9.3-9.4	1	
	08460N7071		80.139	115.9	1.25		1	
			80.141	116.1	1.17		1	
			80.248	117.0	1.26		1	
			80.164	115.9	1.24		4	Heintz,1973: -2°.1, -0".01

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
7203	STF 1306	AB	80.128	0°.0	2″.95	5.0-8.2	1	
	09016N732		80.248	3.0	2.90		1	
			80.890	0.2	3.07		1	
			80.422	1.1	2.97		3	Baize,1948: -3°.5, -0″.24
7284	STF 3121		80.895	189.0	0.40	8.1-8.1	1	Bos,1938: -1°.0, +0″.12
	09120N2860							
7307	STF 1338	AB	80.248	255.2	1.12	6.6-6.8	1	
	09147N3837		80.890	255.7	0.93		1	
			80.895	258.6	0.93		1	
			80.678	256.5	0.99		3	Starikova,1966: -1°.1, +0″.8
7685	STF 213		80.895	127.6	0.66	8.4-10.4	1	Heintz,1962: +0°.6, -0″.18
	10075N2755							
8032	A 1590		80.128	1.16	9.2-9.7		1	Heintz,1963: +2°.7, -0″.06
	10576N5464							
8680	HU 640		80.388	147.1	0.64	10.1-10.1	1	Baize,1973: +7°.3, -0″.11
	12458N2065							
9229	STF 1834		80.388	101.1	1.26	7.9-8.0	1	
	14166N4858		80.574	101.9	1.16		1	
			80.481	101.5	1.21		2	Bos,1936: -2°.5, -0″.02
9324	A 347		80.388	276.8	0.58	8.5-8.7	1	
	14334N4819		80.574	273.6	0.56		1	
			80.481	275.2	0.56		2	Guntzel-Lingner,1956: -1°.9, -0″.07
9343	STF 1865	AB	80.577	306.1	1.12	4.4-4.8	1	Wierzbinski,1956: +1°.4, -0″.06
	14364N1369							
9380	STF 1879	AB	80.484	90.4		7.6-8.6	1	
	14414N0965		80.577	91.7	1.39		1	
			80.530	91.0	1.39		2	Wierzbinski,1956: +1°.2, -0″.12
9425	STT 288		80.498	170.6	1.35	6.9-7.6	1	
	14487N1567		80.577	173.8	1.26		1	
			80.538	172.2	1.30		2	Heintz,1956: +1°.3, +0″.06
9578	STF 1932		80.498	249.9		7.1-7.6	1	
	15140N2672		80.568	250.5	1.27		1	
			80.533	250.2	1.27		2	Heintz,1965: -0°.4, -0″.13
9617	STF 1937		80.549	328.1	0.56	5.6-6.1	1	
	15191N3039		80.574	329.1	0.55		1	
			80.562	328.6	0.55		2	Danjon,1938: -2°.0, +0″.12
9626	STF 1938	BC	80.549	13.2	2.04	7.2-7.8	1	
	15207N3742		80.552	14.6	2.00		1	
			80.551	13.9	2.02		2	Baize,1952: -1°.7, -0″.16
9716	STT 298		80.549	217.3	0.58	7.4-7.7	1	
	15325N3968		80.574	218.9	0.58		1	
			80.724	220.0	0.72		1	
			80.616	218.7	0.63		3	Couteau,1966: +4°.0, -0″.06
9982	STF 2026		80.582	24.7	2.74	9.1-9.6	1	Heintz,1963: +1°.2, -0″.17
	16111N0737							
10075	STF 2052		80.582	136.2	1.19	7.8-7.8	1	
	16245N1837		80.708	132.9	1.26		1	
			80.645	134.5	1.23		2	Siegrist,1952: +0°.2, -0″.21
10188	D 15		80.568	140.2	1.16	9.1-9.1	1	
	16408N4340		80.582	144.7	1.10		1	
			80.575	142.5	1.13		2	Wierzbinski,1955: +0°.8, -0″.03

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
10235	STF 2107 16479N2850		80.552	89°0	1".15	6.7-8.2	1	
			80.569	88.0	1.17		1	
			80.585	84.2	1.20		1	
			80.713	85.2	1.18		1	
			80.605	86.6	1.18		4	Rabe,1927: -1°5, -0".19
10279	STF 2118 16559N6511		80.552	69.2	1.15	6.7-7.4	1	
			80.577	70.1	1.02		1	
			80.713	70.9	0.99		1	
			80.719	70.2	1.01		1	
			80.640	70.1	1.04		4	Giannuzzi,1956: -1°5, -0".24
10341	BU 823 17015N0047	AB	80.549	125.2	0.82	8.7-9.7	1	
			80.574	128.5	0.73		1	
			80.656	119.4	0.74		1	
			80.593	124.4	0.76		3	Arend,1956: +5°7, -0".24
10345	STF 2130 17033N5436	AB	80.552	44.3	2.10	5.8-5.8	1	
			80.577	47.4	1.94		1	
			80.565	45.8	2.02		2	Heintz,1966: +4°6, +0".11
+45°2505	Kui 79 17092N4551		80.724	271.4	0.87	10.1-10.6	1	Baize,1952: -1°9, +0".07
10598	STF 912 17252S0059		80.549	344.1	0.60	5.9-6.2	1	
			80.574	347.8	0.72		1	
			80.562	345.9	0.66		2	Wilson,1976: -3°6, +0".09
11010	BU 1127 17596N4414		80.724	76.8	0.83	7.5-9.3	1	Popović,1970: -2°6, -0".24
11046	STF 2272 18004N0232	AB	80.498	321.2	2.14	4.1-6.3	1	
			80.577	320.2	2.14		1	
			80.538	320.7	2.14		2	Heintz,1973: +0°3, -0".10
11324	AC 11 18198S0138	AB	80.550	357.7	0.82	6.8-7.0	1	
			80.574	353.1	0.73		1	
			80.562	355.4	0.78		2	Heintz,1958: -0°8, -0".0
11334	STF 2315 18210N2720	AB	80.719	131.0	0.59	6.6-7.6	1	
			80.722	130.6	0.57		1	
			80.720	130.8	0.58		2	Heintz,1960: +1°7, -0".11
11483	STT 358 18314N1654		80.574	165.2	1.57	6.8-7.2	1	
			80.569	163.0	1.56		1	
			80.582	163.5	1.64		1	
			80.656	162.8	1.77		1	Starikova,1966: +3°0, +0".09
			80.588	163.6	1.64		4	Hopmann,1970: +1°9, +0".08
11479	STT 359 18314N2331		80.719	12.7	0.59	6.4-6.7	1	Symms,1964: +3°1, -0".02
11568	STF 2384 18385N6702	AB	80.713	311.5	0.61	8.6-9.1	1	
			80.722	311.8	0.57		1	
			80.717	311.7	0.59		2	Heintz,1975: +0°1, -0".01
11623	A 253 18400N3135		80.514	117.1		9.1-10.1	1	
			80.577	128.1	0.64		1	
			80.719	120.4	0.63		1	
			80.603	121.9	0.64		3	Muller,1956: -0°2, -0".12
11635	STF 2382 18410N3934	AB	80.569	353.1	5.1-6.1		1	Guntzel-Lingner,1956: -1°9, -0".07
11635	STF 2383 18410N3934	CD	80.547	90.4	2.41	5.7-6.0	1	Guntzel-Lingner,1956: +7°1, +0".07
11722	STF 2402 18450N1034		80.730	208.6	1.18	8.0-8.4	1	Changed 10°since 1830

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
11791	A 93 18484S0540		80.550	141.8	0.59	9.4-10.0	1	
			80.577	141.8	0.64		1	
			80.563	141.8	0.62		2	Heintz,1973: -2°0, -0"07
11811	BU 137 18505N3715	AB	80.724	156.2	1.35	8.3-8.7	1	Changed 32° since 1875
11897	STF 2438 18558N5805		80.574	5.4	0.74	6.8-7.4	1	
			80.577	0.9	0.78		1	
			80.713	2.7	0.79		1	
			80.621	3.0	0.77		3	Jastrzebski,1959: +0°8, -0"11
11956	STF 2437 18575N1902		80.722	28.8	0.58		1	
			80.730	28.8	0.56		1	
			80.726	28.8	0.57		2	Changed 52° since 1830
12447	STF 2525 19225N2707		80.547	292.5	1.75	8.5-8.7	1	
			80.569	295.4	1.68		1	
			80.675	294.0	1.70		1	
			80.675	294.0	1.70		1	
			80.713	294.3	1.68		1	
			80.790	295.1	1.70		1	
			80.659	294.3	1.70		5	Tamburini,1969: +1°5, -0"14
12667	STT 377 19326N3526	AB	80.577	37.3	0.84	8.4-8.5	1	
			80.708	33.8	0.85		1	
			80.642	35.5	0.85		2	Changed 16° since 1842
12889	STF 2576 19418N3322	AB	80.498	359.0	2.04	9.3-9.3	1	
			80.547	357.3	1.94		1	
			80.574	357.1	1.93		1	
			80.675	357.8	1.95		1	
			80.708	356.7	1.95		1	
			80.790	358.2	1.97		1	
			80.632	357.7	1.96		6	Rabe,1948: +1°7, -0"09
12930	HU 758 19432N3307		80.675	144.5	0.92	9.5-9.6	1	No changed since 1904
12972	STT 387 19450N3504		80.547	167.5	0.75	6.9-7.9	1	
			80.550	165.4	0.58		1	
			80.656	164.2	0.69		1	
			80.722	167.5	0.57		1	
			80.725	167.0	0.61		1	
			80.646	166.3	0.65		5	Baize,1961: -0°3, +0"05
13665	A 1205 20141N2854		80.719	102.4	0.48	9.0-9.6	1	
			80.828	100.1	0.53		1	
			80.774	101.2	0.51		2	Heintz,1978: -0°4, -0"06
13723	STT 406 20166N4503		80.719	118.2	0.52	7.4-8.3	1	Heintz,1975: +1°3, -0"07
13750	STF 2672 20173N2327		80.725	327.6	0.72	8.7-8.8	1	
			80.825	327.1	0.72		1	
			80.775	327.3	0.72		2	Changed 49° since 1831
14238	BU 64 20403N1222	AB	80.713	160.9	0.53	9.1-9.3	1	Baize,1957: -2°7, -0"02
14296	STT 413 20435N3607	AB	80.547	16.2	0.80	4.8-6.1	1	
			80.569	17.5	0.83		1	
			80.574	16.1	0.78		1	
			80.563	16.6	0.80		3	Rabe,1948: +1°3, -0"04
14424	BU 367 20508N2743	AB	80.719	115.5	0.44	8.6-9.0	1	
			80.828	118.2	0.45		1	
			80.773	116.8	0.45		2	Heintz,1962: -2°4, -0"05

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
14499	STF 2737	AB	80.498	286.0	0.96	6.0-6.3	1	
	20541N0355		80.547	288.0	0.97		1	
			80.522	287.0	0.97		2	Zeller,1965: +1.°6, -0.″07
14558	STF 2746		80.577	315.9	0.97	8.0-8.6	1	
	20580N3852		80.708	316.5	0.97		1	
			80.725	314.9	0.94		1	
			80.828	315.5	1.02		1	
			80.709	315.7	0.97		4	Changed 40° since 1830
14562	LV 9		80.708	192.0	2.24	9.8-10.8	1	
	20582N3850		80.790	188.7	2.40		1	
			80.828	193.5	2.16		1	
			80.775	191.4	2.27		3	No changed since 1896
14573	STF 2744		80.498	129.6	1.17	7.0-7.5	1	
	20580N0108		80.569	127.2	1.22		1	
			80.713	130.2	1.21		1	
			80.660	129.0	1.20		3	Popović,1964: +3.°9, -0.″07
14766	A 884		80.722	140.5	0.38	8.6-8.7	1	Changed 45° since 1904
	21098N4630							
14783	H 48		80.550	255.7	0.56	7.1-7.3	1	
	21117N6400		80.569	252.0	0.71		1	
			80.656	253.5	0.72		1	
			80.660	253.7	0.68		1	
			80.608	253.7	0.67		4	Baize,1950: +2.°6, 0.″00
14957	A 1220		80.676	155.6	1.34	8.5-9.0	1	
	21209N3103		80.891	155.0	1.38		1	
			80.783	155.3	1.36		2	No changed since 1905
15267	HO 166		80.719	91.6	0.39	8.8-8.8	1	
	21394N2723		80.828	91.6	0.41		1	
			80.773	91.6	0.40		2	Couteau 1958: -3.°0, +0.″02
15270	STF 2822	AB	80.569	294.2	1.84	4.7-6.1	1	
	21397N2817		80.574	296.3	1.82		1	
			80.660	297.1	1.81		1	
			80.665	296.5			1	
			80.675	296.9	1.86		1	
			80.626	296.2	1.83		5	Heintz,1966: -2.°1, +0.″05
15447	BU 75	AB	80.902	350.1	0.44	8.4-8.9	1	Baize,1973: +14.°2, +0.″14
	21506N1025							
15843	BU 1216		80.722	284.6	0.67	8.4-8.7	1	
	22156N2901		80.725	285.5	0.66		1	
			80.723	285.0	0.66		2	Changed 33° since 1890
15972	KRU 60		80.708	175.5	2.44	9.4-10.9	1	
	22244N5712		80.790	174.6	2.39		1	
			80.828	173.5	2.51		1	Lippincott,1953: +0.°9, -0.″25
			80.775	174.6	2.45		3	Wielen,1962: +2.°6, -0.″27
15988	STF 2912	AB	80.902	121.4	0.74	5.8-7.2	1	Knipe,1960: +3.°9, -0.″28
	22249N0355							
16057	STF 2924	AB	80.881	91.4	0.64	6.5-7.0	1	
	22301N6923		80.897	85.4	0.58		1	
			80.889	88.4	0.61		2	Heintz,1956: +2.°2, +0.″08
16185	STF 2934		80.547	72.8	0.95	8.7-9.7	1	
	22370N2054		80.574	74.7	0.87		1	
			80.713	72.4	0.91		1	
			80.875	73.1	0.96		1	
			80.677	73.3	0.92		4	Heintz,1962: +3.°7, -0.″03

