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The following orbit was computed from observations Nos. 1, 5 and 6.

Equinox	1930·0.		
Epoch	1930. May, 24·0.		
Mo	83°·80646.		
ω	143°·45785.		
☊	353°·27715.		
i	4°·42220.	m	13·2.
φ	6°·46158.	g	7·9.
μ	0°·126366.		
a	3·932914.		

P_x	−0·721214	Q_x	−0·692642
P_y	+0·615841	Q_y	−0·634621
P_z	+0·317158	Q_z	−0·342786

The comparison between an ephemeris deduced from this orbit and the observations gave the following values of O–C :—

	s.	″
1	−0·02	0·0
2	+0·20	+2·1
3	+0·04	−2·0
4	−0·05	0·0
5	0·00	+0·2
6	0·00	+0·1

C. Jackson.

CATALOGUE OF VISUAL BINARY STAR ORBITS.

In 1926 Dr. W. H. van den Bos published a table of orbits of visual binary stars* in which were supplied the Thiele–Innes constants A, B, F, G which greatly simplify orbit and ephemeris computation. The publication since then of many new or improved orbits has made a revised catalogue desirable.

The main features of the original catalogue have been preserved, but the constants C, H, pL, pN have been added. Dynamical parallaxes are also given, together with the first and last ephemeris dates.

Orbit computers are, unfortunately, not unanimous in the conventions they adopt for some of the orbit elements. To prevent confusion the conventions used in this catalogue are defined below. Further particulars and full explanation of the use of the Thiele–Innes constants will be found in earlier numbers of these Circulars.† It should be noted that the formulae there given are valid only for the following system of elements :—

P................ Period in years, unless some other unit is indicated.

n=360°/P......... Mean motion ; *always positive.*

T................ Epoch of periastron passage.

e................ Eccentricity.

a................ Semi-axis major, in seconds of arc.

i................ Inclination of plane of true orbit to tangent plane. In the absence of special information from radial velocities, the ± sign is affixed. For *direct motion* i ranges from ±0° to ±90° (i.e. cos i positive), for *retrograde motion* from ±90° to ±180° (i.e. cos i negative). It will be noticed that in the event of the motion changing from direct to retrograde, or vice versa, as a consequence of proper motion, the inclination in this system passes smoothly through the value ±90° from one quadrant into the next. Furthermore, the ± sign in the formula

$$\tan(\theta - ☊) = \pm \tan(v+\omega)\cos i$$

becomes redundant, the correct sign being supplied by the term cos i.

☊................ Node :—Position angle of line of intersection of true and apparent orbit planes. It ranges from 0° to 180°, no distinction being made between ascending and descending node. In this catalogue ☊ refers to Equinox of 1900.

ω................ Angle in plane of true orbit, *counted in direction of motion*, from node to periastron. It thus ranges from 0° to 360°. Some computers count ω in the direction of increasing position angle, generally without warning that such is the case ; this leads to confusion when the motion is retrograde, besides making it necessary to modify the formulae connecting Campbell elements with Thiele–Innes constants.

A, B, C.......... The x, y, z co-ordinates of periastron, referred to the centre of the relative orbit as origin. C has sign ± when positive C corresponds to positive i, ∓ when the reverse is the case.

F, G, H.......... The x, y, z co-ordinates of that point, on the circle in the true orbit plane having the major axis as diameter, which is 90° from periastron *in the direction of motion.* These co-ordinates are also referred to the centre as origin. The double sign of H is to be interpreted as with C.

L, N............. Coefficients for calculation of relative radial velocity. The tabulated quantities pL, pN (p=absolute parallax) thus permit the calculation of relative radial velocity as a function of the parallax.

In the event of the orbit plane being uniquely determined as a consequence of radial velocity observations, two courses are available. The node ☊ may now be defined as the ascending node, where the receding radial velocity of the companion is a maximum, remembering that a change of 180° to ☊ implies a similar change to ω. The inclination is then always positive. This seems to be the more desirable procedure since it reconciles the points of view of radial velocity and double star observers. For the purpose of an orbit catalogue it is not so convenient, as the demand of uniformity would then require that i should be positive for all cases, ambiguity being shown by quoting both possible values of ☊ and ω. For this reason ☊ has been restricted to the interval 0°−180° and i is given as :—

± when there is no evidence to indicate ascending node,

\+ when ascending node is given,

− when descending node is given.

* *B.A.N.* 3, 149 ; 1926.

† *U.O.C.* 68 and 71, 1926 ; 82, 1930 ; 86, 1932.

Either system may be used at will, as no modification of formulae is required.

The formulae for ephemeris calculation are given below; for other formulae reference should be made to