ADS	DISC IDC	Mult.	Epoch 1900+	P	ρ	m	n	Notes
16326	A 632		80.569	169.1	0.87	8.2-9.0	1	
	22480N5712		80.574	170.7	0.83		1	
			80.722	170.3	0.92		1	
			80.725	161.2	0.94		1	
			80.875	169.3	0.90		1	
			80.693	168.1	0.89		5	Heintz,1962: -0°4, +0"07
16345	BU 382	AB	80.711	208.2	0.75	6.5-8.5	1	
	22492N4413		80.829	204.1	0.87		1	
			80.881	205.5	0.90		1	
			80.807	205.9	0.84		1	Muller,1954: -0°2, -0"11
16373	HU 987		80.678	95.0	0.71	9.1-9.3	1	
	22508N1515		80.829	91.0	0.74		1	
			80.753	93.0	0.72		2	Heintz,1966: +5°7, +0"06
16428	STF 483		80.547	292.7	0.72	6.0-7.5	1	
	22542N1117		80.574	296.8	0.63		1	
			80.562	295.7	0.67		2	Guntzel-Lingner,1956: -6°0, -0"01
16626	ES 1039		80.897	211.0	1.15	10.0-10.5	1	No changed since 1910
	23105N5248							
16665	BU 80		80.569	312.0	0.82	9.0-10.0	1	
	23138N0452		80.574	309.0	0.83		1	
			80.678	312.2	0.89		1	
			80.902	311.7	0.85		1	
			80.681	311.3	0.85		4	Couteau,1960: -6°9, +0"01
16785	A 1487		80.719	166.3	0.89	8.7-9.2	1	
	23244N4009		80.728	165.1	0.88		1	
			80.723	165.7	0.89		2	Changed 23° since 1906
16877	STT 500	AB	80.897	358.9	0.57	6.3-7.2	1	Changed 60° since 1845
	23326N4353							
16928	BU 858	AB	80.719	232.4	0.72	7.4-8.9	1	
	23363N3201		80.728	231.1	0.77		1	
			80.723	231.7	0.75		2	Changed 55° since 1881
16951	A 1242		80.719	323.7	0.77	9.0-9.0	1	
	23380N1117		80.829	326.3	0.77		1	
			80.773	325.0	0.77		2	Zulević,1977: -0°6, +0"02
17020	STT 507	AB	80.719	308.6	0.71	6.8-7.5	1	
	23438N6420		80.829	304.1	0.73		1	
			80.774	306.3	0.72		2	Zulević,1977: +2°1, +0"002
17149	STF 3050		80.569	308.3	1.54	6.6-6.6	1	
	23544N3310		80.574	309.6	1.52		1	
			80.711	309.3	1.56		1	
			80.618	309.1	1.54		3	Heintz,1973: -0°8, -0"01
17178	HLD 60		80.711	180.6	1.00	9.2-9.6	1	
	23563N3905		80.728	180.5	0.92		1	
			80.720	180.6	0.96		2	Heintz,1963: -1°6, -0"09
34	BU 862		80.891	8.1	0.43	10.1-10.2	1	Morel,1969: -8°8, 0"00
	23596N3737							
	GP 5		80.492	138.1	0.68		1	
	GP 39		80.678	97.8	0.48	10.8-10.9	1	

MIKROMETER MEASURES OF DOUBLE STARS

(Series 34)

G. M. Popović

(Received 30 March 1981)

SUMMARY: Presented are 280 measures of 156 double and multiple systems of stars.

Presented are 280 measures of 156 systems respectively 170 pairs made with Zeiss 65/1055 cm refractor of the Belgrade Observatory. Among them there are 66 systems with the designation GP. This is the 34 th Belgrade series of the double stars measures and, at the same time, a continuation of my measures published as Series 30 (G. M. Popović, 1979). The structure of the measured pairs according to ρ is given in Table I.

Table II lists the measurements in the form identical to that of my previous series (G. M. Popović, 1979).

Table I

ρ≤0"50	0"50≤ρ<1"00	1"00≤ρ<2"00	ρ>2"00	Σ
9m	68m	77m	126m	280m
3.2%	24.3%	27.5%	45.0%	100%

Table II
Micrometer measures of double stars

ADS m	Disc. 1900–2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
202	Es 865	80.709	79°0	1"68	0.3	1+2	If Espin's measure of the position angle in 1910 is 306° as reported in IDS, and not 206° as reported in ADS, then the pair is undoubtedly optical one.
00106-159N5200-33		80.810	75.6	1.59	0.3	1+2	
10.9-11.1	AB	**80.760**	**77.3**	**1.64**	**0.3**	**2n**	

ADS / m	Disc / 1900–2000 / Mult.	Epoch 1900+	θ	ρ	m	W	Notes
220	Σ 19	80.791	135.8	2.00	9.0-11.0	1+1	
00115-167N3604-37		80.793	139.5	2.01	8.0-10.0	1+1	
7.1-9.6		80.815	138.3	2.06	8.0-10.0	1+2	
		80.828	137.9	2.20	8.5-11.0	2+2	
		80.811	**137.9**	**2.09**	**8.4-10.6**	**4n**	
221	OΣ 4	80.829	172.4	0.97	9.0-9.5	3+2	Muller,1957: + 1°.7, +0".43
00115-167N3556-89							
8.2-8.9							
256	h 1015	80.708	304.4	5.12	9.0-9.5	1+2	Bos (rectilinear trajectory),1959:
00135-187N2512-45		80.741	303.0	5.53	0.8	2+2	+0°.5, -0".16
9.7-10.4	AB	80.889	302.0	5.41	1.0	2+2	
		80.786	**303.0**	**5.37**	**0.8**	**3n**	
	AC	80.708	255.0	26.8	9.0-11.0	1+2	
-	GP 35	80.651	295.8	0.62	9.5-10.5	3+3	Ap to now measurements indicate
00143-195N3511-44		80.889	295.4	0.56	1.0	2+2	retrograde motion.
9.5-10.7 (6n)		**80.746**	**295.6**	**0.60**	**1.0**	**2n**	GP 35 = BD + $34^{\circ}33$ ($9^{m}.4$)
-	GP 36	80.651	111.7	0.54	10.0-10.1	2+2	Direct motion.
00145-196N3428-61							GP 36 = BD + $34^{\circ}34$ ($9^{m}.5$)
9.8-10.1 (3n)							
399	A 909	79.690	38.6	0.84	0.7	2+2	
00242-297N5822-55		79.701	39.7	0.96	8.8-9.2	1+1	
9.5-9.8		**79.694**	**39.0**	**0.88**	**0.6**	**2n**	
-	GP 38	80.657	97.3	2.39	9.5-14.0	2+2	GP 38 = BD + $34^{\circ}72$ ($9^{m}.2$)
00267-320N3504-38		80.725	96.9	2.47	9.3-13.0	1+1	
9.2-13.2 (6n)		**80.680**	**97.2**	**2.42**	**9.4-13.7**	**2n**	
-	GP 52	80.657	80.5	98.6	10.0-10.5	1+2	
00288-340N3512-46							
10.0-10.2 (1/5n)AB							
10.2-11.4(5n)	BC	80.657	320.2	8.00	10.5-12.0	1+2	
		80.725	323.6	7.54	10.5-12.0	1+2	
		80.758	321.5	7.69	10.0-11.0	1+1	
		80.708	**321.8**	**7.75**	**10.3-11.7**	**3n**	
	AD	80.758	129	63.9		1+1	
473	h 1036	79.673	84.8	6.83	9.3-9.8	1+2	
00292-346N4220-53		80.900	86.4	7.30	9.0-9.5	2+1	Quadrint certain.
10.7-11.3		**80.286**	**85.6**	**7.06**	**9.1-9.6**	**2n**	My measurement does not respond to expected position. It would be useful to establish the cause of this.
673	β 495	79.690	207.1	0.37	0.0	2+1	The angle has decreased by 24° since 1878 with decrease in distance.
00435-488N1809-42							
8.4-8.4							
692	β 781	79.690	23.4	0.92	0.6	2+2	About 9° retrograde motion since 1881.
00453-516N6827-59		79.701	20.7	0.78	8.5-9.5	1+2	
8.7-9.2		**79.695**	**22.2**	**0.86**	**0.8**	**2n**	
710	Σ 65	79.701	38.3	2.86	0.0	1+2	
00464-528N6819-51		80.725	40.1	3.02	0.0	1+1	
8.0-8.0		**80.111**	**39.0**	**2.92**	**0.0**	**2n**	Change in both coordinates uncertain.
-	GP 46	80.714	222.3	28.2	9.0-12.5	1+1	GP 46 = BD + $34^{\circ}189$
01027-082N3502.34							
9.0-11.4(1/4n)	AB						
11.4-12.8(4n)	BC	80.714	151.8	3.74	12.5-13.0	1+1	
-	GP 47	80.714	217.6	3.86	12.8-14.0	1+1	
01029-085N3503-35							
11.9-13.5 (3n)							
-	Stein 1562	80.709	89.1	3.17	9.0-11.0	1+1	Change in θ uncertain since 1913.
01132-194N5746-78							Decrease in distance.
9.8-11.6							

ADS Disc 1900-2000 m Mult.	Epoch 1900+	θ	ρ	m	W	Notes
1133 Ho 310	80.725	360.1	1.54	0.2	1+1	Very slow direct motion.
01200-256N2801-32	80.900	359.7	1.72	0.2	2+1	
10.0-10.2	**80.830**	**359.9**	**1.65**	**0.2**	**2n**	
1370 D 3	80.897	333.1	2.97	1.5	3+2	Unchanged in 103 years.
01384-450N5641-71						
9.7-11.2						
1371 β 453	80.897	68.2	0.42	10.0-10.3	3+2	Baize,1973: +9°.8, -0".16
01384-450N5637-67						
10.1-10.4						
1438 Σ 162	80.957	205.5	1.69	7.0-7.5	1+2	The angle has decreased by 19° since 1836.
01430-492N4724-54						
6.5-7.0 AB						
6.1-8.4 AC	80.957	178.8	20.6	7.0-9.5	1+2	The component D is brighter 0^m.2 than C.
1560 S 404	80.709	81.8	27.69	-	1+1	An optical pair. Herschel's measure in 1783 does not agree with the rectilinear trajectory.
01520-580N4054-83	80.741	81.2	27.65	-	2+2	
7.6-9.6	80.900	82.2	27.77	-	2+2	
	80.798	**81.7**	**27.71**		**3n**	
1709 Σ 228	79.668	266.4	1.04	1.0	1+1	
02076-141N4701-29	80.714	267.8	1.01	0.4	2+2	
6.4-7.3	80.741	268.7	0.97	0.7	1+2	
	80.881	267.0	1.01	9.0-9.3	1+1	
	80.562	**267.6**	**1.00**	**0.6**	**4n**	Heintz,1952: +1°.2, -0".05
1801 β 8	80.741	220.6	1.23	0.7	2+2	
02160-213N0825-52	80.900	220.3	1.35	9.0-10.5	1+2	
8.2-9.1	**80.809**	**220.5**	**1.28**	**1.0**	**2n**	The angle has increased by 20° since 1875
1821 Ho 313	80.741	74.3	2.02	0.5	1+1	
02184-233S0777-50	80.791	73.9	2.03	8.7-9.2	1+1	
9.3-9.7 AB	**80.766**	**74.1**	**2.02**	**0.5**	**2n**	
1859 A 658	80.889	212.1	2.55	-	3+2	
02216-279N4102-29						
9.3-10.9						
2034 OΣ 43	80.900	10.5	0.88	8.2-9.0	2+2	Heintz,1961: +2°.7, - 0".14
02349-407N2612-38						
8.3-9.9						
2436 OΣ 52	80.892	74.2	0.38	0.1	3+3	Heintz,1962: + 6°.2, - 0".06
03088-175N6517-39						
6.9-7.5 AB						
- GP 83	80.076	261.5	0.65	0.7	1+1	GP 83 = COU 1080 = BD + 34°685 (8^m.0)
03291-354N3508-28	80.111	268.0	0.66	8.5-9.5	1+1	
8.0-8.8 (7n)	80.127	266.3	0.74	8.0-9.5	1+1	
	80.105	**265.3**	**0.68**	**1.1**	**3n**	
2656 A 2420	80.834	264.0	1.95	1.0	1+1	
03328-385N1716-36						
8.7-9.7						
2800 Es 1137	80.714	119.2	0.49	0.2	3+3	Since 1912 the angle increased by 42° with decrease in distance. My measure indicate the orbital motion.
03438-511N4922-51						
10.2-10.3						
2801 Σ 457	80.714	92.4	0.93	0.0	3+3	The angle has decreased by 13° since 1831
03444-504N2222-41						
9.5-9.5 AB						
3082 OΣ 77	80.892	268.8	0.66	0.0	2+2	Muller,1955: -0°.7, -0".06
04096-159N3127-42	80.903	270.7	0.73	8.0-8.0	2+2	
8.2-8.2 AB	**80.898**	**269.8**	**0.70**	**0.0**	**2n**	
3174 Σ 535	80.881	291.0	1.19	7.0-9.0	1+2	
04178-233N1109-23	80.889	292.6	1.03	2.0	2+2	
7.1-8.6	80.892	291.9	1.10	7.0-8.5	3+3	
	80.886	**291.9**	**1.10**	**2.4**	**3n**	Popović,1981: +0°.2, -0".05

ADS m	Disc 1900–2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
3329	OΣ 86	80.892	15.7	0.88	0.0	3+2	The angle has decreased by 62° since 1845.
04307-366N1933-45		80.897	17.8	0.54	0.0	2+2	
8.2-8.2		**80.894**	**16.6**	**0.73**	**0.0**	**2n**	
3580	Es 14	79.022	156.0	33.2	8.0-9.5	1+2	
04527-598N4310-19							
9.5-9.5-9.0 ABxC							
9.0-11.8	CD	79.022	279.2	3.18	9.5-11.0	1+1	
		79.934	282.7	4.47	10.0-13.0	2+2	
		79.630	**281.5**	**4.04**	**9.8–12.3**	**2n**	
-	GP 70	80.221	7.8	0.98	9.5-9.8	2+2	All measures of the position angles discordant.
05136-202N3555-63							GP 70 = BD + 35°1056 (9^m.5)
9.7-10.0 (4n)							
-	GP 69	80.076	298.4	3.19	1.0	1+1	
05148-215N3509-15		80.221	300.5	3.73	10.0-11.5	1+2	
10.4-11.6 (9n)		**80.163**	**299.7**	**3.51**	**1.2**	**2n**	
-	GP 107	79.937	141.5	2.90	13.0-13.4	1+2	
05180-248N3610-17							
12.2-13.1 (3n)							
4032	Ho 226	80.892	259.0	0.74	0.1	2+2	The angle has increased by 29° since 1887.
05208-271N2731-36		80.897	258.2	0.74	0.1	2+2	
8.6-8.6		**80.894**	**258.6**	**0.74**	**0.1**	**2n**	
-	GP 14	80.100	117.3	4.48	0.0	1+1	
05583-050N3504-05		80.128	124.6	5.94	14.0-14.2	1+1	At the limit of visibility.
12.5-12.8		**80.114**	**121.0**	**5.21**	**0.1**	**2n**	
4950	Σ 881	80.898	135.4	0.75	1.2	1+2	The angle has increased by 46° since 1830.
06132-221N5925-23							
6.2-7.7	AB						
5026	Es 1534	79.186	92.0	1.53	9.5-10.2	2+2	
06184-255N4326.23		79.934	92.5	1.74	0.8	2+2	
10.8-11.1		**79.560**	**92.2**	**1.64**	**0.8**	**2n**	
5054	1191	80.898	309.2	2.07	7.0-14.0	3+2	This measure does not offer a convincing argument the pair has to be optical, trough there are the elements for this assertion. My measure of the distance in this case would have to be about 0".7 wider.
06203-262N1849-46							
6.9-13.7							
5081	J 910	79.186	331.9	1.45	8.5-9.5	3+3	Retrograde motion of about 6° since 1912
06213-285N4308-05							
10.0-10.4	AB						
5261	A 2451	79.202	140.6	0.49	9.0-9.0	1+2	Unchanged in 68 years.
06312-383N4207-02		79.934	144.6	0.58	0.0	2+2	
9.4-9.4		**79.620**	**142.9**	**0.54**	**0.0**	**2n**	
5269	Σ 941	79.202	82.3	1.66	7.5-8.7	1+2	
06316_387N4140-35		79.260	82.9	1.71	7.5-9.0	1+2	
7.2-8.2	AB	79.934	81.7	1.75	8.0-9.0	1+2	
		79.465	**82.3**	**1.71**	**7.7–8.9**	**3n**	
5278	Mlb 63	79.202	259.5	5.28	9.7-10.2	1+2	Unchanged in 61 years.
06320-391N4225-20							
9.2-9.8							
5290	HΣ -	80.892	282.9	0.68	0.0	1+2	
06337-392N0944-39		80.898	281.4	0.73	0.0	2+2	
8.6-8.6		**80.895**	**282.0**	**0.71**	**0.0**	**2n**	
5831	Σ 1024	80.898	315.0	1.26	0.3	3+3	
07034-103N3817-06							
9.0-9.5	AB						
-	GP 84	80.128	188.7	1.79	0.0	1+2	GP 84=BD + 35°1573 (9^m.5)
07060-127N3522-13							
9.5-9.8 (1n)							

ADS m	Disc 1900–2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
– 9.6-11.2 (10 n)	GP 74 07174-240N3439-28	80.084 80.111 **80.975**	148.7 148.2 **148.4**	8.92 8.92 **8.92**	10.0-12.0 10.0-11.0 **10.0–11.5**	1+1 1+1 **2n**	
– 9.8-10.0 (3n)	GP 105 07259-325N3555-42	80.240	49.1	0.51	10.0-10.2	3+3	GP 105 = BD + 36°1643 ($9^m.2$)
6194 9.4-9.8	Ku 30 07295-360N3433-20	79.934	108.9	2.90	1.0	1+2	
6675	OΣ 189 08080-149N4320-02	79.180 79.186 **79.184**	291.5 293.1 **292.6**	3.41 4.44 **4.10**	8.0-14.0 7.0-12.0 **7.3–12.7**	1+1 2+2 **2n**	
– 10.0-10.2 (3n)	GP 111 08084-149N3553-35	80.240	51.3	0.76	10.0-10.1	3+2	GP 111 = BD + 36°1771 ($9^m.1$)
6671 8.3-8.5	β 1244 08086-138N0177-59	80.898	17.2	1.11	8.0-9.0	2+2	The angle has decreased by 33° since 1891.
– 10.0-10.5 (1n)	GP 97 08372-435N3363-41	79.142 70.175 79.279 **79.207**	276.5 280.3 276.2 **278.1**	0.72 0.70 0.71 **0.71**	0.0 10.0-10.5 0.0 **0.2**	1+1 3+2 2+2 **3n**	GP 97 = BD + 34°1888 ($9^m.3$)
6963 9.2-9.2	A 2472 08388-444N1577-55	80.898	81.5	0.67	0.0	2+2	The angle has decreased by 15° since 1912.
7067 9.3-9.4	Σ 1280 08460-557N7071-48 AB	79.142 80.221	111.5 116.7	1.36 1.44	0.1 0.1	2+2 2+2	Heintz,1973: $-2^\circ.7$, $+0''.08$ Heintz,1973: $-1^\circ.5$, $+0''.20$ The brighter component is red and fainter blue.
– 9.6-10.3 (3n)	GP 106 09158-219N3338-13	80.240 80.898 **80.616**	66.8 70.3 **68.8**	1.21 1.61 **1.44**	0.3 1.0 **0.8**	1+2 2+2 **2n**	
– 10.0-10.8 (2n) AB	GP 115 09556-017N4356-27	80.221	265.5	1.79	10.5-11.5	2+2	There is the component C: $\theta \sim 16^\circ$ $m \sim 10^m0$ GP 115 = BD + 44°1943 ($9^m.4$)
– 10.9-12.3 (4n) AB	GP 85 10054-113N3416-47	79.142	38.5	5.00	11.0-12.0	1+1	There are still two components: at ρ 15" and ρ 30" with magnitudes 14^m respectively 11^m
– 9.4-9.6 (2n)	GP 116 10057-120N4252-25	79.279 80.221 **79.698**	243.8 249.6 **246.4**	0.42 0.46 **0.44**	0.0 10.0-10.5 **0.2**	3+2 2+2 **2n**	GP 116 = BD + 43°1996 ($9^m.2$)
7704 7.3-7.5	OΣ 215 10108-163N1774-44	79.339	185.6	1.48	–	2+2	Wierzbinski,1953: $+2^\circ.2$, $+0''.10$ Zaera,1957: $+4^\circ.3$, $+0''.10$
– 7.9-9.1 (4n)	GP 117 10123-154N4416-01	79.175 79.271 79.279 **79.239**	260.5 262.8 260.4 **261.3**	0.61 0.48 0.53 **0.54**	7.5-8.5 7.8-9.5 8.0-9.0 **7.7–9.0**	3+2 3+2 2+2 **3n**	GP 117 = BD + 44°1972 ($7^m.7$)
– 9.7-9.7 (3n)	GP 73 10511-560N3351-18	79.271 79.279 **79.276**	207.8 206.1 **206.8**	0.67 0.68 **0.68**	0.0 0.1 **0.1**	1+2 2+2 **2n**	GP 73 = BD + 34°2186 ($9^m.4$)
– 9.1-9.2 (3n)	GP 113 11245-299N3336-03	79.279 80.221 **79.750**	47.3 48.0 **47.6**	0.95 0.94 **0.94**	0.1 9.2-9.2 **0.1**	3+3 3+3 **2n**	GP 113 = BD + 33°2119 ($9^m.1$)
8820 9.0-9.0	A 1606 13083-128N4062-30	80.249	21.4	1.18	0.0	1+2	Very slow retrograde motion.

ADS / m	Disc. 1900–2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
–	GP 72	79.271	321.3	1.50	0.7	1+1	
13119-166N3464-32		80.238	327.1	1.46	1.0	1+2	
9.7-10.8	(4n)	**79.754**	**324.2**	**1.48**	**0.8**	**2n**	
9031	Σ 1785	79.424	158.7	3.27	0.2	2+2	
13445-492N2689-59		80.238	159.7	3.35	0.2	2+2	
7.9-8.2		**79.831**	**159.2**	**3.31**	**0.2**	**2n**	Stand,1953: -0°.1, -0″.08
9182	Σ 1819	79.424	243.6	0.77	0.0	1+2	Baize,1973: +3°.6, -0″.05
14103-153N0336-08							
7.7-7.8							
9229	Σ 1834	80.249	102.8	1.14	0.0	1+2	Van den Bos: -1°.0, -0″.10
14166-203N4858-31							
7.9-8.0							
9254	Σ 1837	79.424	283.1	1.09	1-2	1+2	About 45° retrograde motion since
14193-247S1113-40		80.238	280.2	1.09	8.0-9.0	1+2	1829 and decrease in distance.
6.7-8.3		**79.831**	**281.6**	**1.09**	**1.1**	**2n**	
9265	Σ 1842	80.238	17.5	2.56	9.0-9.2	2+1	
14220- . N0368-41							
9.3-9.3							
9343	Σ 1865	80.249	305.9	0.95	-0.1	1+2	Wierzbinski,1953: +1°.1, -0″.12
14364-411N1369-44							
4.4-4.8	AB						
9982	Σ 2026	80.492	23.9	2.70	9.0-9.5	1+2	Heintz,1962: 0°.3, -0″.10
16111-160N0737-22							
9.1-9.6							
9988	A 2180	79.424	309.7	1.06	11.0-12.0	1+1	
16118-168N0132-17							
14.0-14.5	BC						
–	GP 2	80.593	134.4	3.32	11.0-13.0	1+2	
16334-371N3363-50							
11.0-12.9	(5n)						
10188	D 15	80.492	142.6	1.13	0.0	1+2	
16408-439N4340-29		80.596	141.4	1.07	9.0-9.0	2+2	
9.1-9.1		**80.551**	**141.9**	**1.10**	**0.0**	**2n**	Wierzbinski,1955: +0°.2, -0″.06
–	GP 5	80.492	139.6	0.54	10.0-10.3	1+2	GP 5 = BD + 34°2834 (9^m.3)
16413-450N3366-53							
9.7-10.0	(5n)						
10235	Σ 2107	80.492	87.7	1.15	6.0-8.0	1+2	
16479-519N2850-40		80.596	87.2	1.24	8.0-9.0	2+2	
6.7-8.2	AB	**80.551**	**87.4**	**1.20**	**7.3-8.7**	**2n**	Rabe,1926: -0°.7, -0″.17
10429	A 2984	79.692	357.2	0.86	3.0	2+2	Since 1915 the position angle increased by 59°. Independent from my remark in 1976, when I have registered the elongattion of the component A in θ~121°, now I have a impression of the elongation but in θ~34°.
17114-165S0020-27							
4.9-7.9							
–	GP 10	80.653	215.0	1.97	0.3	1+1	The position of the system GP 10 related to BD + 35°3112 (7^m.0) = ADS 10932: $\simeq -9^s$
17537-573N3542-41							
10.5-10.7	(5n) AB						
–	GP 123	79.665	232.2	2.97	12.0-12.2	1+2	
17556-586N4231-31		79.670	230.7	2.95	11.0-11.2	3+2	
11.2-11.4	(3n)	**79.668**	**231.4**	**2.96**	**11.2-11.4**	**2n**	
–	GP 78	80.596	249.5	13.74	9.7-10.0	1+2	Perhaps identical with ALI 140=IDS 180079N3505.According to IDS ALI 140 has not BD number and the magnitudes are: 13.0-13.8 GP 78 = BD + 35°3173 (9^m.5)
18078-113N3505-06							
9.6-10.1	(4n)						

ADS m	Disc 1900–2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
11280	Σ 2312	80.495	341.2	1.42	1.0	1+2	
	18172-211N2817-20						
9.0-10.0							
–	GP 15	80.640	312.7	8.44	10.0-12.0	1+1	
	18308-343N3458-63	80.651	312.0	7.42	10.0-13.0	2+1	
10.7-12.9	(5n)	**80.647**	**312.3**	**7.83**	**10.0–12.7**	**2n**	
11483	OΣ 358	80.495	164.3	1.76	-0.1	1+2	
	18314-359N1654-59	80.653	165.7	1.85	0.0	1+2	Starikova,1966: +4°.4, +0".26
6.8-7.2	AB	**80.574**	**165.0**	**1.80**	**0.0**	**2n**	Hopmann,1970: +3°.3, +0".25
–	GP 16	80.500	308.1	8.61	10.5-12.0	1+2	
	18343-379N3500-05	80.593	308.4	7.94	10.0-13.0	1+2	
9.9-12.7	(7n)	80.596	308.3	8.20	10.0-13.0	1+2	According to "Carte du Ciel" the
		80.563	**308.3**	**8.25**	**10.0–12.6**	**3n**	position from 1939: θ∼291°, ρ∼6"
							Direct motion.
–	GP 17	80.593	15.1	8.86	14.0-14.0	1+2	
	18354-390N3456-62						
13.4-13.4	(4n)						
–	GP 45	80.593	276.2	6.28	12.0-12.0	1+2	
	18389-425N3426-32	80.596	276.9	6.21	12.5-12.5	1+1	
12.1-12.1	(5n)	**80.594**	**276.5**	**6.25**	**12.2–12.2**	**2n**	
–	GP 43	80.500	273.2	2.90	14.5-15.0	1+1	At the limit of vicibility.
	18447-484N3425-32	80.593	274.5	2.89	12.5-14.0	1+2	
12.8-13.8	(6n)	**80.547**	**273.8**	**2.90**	**13.5–14.5**	**2n**	
–	GP 44	80.594	230.6	9.70	9.0-12.0	1+2	GP 44 = BD + 35°3368 (9^m.5)
	18459-495N3505-11	80.596	230.2	8.97	9.0-11.0	1+2	
8.9-10.6	(4n)	**80.595**	**230.4**	**9.34**	**9.0–11.5**	**2n**	
11863	Σ 3130	80.681	258.4	2.39	8.0-11.0	2+2	
	18529-559N4406-13	80.711	258.9	2.23		1+1	
7.2-8.3-10.6	AB-C	**80.691**	**258.6**	**2.34**	**8.0–11.0**	**2n**	
–	GP 41	80.632	353.1	5.34	14.0-15.0	1+1	
	18532-567N3438-45						
13.5-14.3	(2n)						
–	GP 130	80.632	125.4	55.5	9.5-12.0	1+2	GP 130 = BD + 34°3369 (9^m.5)
	18538-574N3459-65						
9.5-11.2	(1/4n)AB						
11.2-12.2	(4n) BC	80.632	271.9	8.61	12.0-13.0	1+2	
		80.727	270.9	8.28	11-0-12.0	3+2	
		80.691	**271.3**	**8.40**	**11.2–12.2**	**2n**	
–	GP 29	80.501	171.4	2.37	10.0-11.0	1+2	
	18539-575N3446-54	80.632	174.3	2.28	10.0-11.0	1+2	
10.5-11.6	(10n)	80.727	172.6	2.63	12.0-13.0	3+2	
		80.639	**172.7**	**2.46**	**11.2–11.9**	**3n**	
11894	A 587	80.681	190.4	1.75	10.0-10.7	3+2	
	18550-580N4358-66	80.711	190.5	1.59	10.0-10.8	1+2	
10.4-11.2	BC	**80.692**	**190.4**	**1.69**	**10.0–10.7**	**2n**	
–	GP 40	80.501	79.6	5.79	12.0-13.0	1+2	
	18583-620N3427-36	80.632	75.0	6.76	11.0-12.5	1+1	
10.8-11.9	(4n) AB	**80.563**	**77.8**	**6.18**	**11.5–12.8**	**2n**	
12.3-12.3	CD	80.501	352.7	3.89	13.0-13.0	1+2	
		80.632	349.2	3.39	12.3-12.5	1+1	
		80.553	**351.3**	**3.69**	**12.6–12.8**	**2n**	
12040	Σ 2454	80.716	276.2	0.98	1.5	1+1	Baize,1975: -2°.6,-0".24(elipt. trajec.)
	19023-062N3017-26						Olević,1976:-3°.4,-0".13(rectilin. trajec.)
8.5-9.7	AB						
–	GP 30	80.634	317.1	2.16	12.0-12.7	1+1	
	19051-087N3412-21						
10.4-10.9	(4n)						

ADS m	Disc 1900-2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
-	GP 34	79.660	52.2	2.43	-	1+1	According to "Carte du Ciel" the position angle in 1925 is ~135°. Retrograde motion.
19252-289N3503-25		79.665	51.2	-	9.5-14.0	1+2	GP 34 = BD + 34°3568 (9.m5)
9.5-13.1 (11n)	AB	79.670	52.0	3.08	9.5-13.0	3+3	
		79.692	54.6	3.22	3.0	2+1	
		79.698	52.1	2.88	9.5-14.0	2+2	
		79.678	**52.3**	**3.07**	**3.8**	**5n**	
-	GP 135	80.727	36.1	1.86	1.5	3+2	
19253-290N3456-78							
10.8-11.7 (5n)							
12521	Es 2240	79.698	151.7	2.35	12.0-12.1	1+1	About 8° direct motion since 1926.
19259-296N3441-54							
12.4-12.9	BC						
-	GP 96	80.727	111.1	1.19	0.1	3+2	
19327-363N3419-33							
11.0-11.4 (2n)							
-	GP 121	79.611	323.3	1.39	-0.3	1+2	GP 121 = BD + 36°3687 (9.m2)
19417-454N3641-56		79.660	324.1	1.34	0.3	1+1	
10.0-10.0 (1n)		**79.631**	**323.4**	**1.37**	**0.0**	**2n**	
12965	OΣ 386	80.640	71.7	0.99	0.2	2+2	
19446-482N3655-70		80.653	70.8	0.99	-0.1	1+2	
8.2-8.5		80.744	70.7	0.96	0.0	1+2	
		80.760	72.8	0.87	0.0	2+2	
		80.699	**71.6**	**0.95**	**0.0**	**4n**	Very slow retrograde motion.
-	SEI 695	80.793	347.2	8.31	10.0-10.3	1+2	
19469-507N3414-29		80.809	347.8	8.12	0.2	1+2	The angle has increased by 10° since 1894
10.0-10.7	AB	**80.801**	**347.5**	**8.22**	**0.2**	**2n**	
	AC	80.793	291.0	99.7	10.0-11.5	1+2	This is probably first measure of AC.
-	SEI 696	80.793	129.1	19.4	0.3	1+2	
19470-508N3415-30		80.809	129.3	19.5	0.1	2+2	
11.2-10.1	BA	**80.802**	**129.2**	**19.4**	**0.2**	**2n**	
13030	β 978	80.640	237.7	0.93	0.0	1+2	
19472-514N2316-31							
9.5-9.6							
-	GP 37	80.711	334.5	2.49	-	1+1	GP 37 = BD + 34°3771 (9.m5)
19494-532N3501-16		80.793	334.3	2.63	9.7-9.8	1+1	
9.7-9.9 (4n)		80.809	330.1	2.27	10.0-10.2	1+2	
		80.776	**332.6**	**2.43**	**9.8-10.0**	**3n**	
-	GP 138	80.760	35.2	0.45	9.6-9.6	3+2	GP 138 = BD + 45°3102 (9.m1)
20107-139N4521-39							
9.4-9.5 (2n)							
-	GP 128	80.815	307.8	4.27	12.0-12.5	1+2	
20152-190N3531-50							
12.0-12.4 (2n)							
-	GP 129	80.815	289.9	55.6	9.5-12.0	1+2	
20172-210N3506-25							
9.5-12.5 (1/2n)	AB						
12.5-13.0 (2n)	BC	80.815	33.8	5.50	12.0-12.5	1+2	
	AD	80.815	214.9	80.5	9.5-11.0	1+2	
	DE	80.815	259.9	13.10	11.0-13.0	1+2	
-	GP 144	80.651	122.8	5.63	13.0-13.5	1+1	
20190-223N4527-46							
13.0-13.5 (3n)							
-	GP 94	80.760	154.6	2.54	10.5-11.5	1+2	
20203-242N3437-56							
11.8-12.3 (3n)							

ADS m	Disc 1900–2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
–	GP 80	80.760	334.1	2.59	0.5	2+2	
20204-243N3447-66							
12.4-12.9 (3n)							
–	BRT 2263	79.785	30.7	3.49	11.0-11.3	1+2	
20236-268N4551-71		79.791	30.7	3.65	11.0-11.2	2+2	
10.[illegible]-10.6		**79.788**	**30.7**	**3.58**	**11.0–11.2**	**2n**	
14194	ARG 39	79.780	168.3	11.60	–	1+2	An optical pair.
20393-424N4854-76							
8.7-9.3	AB						
14499	Σ 2737	79.668	286.1	0.85	8.1-8.3	2+2	
20541-591N0355-78		80.716	284.9	1.01	0.1	1+2	
5.8-6.3	AB	**80.117**	**285.6**	**0.92**	**0.2**	**2n**	Van den Bos,1932: +0°.1, -0".13
5.8-7.1	AC	79.668	66.9	10.34	8.1-10.0	2+2	
–	GP 82	80.634	23.6	4.44	9.0-11.0	1+2	
20544-583N3549-71		80.651	26.1	4.55	10.0-13.0	1+1	
10.4-12.5 (4n)		80.657	26.2	4.40	12.0-14.0	1+1	
		80.645	**25.1**	**4.46**	**10.3–12.7**	**3n**	
–	GP 27	79.698	158.0	1.26	0.0	1+1	GP 27 = BD + 34°4228 $(9^m.5)$
20552-593N3412-35		80.651	161.0	1.36	11.0-11.5	1+1	
10.3-10.7 (2n)		**80.174**	**159.5**	**1.31**	**0.2**	**2n**	
–	GP 28	80.634	0.8	2.68	12.5-12.7	1+2	The position of the pair related to
20553-593N3407-30		80.651	6.7	2.92	13.0-14.0	1+2	BD + 33°4112 $(8^m.0)$: $\Delta\alpha = +13^s$, $\Delta\delta = +2$.
12.6-13.1 (4n)		**80.642**	**3.8**	**2.80**	**12.8–13.4**	**2n**	
–	GP 24	80.755	246.3	6.55	9.5-11.5	1+1	GP 24 = BD + 34°4278 $(9^m.5)$
21019-059N3435-59							
9.5-11.5 (1n)							
–	GP 25	80.755	299.7	4.33	11.0-13.0*	1+1	
21021-061N3435-59							
11.0-12.5 (2n)							
–	GP 22	80.755	96.2	6.05	9.5-10.7	1+1	GP 22 = BD + 34°4283 $(9^m.5)$
21025-066N3412-56							
9.5-10.7 (3n)	AB						
9.5-10.5	AC	80.755	16.9	31.8	9.5-10.5	1+1	
–	GP 26	80.755	243.9	4.55	9.5-10.2	1+1	
21051-092N3507-31							
9.8-11.4 (6n)							
14784	Σ 2783	79.660	7.9	0.71	0.0	1+2	
21114-141N5753-78		79.665	9.5	0.73	0.0	2+2	
7.8-7.8		79.670	8.4	0.77	0.0	2+2	The angle has decreased by 34° since 1830
		79.665	**8.7**	**0.74**	**0.0**	**3n**	with decrease in distance.
14783	HI 48	80.656	252.2	0.58	0.2	2+2	Baize,1949: +1°.1, -0".09
21117-137N6400-25							
7.1-7.3							
14894	OΣ 435	79.682	227.4	0.58	0.2	1+2	The angle has increased by 24° since 184[illegible]
21163-214N0228-54							
8.1-8.6							
14889	OΣ 437	79.681	25.3	2.04	0.5	1+2	
21166-208N3202-28		80.711	27.6	2.24	0.3	2+1	
6.9-7.6	AB	**80.196**	**26.4**	**2.14**	**0.4**	**2n**	
14919	J 851	80.711	139.9	1.46	0.5	1+2	
21179-226N1508-34							
10.2-10.5	AB						
14992	A 619	79.704	61.6	0.70	8.0-8.7	2+2	Very slow angular increase.
21230-268N4202-28							
8.5-9.3							

ADS m	Disc. 1900-2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
15139	Hn 46	80.653	199.3	1.70	0.0	1+1	
21325-366N3557-84							
11.3-11.6							
15270	Σ 2822	79.673	296.2	2.04	1.5	1+1	
21397-441N2817-45		80.809	297.8	1.87	-	1+2	
4.7-6.1	AB	**80.355**	**297.2**	**1.94**	**1.5**	**2n**	Heintz,1965:-0°.9, +0".16
15417	Σ 2845	80.640	172.9	1.96	0.1	1+1	
21496-524N6237-65		80.889	172.8	1.75	0.1	1+2	
8.4-8.5		**80.533**	**172.8**	**1.83**	**0.1**	**2n**	
-	GP 93	80.632	284.2	5.86	11.0-11.7	1+1	
22227-271N3446-76		80.653	283.5	5.11	11.0-11.5	2+1	
11-1-11.6 (4n)		**80.645**	**283.8**	**5.41**	**11.0-11.6**	**2n**	
15971	Σ 2909	79.673	227.8	1.78	0.1	1+1	
22237-288S0032-02		80.809	224.6	1.57	0.2	1+1	
4.4-4.6		80.889	222.4	1.56	0.2	1+2	
		80.519	**224.6**	**1.62**	**0.2**	**3n**	Harrington,1967: +1°.6, -0".15
-	GP 90	80.632	284.4	6.67	9.5-9.3	1+2	
22239-284N3503-33		80.654	285.4	6.31	0.0	2+2	
9.5-9.4 (2n)		**80.645**	**285.0**	**6.46**	**-0.1**	**2n**	
-	GP 99	80.632	290.9	1.47	10.5-11.0	2+2	
22242-286N3443-73		80.654	289.4	1.59	10.0-10.6	1+2	
10.0-10.5 (4n)		**80.641**	**290.2**	**1.52**	**10.3-10.9**	**2n**	
15988	Σ 2912	80.681	117.2	0.84	1.0	2+2	
22249-299N0355-85		80.727	116.0	0.62	1.2	1+2	
5.8-7.2		**80.700**	**116.7**	**0.75**	**1.1**	**2n**	Knipe,1960: -0°.8, -0".27
-	GP 39	79.690	93.5	0.45	0.2	3+2	There is the discordance in the measures
22280-325N3429-60		80.654	92.4	0.62	10.0-10.5	1+2	of the position angles put it is visible
10.0-10,2 (4n)		**80.052**	**93.1**	**0.51**	**0.3**	**2n**	the tendention of direct motion.
							GP 39 = BD + 34°4710, (9^m.3)
16185	Σ 2934	79.690	77.0	1.08	1.2	3+3	
22370-418N2054-85		79.692	73.6	1.02		1+1	
8.7-9.7	AB	79.701	72.4	1.01	0.8	1+1	
		80.714	74.1	1.00	9.5-10.0	2+2	
		80.727	73.3	1.00	1.0	1+1	
		80.077	**74.8**	**1.03**	**1.1**	**5n**	Heintz,1960: +4°.8, +0".08
16317	Σ 2950	80.894	288.8	1.49	1.0	1+2	About 30° retrograde motion and
22474-513N6109-41							decrease in distance since 1832.
6.1-7.4	AB						
16326	A 632	80.725	170.6	0.94	1.0	1+1	Heintz,1961: +2°.2, +0".12
22480-521N5712-44							
8.2-9.0	AB						
16345	β 382	79.673	203.9	0.77	2.0	1+1	
22492-537N4413-45		80.711	207.4	0.90	2.5	1+1	
5.8-7.8	AB	**80.192**	**205.6**	**0.84**	**2.2**	**2n**	Muller,1953: 0°.0, -0".11
16435	Hn 56	79.668	96.9	1.08	0.0	3+2	
22551-597N4117-49		79.941	96.0	1.04	0.0	1+2	
9.3-9.4		**79.770**	**96.6**	**1.06**	**0.0**	**2n**	The angle has decreased by 28° since 1881
-	GP 68	80.727	327.2	0.98	0.0	1+1	GP 68 = BD + 35°5010 (9^m.4)
23158-205N3548-80							
9.5-9.5 (1n)							
-	GP 67	80.640	312.3	2.99	9.0-13.5	1+1	
23169-217N3550-83							
9.2-12.6 (5n)							
-	GP 21	80.714	209.6	0.61	-0.3	2+3	GP 21 = BD + 29°4929 (9^m.5)
23223-272N2953-86							
9.7-9.8 (1n)							

ADS m	Disc 1900-2000 Mult.	Epoch 1900+	θ	ρ	m	W	Notes
– 23224-272N2941-74 12.6-12.6 (8n)	GP 3	80.714	120.5	4.25	12.0-12.0	2+1	
16951 23380-431N1117-50 9.6-9.6	A 1242	79.668	323.1	0.69	0.0	2+2	Zulević,1977: -1°.8, -0".06
17020 23438-486N6420-53 6.9-7.6	OΣ 507 AB	79.668	305.4	0.75	7.0-8.0	2+2	
		79.673	305.0	0.70	0.7	1+2	
		79.690	307.1	0.59	0.5	2+2	
		79.701	304.6	0.75	0.7	1+2	
		79.682	**305.6**	**0.69**	**0.7**	**4n**	Zulević,1977: +1°.8, -0".05
17053 23468-518N4231-64 10.9-11.0	Es 1476 AB	80.889	65.0	1.46	12.0-12.0	1+2	
17063 23471-521N4257-90 8.7-8.7	β 728	80.793	6.7	1.17	8.5-8.7	1+2	
		80.809	6.0	1.16	0.1	3+2	
		80.889	8.8	1.15	0.2	2+2	
		80.832	**7.1**	**1.16**	**0.2**	**3n**	The angle has increased by 14° since 1878.
10 23577-629N4642-75 8.8-8.8	A 800	80.894	291.3	1.53	-0.1	2+2	The component A is fainter then B.
		80.900	292.3	1.54	-0.1	2+2	
		80.897	**291.8**	**1.54**	**–0.1**	**2n**	

REFERENCE

G.M.Popović, 1979: Bull. Obs. Astron., Belgrade, No 130, pp. 28 1979.

RESULTS OF OBSERVATIONS OF THE SUN, MERCURY AND VENUS WITH THE BELGRADE LARGE MERIDIAN INSTRUMENT

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(Received February, 12, 1980)

Visual observations of the Sun, Mercury and Venus in right ascension and declination are being carried out with the Belgrade Large Meridian Instrument ASKANA (d = 190 mm, f = 2578) since 1973. The instrument, the pavilion, the method of observation and the data processing are described elsewhere (Sadžakov et al. 1976).

We present here the results obtained within the scheme until June 1979.

In cases where the number of reference stars during daytime observations was unsufficient, we were constrained to let the choronograph running until the evening, when 10 to 15 fundamental stars could be observed, with declinations close to that of the members of the solar system concerned, in addition to two or three polar stars. Thus, due corrections Δm, Δn, and Δc could be introduced into corresponding formulae on the basis of these subsequently observed FK4 stars.

The ephemeris positions of the Sun and the planets are the planets are calculated in the Computing Centre of the Pulkovo Observatory (USSR) under the programme of M.Chubey.

The apparent right ascensions and declinations of the Sun and the two planets, obtained from our observations, are compared with the ephemeris positions and the results are given in Tables 1, 2 and 3.

All three Tables consist of ten columns, namely:

Column:

I – date of observation
II – observer and his assistant
III – mean temperature within the dome
IV – number of FK4 reference stars
V – right ascension α from the observation
VI – V $(O-C)_\alpha$.
VII – declination δ from the observation
VIII – $(O-C)_\delta$
IX – epoch of observation in fraction of year
X – clamp position

Code numbers of the observers: 1 – S. Sadžakov, 2 – D. Šaletić, 3 – M. Dačić.

Code numbers of the assistants: 1 – V. Protić – Benišek, 2 – V. Trajkovska and 3 – D. Božičković.

A dependence of the sign of (O – C) on the air temperature during observation is apparent.

Sun

Table 1

Date of observ.	ob-serv.	t^oC	n	α	$(O-C)_\alpha$	δ	$(O-C)_\delta$	E_p	clamp. posit.
1974				h m s	0.ˢ001	° ′ ″	0.″01	197	
14.XI	1,2,3,	12.0	8	15 16 58.138	− 80	− 18 11 05.06	− 14	4.87	KE
14.XI	1,4	13.0	8	15 21 04.396	+ 85	− 18 26 37.96	− 32	4.87	KE
16.XI	1,3	10.1	21	15 25 11.501		− 18 41 49.58	− 24	4.87	KE
18.XI	1,3	12.9	19	15 33 27.947		− 19 11 15.15	− 8	4.88	KE
20.XI	1,3	9.5	32	15 41 47.740		− 19 39 17.89	+ 9	4.89	KE
22.XI	1,2,3	9.0	7	15 50 10.720		− 20 05 54.74	+ 1	4.89	KW
10.XII	1,3,4	5.9	8	17 07 44.497		− 22 54 01.25	− 36	4.94	KW

Sun

Table 1

Date of observ.	ob-serv.	t^oC	n	α	$(0-C)_\alpha$	δ	$(0-C)_\delta$	E_p	clan… pos…
1975								197	
15.I	1,3	8.5	7	19 46 20.424	+ 29	- 21 11 46.31	- 10	5.04	K
16.I	1,3	8.0	12	19 50 38.185		- 21 00 41.25	+ 13	5.04	K
21.IV	1,3	15.4	13	01 54 21.528	-135	+ 11 43 14.48	- 32	5.30	K
29.IV	1,3	15.0	12	02 24 28.704	+ 45	+ 14 20 10.43	- 17	5.33	K
16.VII	1,3	27.2	8	07 40 34.053	+ 57	+ 21 25 46.74	+ 10	5.54	K
18.VII	1,3	26.7	11	07 48 37.631	-118	+ 21 05 42.73	+ 5	5.54	K
20.VII	1,3	23.4	19	07 56 39.301		+ 20 44 14.05	+ 8	5.56	K
21.VII	1,3	23.8	11	08 00 39.233		+ 20 32 57.27	- 4	5.56	K
10.IX	1,3	18.1	14	11 12 33.354	- 7	+ 05 05 28.42	- 13	5.69	K
18.IX	1,2,3	22.8	10	11 41 15.488	- 36	+ 02 01 38.37	+ 92	5.71	K
19.IX	1,3	23.0	11	11 44 50.441	-142	+ 01 38 23.45	- 26	5.72	K
20.IX	1,3	23.4	11	11 48 25.668	- 16	+ 01 15 08.28	- 8	5.72	K
1977								197	
10.III	1,5	12.1	18	23 22 19.491	- 38	- 04 03 36.29	- 61	7.19	I
17.III	1,5	12.6	17	23 47 59.559	-134	- 01 18 07.02	+ 36	7.21	I
18.III	1,5	12.5	6	23 51 38.970	+130	- 00 54 24.14	- 14	7.21	I
24.III	1,5	21.5	9	00 13 30.891	+ 40	+ 01 27 42.82	+ 13	7.22	I
25.III	1,5	18.5	7	00 17 09.208		+ 01 51 19.04	+ 7	7.31	I
7.IV	1,5	15.3	7	01 04 31.101	-164	+ 06 52 01.62	+ 35	7.32	I
18.IV	1,5	10.9	17	01 45 04.251		+ 10 51 38.99	+ 89	7.32	I
19.IV	1,5	14.1	17	01 48 47.509	- 74	+ 11 12 26.93	- 12	7.32	I
21.IV	1,5	10.4	17	01 56 15.490		+ 11 53 33.85	+ 39	7.33	I
22.IV	1,5	11.0	12	02 00 00.086		+ 12 13 48.56	+ 28	7.33	I
21.VI	1,5	12.0	10	05 59 43.668		+ 23 26 18.42	- 2	7.47	I
25.VI	1,2,5	21.6	10	06 16 21.836		+ 23 23 07.17	- 2	7.47	I
27.VII	1,3	23.1	14	06 24 40.149		+ 19 11 12.62	+ 34	7.58	I
29.IX	1,3,5	19.5	32	12 22 38.700		- 02 27 03.71	+ 25	7.75	I
30.IX	1,3,5	12.6	8	12 26 15.294	-118	- 02 50 21.62	- 22	7.75	I
1.X	1,3	18.0	8	12 29 52.594	-188	- 03 13 38.33	- 7	7.75	
4.X	1,3,5	13.0	14	12 40 45.126	-175	- 04 23 15.42	+ 17	7.76	
5.X	3,5	16.8	19	12 44 23.602	- 39	- 04 46 22.56	+ 41	7.76	
6.X	1,3,5	18.6	12	12 48 02.356	- 12	- 05 09 24.85	- 38	7.77	
7.X	1,3,5	19.5	12	12 51 41.489	- 14	- 05 32 24.98	- 64	7.77	
17.X	1,3,5	13.9	15	13 28 39.182	+113	- 09 17 26.70	- 3	7.80	
18.X	1,3,5	14.7	26	13 32 23.836	+ 55	- 09 39 19.23	+ 27	7.80	
19.X	1,3,5	16.7	12	13 36 09.043	- 42	- 10 01 03.31	+ 6	7.80	
20.X	1,3,5	15.4	12	13 39 55.072	+ 77	- 10 22 37.56	- 29	7.80	
21.X	1,3,5	15.5	12	13 43 41.716	+186	- 10 44 02.74	- 32	7.81	
24.X	3,5	16.0	12	13 55 05.050	- 8	- 11 47 21.25	+ 14	7.81	
27.X	3,5	15.5	12	14 06 34.862		- 12 49 01.62	- 45	7.81	
28.X	3,5	15.9	12	14 10 26.275		- 13 09 17.00	+ 75	7.81	
11.XI	1,3,5	15.8	16	15 05 51.608	+ 63	- 17 27 01.58	+ 49	7.87	
21.X	1,3,5	6.5	13	15 47 07.377		- 19 56 16.94	- 51	7.87	
1978								197	
5.I	1,3,5	2.0	10	19 04 01.391	+ 11	- 22 37 33.47	- 4	8.07	
6.I	1,5	-2.0	10	19 08 24.730		- 22 30 37.73	+ 31	8.07	

Sun

Table 1

Date of observ.	ob-serv.	t^oC	n	α	$(0-C)_\alpha$	δ	$(0-C)_\delta$	E_p	clamp. posit.
12.I	1,5	5.4	10	19 34 34.332	+ 38	- 21 39 48.34	+ 32	8.07	KW
2.II	1,5	5.9	10	21 02 49.880		- 16 50 46.69	- 25	8.08	KW
3.III	1,3,5	15.6	10	22 55 28.390		- 06 52 14.34	+ 1	8.17	KW
13.III	1,3	16.0	10	23 32 27.863	- 29	- 02 58 35.90	- 6	8.17	KW
15.III	1,3	13.2	10	23 39 47.759		- 02 11 16.96	+ 43	8.17	KW
23.III	1,3	7.8	20	00 08 58.765	- 4	+ 00 58 17.09	+ 67	8.24	KW
28.III	1,3,5	10.0	16	00 27 09.805	- 77	+ 02 56 00.48	- 10	8.25	KW
30.III	3,5,6	17.9	16	00 34 27.435	- 37	+ 03 42 45.04	+ 19	8.25	KW
31.III	1,3,5	15.2	16	00 38 04.925	+ 37	+ 04 06 01.27	+ 25	8.25	KW
3.IV	1,3,5	20.5	16	00 49 00.773	- 69	+ 05 15 21.40	+ 11	8.25	KW
7.IV	1,3	21.0	18	01 03 37.743	+ 16	+ 06 46 30.18	- 18	8.28	KW
4.V	3,5	17.0	18	02 44 35.543		+ 15 55 17.48	+ 16	8.29	KW
5.V	1,3,5	21.0	18	02 48 26.598	- 54	+ 16 12 34.20	+ 9	8.29	KW
17.V	3,5	17.1	14	03 35 24.046		+ 19 17 35.89	- 50	8.38	KW
18.V	1,3,5	17.1	4	03 39 22.430		+ 19 31 00.29	- 11	8.38	KW
20.VI	1,3,5	22.1	12	05 54 32.282	+159	+ 23 25 57.98	+ 72	8.47	KW
23.VI	1,3	22.7	11	06 07 01.091	+ 22	+ 23 25 43.62	+ 9	8.48	KW
24.VI	3,5	23.9	11	06 11 10.518		+ 23 24 49.56	+ 23	8.48	KW
25.VI	1,3	24.1	11	06 15 20.036	+148	+ 23 23 30.84	+ 48	8.48	KW
5.VII	3,5	26.3	12	06 56 44.358		+ 22 47 51.68	- 6	8.53	KW
11.VII	1,3,5	22.4	12	07 21 20.469	- 11	+ 22 07 20.31	- 19	8.53	KW
12.VII	1,3	25.2	14	07 25 24.890	-113	+ 21 59 14.69	- 21	8.53	KE
13.VII	1,3	24.4	11	07 29 29.047	+ 19	+ 21 50 47.13	+ 27	8.54	KE
14.VII	1,3,5	24.1	11	07 33 32.692	+124	+ 21 41 55.06	- 15	8.54	KE
18.VII	1,3	26.0	11	07 49 41.448	-100	+ 21 02 51.39	+ 15	8.55	KE
19.VII	1,3	27.8	21	07 53 42.447	·	+ 20 52 11.74	+ 11	8.55	KE
21.VII	1,3,5	23.1	14	08 01 42.742	+162	+ 20 29 48.58	- 37	8.56	KE
26.VII	1,3	22.2	13	08 21 32.959	- 76	+ 19 27 54.73	0	8.58	KW
27.VII	1,3	23.7	13	08 25 29.508	+ 96	+ 19 14 32.76	- 23	8.58	KW
31.VII	1,3	25.3	18	08 41 09.275	+177	+ 18 17 55.78	+ 5	8.62	KW
1.VIII	1,3	25.2	17	08 45 02.377	-128	+ 18 03 00.11	0	8.65	KW
2.VIII	1,3	25.8	11	08 48 55.378	+ 42	+ 17 47 47.26	- 42	8.66	KW
3.VIII	1,3	25.6	11	08 52 47.563	+ 1	+ 17 32 18.37	+ 3	8.68	KW
7.VIII	1,3	27.8	22	09 08 10.520	+119	+ 16 27 30.25	+ 36	8.78	KW
14.VIII	1,3	21.4	22	09 34 42.207	-100	+ 14 24 08.47	+ 65	8.78	KW
15.VIII	1,2,3	22.8	7	09 38 27.487	+ 73	+ 14 05 32.25	+ 21	8.79	KW
22.VIII	1,3	20.8	7	10 04 28.634	+ 30	+ 11 49 32.90	+ 19	8.80	KE
23.VIII	1,3	23.4	4	10 08 09.716	- 34	+ 11 29 18.74	+ 8	8.80	KE
4.IX	1,3,5	20.2	5	10 51 54.623		+ 07 13 54.80	- 31	8.81	KE
25.IX	1,3	21.8	6	12 07 20.941	- 8	- 00 47 55.04	+ 47	8.84	KE
26.IX	1,3	20.8	10	12 10 56.789	- 57	- 01 11 16.29	- 2	8.84	KE
9.X	1,3	18.9	13	12 56 08.009		- 06 12 40.01	+ 3	8.86	KW
10.X	1,3,5	18.6	13	13 01 48.272	- 11	- 06 35 27.41	+ 11	8.87	KW
15.X	1,3	15.0	13	13 20 16.763	+ 59	- 08 27 51.42	-102	8.88	KW
18.X	1,3	16.9	13	13 31 28.257	+ 38	- 09 33 56.52	- 37	8.88	KW
19.X	2,3,5	15.9	12	13 35 13.270		- 09 55 51.48	- 32	8.89	KW
24.X	1,3,5	11.6	12	13 54 08.696	+245	- 11 42 11.99	+ 14	8.89	LW
25.X	1,3,5	11.5	12	13 57 57.584		- 12 02 00.62	+ 79	8.90	KW

Sun

Table 1

Date of observ.	ob-serv.	t°C	n	α	(O-C)α	δ	(O-C)δ	Ep	clamp. posit.
1979								197	
21.II	1,2,3	2.4	14	22 16 46.975		- 10 41 21.72	- 2	9.14	KW
22.II	1,2	3.0	13	22 20 36.448	+ 7	- 10 19 37.98	+ 33	9.15	KW
23.II	1,2,3	-0.6	16	22 24 25.411	+121	- 09 57 44.55	+ 57	9.15	KW
27.II	1,3	2.2	16	22 39 34.753		- 08 28 42.89	+ 11	9.16	KW
2.III	1,3	8.3	19	22 50 50.963		- 07 20 37.25	+ 56	9.17	KW
7.III	1,2,3	7.3	13	23 09 28.052	+ 58	- 05 25 07.29	- 52	9.18	KW
11.III	1,3	6.3	13	23 24 14.137	+162	- 03 51 24.67	- 80	9.19	KW
20.III	1,3	15.3	12	23 57 10.399	+ 26	+ 00 18 28.07	- 35	9.21	KW
21.III	3,5	15.0	8	00 00 48.973	- 98	+ 00 05 13.84		9.22	KW
22.III	1,3	15.2	12	00 04 27.617	- 53	+ 00 28 55.97	+ 77	9.23	KW
25.III	1,2,3	10.0	6	00 15 23.115	+ 55	+ 01 39 51.19	- 21	9.23	KW
4.IV	1,3	13.5	12	00 51 48.300	- 70	+ 05 32 54.42	+ 26	9.25	KW
12.IV	1,3	11.6	18	01 21 06.035	+ 7	+ 08 32 34.87	+ 6	9.28	KW
16.IV	1,3	17.0	10	01 35 51.399		+ 09 59 09.54	+ 20	9.29	KW
19.IV	1,3	7.5	15	01 46 59.329		+ 11 02 22.86	- 87	9.30	KW
20.IV	1,2,3	7.2	15	01 50 42.803		+ 11 23 07.78	- 24	9.31	KW
23.IV	1,3	14.8	12	02 01 55.874	- 18	+ 12 24 09.82	+ 10	9.31	KW
24.IV	1,3,5	18.3	14	02 05 41.128	- 55	+ 12 44 06.34	- 8	9.32	KW
3.V	1,3	18.4	14	02 39 51.066	- 42	+ 15 33 34.20	- 32	9.34	KW
15.V	1,3	16.4	10	03 26 31.730	- 89	+ 18 46 24.61	- 4	9.36	KW
17.V	1,3	18.4	12	03 34 26.633		+ 19 14 18.85	+ 6	9.37	KW
18.V	3,5	18.0	10	03 38 24.912		+ 19 27 49.43	- 77	9.37	KW
20.V	1,3	22.9	12	03 46 23.192		+ 19 53 46.88	+ 61	9.38	KW
21.V	1,3	26.5	14	03 50 23.183		+ 20 06 14.16	- 40	9.39	KW
23.V	1,3	24.1	12	03 58 24.607	-213	+ 20 30 08.57	- 55	9.39	KW
24.V	1,3	23.4	12	04 02 26.332	-122	+ 20 41 35.34	+ 4	9.40	KW
25.V	1,3	24.3	12	04 06 28.459	-145	+ 20 52 40.53	- 29	9.40	KW
26.V	1,3	24.6	10	04 10 31.260		+ 21 03 23.43	- 20	9.40	KW
27.V	1,3	25.7	10	04 14 34.451	+ 46	+ 21 13 45.60	+ 2	9.40	KW
29.V	1,3,5	18.6	12	04 22 42.092		+ 21 33 21.94	- 15	9.42	KW
30.V	1,3	21.7	12	04 26 46.578	- 21	+ 21 42 38.15	+ 47	9.43	KW
31.V	1,3	23.2	12	04 30 51.580	+ 53	+ 21 51 29.86	- 20	9.43	KW
1.VI	1,3	25.0	12	04 34 56.844	- 14	+ 21 59 58.63	- 24	9.43	KW
4.VI	1,3	26.0	12	04 47 15.074	- 26	+ 22 23 08.03	- 14	9.44	KW
5.VI	1,3	24.7	12	04 51 21.799	- 76	+ 22 30 04.10	- 13	9.45	KW
6.VI	1,3	25.0	12	04 55 28.969		+ 22 36 36.23	- 55	9.45	KW
7.VI	1,3	24.4	12	04 59 36.310	- 55	+ 22 42 45.33	- 24	9.46	KW
8.VI	1,3	24.5	12	05 03 44.048		+ 22 48 30.75	- 20	9.46	KW
11.VI	1,3	24.9	12	05 16 08.719	+ 69	+ 23 03 19.81	- 85	9.47	KW

Mercury

Table 2

Date of observ.	ob-serv.	t°C	n	α	(O-C)α	δ	(O-C)δ	Ep	clamp. posit.
1974				h m s	0.001 s	° ′ ″	0.″01	197	
14.XI	1,2,3	12.0	8	14 07 14.228	+ 21	- 10 32 48.86	+ 21	4.87	KE
16.XI	1,4	13.0	8	14 17 20.982	+ 21	- 11 33 11.21	+ 32	4.87	KE
10.XII	1,3,4	5.9	8	16 44 55.755	+ 21	- 22 51 30.59	- 17	4.94	KW

Mercury

Table 2

Date of observ.	ob-serv.	t°C	n	α	(O-C)α	δ	(O-C)δ	E_p	clamp. posit.
1975								197	
15.I	1,3	8.5	7	20 53 53.030	- 79	- 19 05 57.66	- 10	5.04	KW
21.IV	1,3	15.4	13	02 05 56.397	-109	+ 12 36 11.18	- 45	5.30	KE
29.IV	1,3	15.0	12	03 10 42.693	- 48	+ 19 05 14.54	+ 18	5.33	KE
16.VII	1,3	27.2	8	06 27 55.455	- 79	+ 22 41 37.09	+ 22	5.54	KW
18.VII	1,3	26.7	11	06 43 28.585	- 79	+ 22 53 35.64	- 21	5.54	KW
1977								197	
21.VI	1,5	12.0	10	05 14 50.656	+ 53	+ 22 55 25.05	+ 3	7.47	KE
29.IX	1,3,5	19.5	32	11 31 27.239	+ 53	+ 05 04 02.59	- 24	7.75	KE
30.IX	1,3,5	12.6	8	11 37 39.330	+101	+ 04 26 49.90	+ 25	7.75	KE
1.X	1,3	18.0	8	11 43 56.795	+103	+ 03 47 50.37	+ 6	7.75	KE
4.X	1,3,5	13.0	14	12 03 08.772	- 79	+ 01 42 46.47	- 25	7.76	KE
5.X	3,5	16.8	19	12 09 36.275	+165	+ 00 59.07.30	- 58	7.76	KE
6.X	1,3,5	18.6	12	12 16 04.711	+ 3	+ 00 14 47.34	+ 48	7.77	KE
7.X	1,3,5	19.5	12	12 22 31.129	+ 22	+ 00 30 02.15	+ 13	7.77	KW
1978								197	
5.I	1,3,5	2.0	10	17 27 55.451	- 1	- 20 43 56.62	- 13	8.07	KW
12.I	1,5	5.4	10	17 53 08.108	- 53	- 21 58 23.55	- 18	8.07	KW
2.II	1,5	5.9	10	19 55 21.031	-136	- 22 06 44.73	- 26	8.08	KW
23.III	1,3	7.8	20	01 04 39.166	+ 4	+ 10 12 20.00	- 43	8.24	KW
29.III	1,3	5.6	16	01 29 58.311	- 53	+ 12 43 33.13	- 38	8.25	KW
20.VI	1,3,5	22.1	12	06 26 35.395	-201	+ 24 56 30.49	- 17	8.47	KW
23.VI	1,3	22.7	11	06 54 07.042	+ 45	+ 24 42 11.49	- 9	8.48	KW
25.VI	1,3	24.1	11	07 11 40.948	-316	+ 24 20 20.25	- 10	8.48	KW
5.VII	3,5	26.3	12	08 28 00.754	-149	+ 20 42 12.57	+ 6	8.53	KW
12.VII	1,3	25.2	14	09 09 38.442	+ 16	+ 17 07 46.11	- 12	8.53	KE
13.VII	1,3	24.4	11	09 14 48.762	- 53	+ 16 35 30.88	- 6	8.54	KE
18.VII	1,3	26.0	11	09 37 46.289	+118	+ 13 53 55.05	+ 14	8.55	KE
19.VII	1,3	27.8	21	09 41 46.182	- 53	+ 13 22 09.35	- 11	8.55	KE
25.IX	1,3	21.8	6	11 54 09.402	- 53	+ 02 27 49.68	+ 4	8.84	KE
9.X	1,3	18.9	13	13 22 50.736	+ 90	- 08 15 56.94	- 7	8.86	KW
1979								197	
21.II	1,2,3	2.4	14	22 56 14.119	+016	- 07 58 34.88	+ 1	9.14	KW
23.II	1,2,3	-0.6	16	23 09 28.605	-205	- 06 16 31.66	- 16	9.15	KW
23.IV	1,3	14.8	12	00 24 01.220	- 33	- 00 15 32.38	- 18	9.31	KW
24.IV	1,3,5	18.3	14	00 28 07.812	+ 29	00 06 39.50	- 24	9.32	KW
3.V	1,3	18.4	14	01 11 07.362	+ 47	04 29 04.23	- 14	9.34	KW
20.V	1,3	22.9	12	03 08 57.187	+ 3	16 02 12.55	- 10	9.38	KW
21.V	1,3	26.5	14	03 09 54.519	- 51	16 45 08.15	- 52	9.39	KW
23.V	1,3	24.1	12	03 26 21.147	+ 29	18 09 17.75	- 12	9.39	KW
24.V	1,3	23.4	12	03 34 50.094	+138	18 50 09.74	- 8	9.40	KW
25.V	1,3	24.3	12	03 43 28.868	+133	19 29 57.38	- 51	9.40	KW
26.V	1,3	24.6	10	03 52 16.908	+ 35	20 08 28.62	+ 20	9.40	KW
4.VI	1,3	26.0	12	05 15 53.940	+ 26	24 25 45.69	- 1	9.44	KW
5.VI	1,3	24.7	12	05 25 16.405	+ 45	24 41 42.18	+ 36	9.45	KW
6.VI	1,3	25.0	12	05 34 34.511	+ 16	24 54 51.22	+ 12	9.45	KW

Venus **Table 3**

Date of observ.	ob-serv.	t°C	n	α	(O-C)α	δ	(O-C)δ	E_p	clamp. posit.
1974				h m s	0.s001	° ' "	0."01	197	
14.XI	1,2,3	12.0	8	15 25 33.755	- 4	- 18 12 31.15	- 8	4.87	KE
15.XI	1,4	13.0	8	15 30 39.634	- 3	- 18 33 09.71	+ 24	4.87	KE
16.XI	1,3	10.1	21	15 35 46.746	- 5	- 18 53 17.96	+ 1	4.87	KE
20.XI	1,3	9.5	32	15 56 27.377	- 6	- 20 08 32.69	0	4.89	KE
10.XII	1,3,4	5.9	8	17 43 57.951	- 4	- 23 55 17.94	+ 54	4.94	KE
1975								197	
15.I	1,3	8.5	7	20 57 49.125	- 17	- 18 45 42.39	+ 21	5.64	KW
21.IV	1,3	15.4	13	04 27 51.302	+243	+ 23 27 00.68	+ 32	5.30	KE
29.IV	1,3	15.0	12	05 08 06.995	+ 4	+ 24 56 10.53	- 40	5.33	KE
16.VII	1,3	27.2	8	10 25 05.817	- 57	+ 08 52 23.22	- 41	5.54	KW
18.VII	1,3	26.7	11	10 29 02.728	+118	+ 08 09 12.32	+ 15	5.54	KW
20.VII	1,3	23.4	19	10 32 37.355	+ 28	+ 07 26 56.95	+ 5	5.54	KE
21.VII	1,3	23.8	11	10 34 16.071	+ 28	+ 07 06 13.12	- 8	5.56	KE
10.IX	1,3	18.1	14	09 44 40.219	+ 7	+ 05 16 02.54	+ 30	5.69	KW
19.IX	1,3	23.0	11	09 42 11.773	- 93	+ 06 57 25.38	+ 27	5.72	KE
20.IX	1,3	23.4	11	09 42 41.505	+ 19	+ 07 05 59.32	+ 8	5.72	KW
1977								197	
17.III	1,5	12.6	17	01 19 42.121	+134	+ 16 16 28.15	- 35	7.21	KE
18.III	1,5	12.5	6	01 19 13.814	-129	+ 16 20 54.60	+ 14	7.21	KW
24.III	1,5	21.4	9	01 13 24.017	- 25	+ 16 20 54.74	- 13	7.22	KW
25.III	1,5	18.4	7	01 11 57.034	- 26	+ 16 13 21.17	- 8	7.31	KW
7.IV	1,5	15.3	7	00 45 52.736	+233	+ 12 55 53.61	- 36	7.32	KW
19.IV	1,5	14.1	17	00 27 04.922	+ 74	+ 08 22 56.89	+ 13	7.32	KW
21.IV	2,5	10.4	17	00 25 45.136	- 25	07 43 53.14	- 39	7.33	KW
22.IV	1,5	11.0	12	00 25 18.574	- 25	07 25 42.20	- 28	7.33	KW
25.VI	1,2,5	21.6	10	00 24 51.876	- 25	13 21 14.77	+ 2	7.47	KE
30.IX	1,3,5	12.6	8	10 45 46.796	- 25	09 05 53.11	- 3	7.75	KE
1.X	1,3	18.0	8	10 50 24.866	- 66	08 39 47.51	+ 2	7.75	KE
4.X	1,3,5	13.0	14	11 04 16.704	+117	07 19 59.81	+ 5	7.76	KE
5.X	3,5	16.8	19	11 08 52.828	-141	06 52 55.20	+ 17	7.76	KE
6.X	1,3,5	18.6	12	11 13 28.901	- 76	06 25 37.33	- 10	7.77	KE
7.X	1,3,5	19.5	11	11 18 04.628	- 8	05 58 08.60	+ 52	7.77	KW
17.X	1,3,5	13.9	15	12 03 48.375	-160	01 14 28.14	+ 4	7.80	KW
18.X	1,3,5	14.7	26	12 08 22.331	- 15	00 45 30.59	- 27	7.80	KW
19.X	1,3,5	16.7	12	12 12 56.228	+ 42	- 00 16 28.04	- 6	7.80	KW
20.X	1,3,5	15.4	12	12 17 29.902	-187	- 00 12 38.09	+ 28	7.80	KW
21.X	1,3,5	15.4	12	12 22 04.056	- 40	- 00 41 44.94	+ 32	7.81	KW
24.X	3,5	16.0	12	12 35 47.056	- 71	- 02 09 12.99	- 15	7.81	KW
11.XI	1,3,5	15.8	16	13 59 31.368	-107	- 10 40 11.27	0	7.87	KW
21.XI	1,3,5	6.5	13	14 47 55.841	- 25	- 14 55 00.94	+ 50	7.87	KW
1978								197	
05.I	1,3,5	+2.0	10	18 46 45.412	- 10	- 23 28 26.42	+ 17	8.07	KW
06.I	1,5	-2.0	10	18 52 14.577	- 9	- 23 28 26.27	- 31	8.07	KW
12.I	1,5	+5.4	10	19 24 59.093	- 38	- 22 43 55.92	- 14	8.07	KW
02.II	1,5	5.9	10	21 15 12.272	-129	- 17 17 23.56	+ 50	8.08	KW

Venus

Table 3

Date of observ.	ob-serv.	t^oC	n	α	$(O-C)_\alpha$	δ	$(O-C)_\delta$	E_p	clamp. posit.
03.III	1,3,5	15.6	10	23 33 45.640	- 9	- 04 20 32.13	- 1	8.17	KW
13.III	1,3	16.0	10	00 19 15.604	+ 28	00 45 57.32	+ 6	8.17	KW
23.III	1,3	7.8	20	00 08 58.765	- 4	05 51 48.61	- 24	8.24	KW
28.III	1,3,5	10.0	16	01 27 31.697	+ 78	08 20 41.28	+ 9	8.25	KW
29.III	1,3	5.6	16	01 32 07.662	+ 22	08 49 56.67	+ 38	8.25	KW
30.III	3,5,6	17.8	16	01 36 44.300	+ 37	09 18 59.51	- 10	8.25	KW
31.III	1,3,5	15.8	16	01 41 21.488	- 37	09 47 49.79	- 25	8.25	KW
03.IV	1,3,5	20.5	16	01 55 17.562	+ 68	11 12 56.22	- 10	8.25	KW
07.IV	1,3	21.0	18	02 14 03.051	- 16	13 02 40.27	+ 18	8.28	KW
05.V	1,3,5	21.0	18	04 32 45.629	+ 54	22 55 54.80	- 9	8.29	KW
20.VI	1,3,5	22.1	12	08 31 35.521	+ 61	20 53 06.95	- 54	8.47	KW
23.VI	1,3	22.7	11	08 46 05.021	- 68	19 58 28.76	0	8.48	KW
25.VI	1,3	24.1	11	08 55 37.054	- 58	19 19 29.53	- 38	8.48	KW
11.VII	1,3,5	22.4	12	10 08 12.454	+ 11	13 05 53.20	+ 20	8.53	KW
12.VII	1,3	25.2	14	10 12 32.175	+142	12 39 32.68	+ 32	8.53	KE
13.VII	1,3	24.4	11	10 16 50.070	- 20	12 12 54.72	- 21	8.54	KE
14.VII	1,3,5	24.1	11	10 21 06.606	-127	11 46 00.29	+ 15	8.54	KE
18.VII	1,3	26.0	11	10 37 59.548	+ 53	09 55 55.98	- 32	8.55	KE
21.VII	1,3,5	23.1	14	10 50 25.007	- 97	08 31 08.13	+ 37	8.56	KE
26.VII	1,3	22.2	13	11 10 43.159	+ 76	06 06 21.74	+ 1	8.58	KW
27.VII	1,3	23.7	13	11 14 43.116	- 95	19 37 00.10	+ 24	8.58	KW
31.VII	1,3	25.3	18	11 30 32.779	-178	03 38 28.24	- 5	8.62	KW
01.VIII	1,3	25.2	17	11 34 27.928	+128	03 08 37.39	+ 1	8.65	KW
02.VIII	1,3	25.8	11	11 38 21.643	- 9	02 38 44.12	+ 42	8.66	KW
03.VIII	1,3	25.6	11	11 42 14.499	- 1	02 08 47.56	- 2	8.68	KW
07.VIII	1,3	27.8	22	11 57 36.247	-119	00 08 41.24	- 36	8.78	KW
14.VIII	1,3	21.4	22	12 23 54.464	+ 99	- 03 02 58.34	- 64	8.78	KW
15.VIII	1,2,3	22.8	7	12 27 36.142	- 73	- 03 50 43.07	- 21	8.79	KW
22.VIII	1,3	20.8	7	12 53 04.141	- 31	- 07 15 56.89	- 19	8.80	KE
23.VIII	1,3	23.4	4	12 56 38.906	+ 35	- 07 44 43.26	- 9	8.80	KE
25.IX	1,3	21.8	6	14 41 32.435	+ 8	- 21 03 41.17	- 51	8.84	KE
26.IX	1,3	20.8	10	14 44 01.591	- 2	- 21 21 13.64	+ 2	8.84	KE
09.X	1,3	18.9	13	15 08 41.676	+101	- 24 15 19.93	+ 4	8.86	KW
10.X	1,3,5	18.6	13	15 09 50.876	+ 12	- 24 23 52.97	- 10	8.87	KW
15.X	1,3	15.0	13	15 13 35.294	- 59	- 24 53 40.92	+102	8.88	KW
18.X	1,3	16.8	13	15 14 04.283	- 38	- 24 59 58.02	- 36	8.88	KW
24.X	1,3,5	11.6	12	15 10 49.332	-145	- 24 42 08.79	- 15	8.89	KW
1979									
22.II	1,2	3.0	13	19 21 48.694	- 3	- 20 25 59.55	- 32	197 9.13	KW
23.II	1,2,3	-0.6	16	19 26 42.795	-121	- 20 20 14.45	- 40	9.15	KW
27.II	1,3	2.2	16	19 46 20.295	+ 25	- 19 51 39.68	- 11	9.16	KW
2.III	1,3	8.3	19	20 01 02.353	+ 25	- 19 24 22.51	- 57	9.17	KW
7.III	1,2,3	7.3	13	20 25 27.058	+ 30	- 18 15 12.01	+ 53	9.18	KW
9.III	1,3	5.3	13	20 35 10.310	+166	- 18 01 47.98	- 66	9.19	KW
15.III	1,3	14.4	15	21 04 07.094	+ 39	- 16 31 58.75	- 21	9.20	KW
20.III	1,3	15.3	12	21 27 57.946	+ 42	- 15 02 16.06	+ 34	9.21	KW
21.III	3,5	13.9	20	21 32 42.119	+ 19	- 14 43 11.54	- 7	9.22	KW
22.III	1,3	15.2	12	21 37 25.737	+122	- 14 23 41.40	- 77	9.23	KW

Venus

Table 3

Date of observ.	ob-serv.	t°C	n	α	(0-C)α	δ	(0-C)δ	E_p	clamp. posit.
25.III	1,2,3	10.0	6	21 51 31.988	+ 25	- 13 22 48.99	+ 22	9.23	KW
4.IV	1,3	13.5	12	22 37 48.187	+195	- 09 36 33.78	- 25	9.25	KW
12.IV	1,3	11.6	18	23 14 04.498	- 6	- 06 15 02.84	+ 14	9.28	KW
16.IV	1,3	17.0	10	23 32 01.883	+ 25	- 04 29 16.87	- 21	9.29	KW
19.IV	1,3	7.5	15	23 45 26.669	+ 25	- 03 08 21.94	+ 65	8.30	KW
20.IV	1,2,3	7.2	15	23 49 54.467	+ 25	- 02 41 08.33	+ 25	9.31	KW
23.IV	1,3	14.8	12	00 03 16.927	+ 52	- 01 18 50.27	+ 9	9.31	KW
24.IV	1,3,5	18.3	14	00 07 44.141	+ 26	- 00 51 15.49	+ 31	9.32	KW
3.V	1,3	18.4	14	00 47 50.356	- 4	+ 03 18 28.36	- 28	9.34	KW
15.V	1,3	16.4	10	01 41 53.857	+ 88	08 45 08.40	+ 5	9.36	KW
17.V	1,3	18.4	12	01 51 02.048	- 61	09 37 40.66	- 5	9.37	KW
18.V	3,5	18.0	10	01 55 37.379	+ 25	10 03 39.21	+ 77	9.37	KW
20.V	1,3	22.9	12	02 04 50.212	- 3	10 54 59.16	- 63	9.38	KW
21.V	1,3	26.5	14	02 09 27.900	+ 52	11 20 19.92	+ 92	9.39	KW
23.V	1,3	24.1	12	02 18 45.865	+190	12 10 13.40	+ 67	9.39.	KW
24.V	1,3	23.4	12	02 23 25.904	- 15	12 34 46.45	+ 7	9.40	KW
25.V	1,3	24.3	12	02 28 07.094	+ 13	12 59 04.47	+ 83	9.40	KW
26.V	1,3	24.6	10	02 32 49.185	+ 5	13 23 02.38	0	9.40	KW
27.V	1,3	25.6	10	02 37 32.189	- 47	13 46 43.82	- 2	9.40	KW
29.V	1,3,5	18.6	12	02 47 01.292	+ 25	14 33 08.32	+ 16	9.42	KW
30.V	1,3	21.7	12	02 51 47.347	+ 21	14 55 50.55	- 47	9.43	KW
31.V	1,3	23.2	12	02 56 34.334	- 53	15 18 12.45	+ 20	9.43	KW
1.VI	1,3	25.0	12	03 01 22.504	+ 15	15 40 11.25	+ 24	9.43	KW
4.VI	1,3	26.0	12	03 15 53.115	- 65	16 43 51.48	+ 16	9.44	KW
5.VI	1,3	24.7	12	03 20 45.608	+ 30	17 04 16.13	- 23	9.45	KW
6.VI	1,3	25.0	12	03 25 39.076	+ 25	17 24 16.75	+ 45	9.45	KW
7.VI	1,3	24.4	12	03 30 33.737	+ 55	17 43 50.67	+ 24	9.46	KW
8.VI	1,3	24.5	12	03 35 29.438	+ 36	18 02 58.55	+ 19	9.46	KW
11.VI	1,3	24.9	12	03 50 23.202	- 70	18 57 35.14	+ 86	9.47	KW

OBSERVATIONS À LA LUNETTE ZENITHALE (DE 110 mm) DU SERVICE DE LATITUDE DE L'OBSERVATOIRE DE BELGRADE EN 1980

R. Grujić et M. Djokić

(Reçu le 31 mai, 1981)

RÉSUMÉ: On présente les valeurs de latitude ansi que quelques données météorologiques prises au cours d'observations.

Tableau I
Les valuers de latitude ansi que quelques données météorologiques au cours d'observation

DATE		τ	Obs.	T_z	T_i	T_v	B_o	GR	φ_a	φ_b	φ_d
1980									44°	48'+	
I	31	1980.084	RG	8°.2C	5°.3C	9°.6C	735.8	II	–	10".236	10".236
II	7	.103	RG	7.1	6.4	6.4	737.6	II	10".406	10.400	10.403
	16	.128	RG	-0.1	0.6	0.1	741.8	II	10.337	10.398	10.368
	20	.138	MD	-2.1	-0.3	-1.3	750.3	II	10.372	10.349	10.360
III	2	.169	RG	4.8	3.1	3.5	737.4	II	–	10.366	
		.169	RG	5.1	2.7	3.7	734.9	III	10.021	–	10.194
	5	.177	MD	0.1	0.8	0.1	746.1	II	–	10.226	10.226
	13	.199	RG	3.9	4.8	4.3	740.4	II	–	10.317	
		.199	RG	2.0	2.6	2.0	740.5	III	10.259	–	10.288
	18	.213	RG	3.4	3.9	3.2	737.3	III	10.227	10.145	10.186
	27	.237	RG	9.6	9.2	8.6	736.3	III	10.274	10.238	10.256
IV	13	.284	RG	7.5	8.0	7.3	746.7	III	–	10.208	10.208
	14	.286	MD	11.3	10.1	9.5	745.7	III	10.311	–	10.311
	17	.295	RG	15.6	14.4	13.6	738.2	III	10.321	10.286	10.304
V	21	.388	MD	11.3	12.1	11.6	736.6	IV	10.111	10.163	10.137
	25	.399	RG	9.6	10.5	10.0	739.0	IV	10.146	10.308	10.227
VI	10	.443	RG	21.0	20.1	19.8	735.1	IV	–	10.121	10.121
	29	.495	RG	16.4	18.6	17.2	733.2	V	10.332	–	10.332
VII	8	.521	RG	22.4	22.4	21.6	735.7	V	10.245	10.180	10.212
	14	.536	RG	18.7	20.3	19.2	739.2	V	10.077	10.178	10.128
	16	.541	RG	23.8	23.8	23.1	737.0	V	10.112	10.233	10.172
	28	.574	RG	19.4	21.8	20.8	737.4	V	10.291	10.334	10.312
VIII	3	.590	RG	22.8	23.2	22.5	742.5	V	–	10.188	10.188
	11	.612	MD	18.4	20.9	19.6	738.6	V	10.087	10.153	10.120
	26	.653	RG	14.9	16.5	15.5	743.5	V	–	10.227	
		.654	RG	14.2	14.9	14.6	743.3	VI	10.338	–	10.282
IX	4	.678	RG	13.9	14.5	14.0	744.5	VI	10.349	–	10.349
	9	.692	RG	17.8	19.3	18.4	741.6	V	–	10.227	
		.692	RG	16.2	17.5	16.5	741.4	VI	10.313	–	10.270
	21	.725	MD	17.3	16.9	16.2	741.3	VI	10.262	10.290	10.276
X	28	.826	RG	10.0	9.6	9.2	745.9	VI	10.344	10.400	10.372
	29	.829	MD	12.7	11.3	11.5	736.8	I	10.155	10.220	10.188
XI	17	.880	RG	11.8	8.8	9.3	744.9	VI	10.358	10.332	
		.881	RG	11.8	8.2	9.1	745.0	I	10.324	–	10.338
	20	.888	RG	3.2	4.4	3.5	748.9	VI	–	10.539	
		.889	RG	2.4	3.1	2.4	749.6	I	10.538	–	10.538
XII	23	.980	RG	0.4	1.3	0.8	744.2	II	10.428	10.299	10.364
	30	.998	RG	-1.4	-0,6	-1.0	748.0	I	–	10.182	10.182

Les valeurs observées de φ (Tableau I) sont reduites à la manière déjâ signalée (Ševarlić, B., Teleki, G.) mais sans tenir compte des erreurs progréessives et periodiques et de coefficient de température (Milovanović, V. et les autres). Les réductions ont été faites dans le systéme FK4 et on a appliqué les corrections des déclinaisons présentées dans le Tableau 2 (Grujić, R. et les autres).

La valeurs du tour de la vis micrométrique adoptée était: R = 40"0481.

LA LÉGENDE:

Date :Année, mois et date d'observation.

τ :Partie d'année tropique.

Obs. :Observateurs R. Grujić (RG), M. Đokić (MD).

Tz :Température à l'abri météorologique éleoigné 50 m de l'instrument.

Ti :Température de l'instrument.

Tv :Température de l'air dans la salle d'observatio (valeur moy. des lectures des thermométres su et nord).

Bo :Lecture du barométre en mm Hg (tenant com pte de la température de baromètre).

GR. :Numéro de la groupe.

$\varphi a \varphi b$: La latitude de la sous-groupe a, resp. b

φd : La valur moy. de la latitude de la nuit.

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TABLE DES MATIERES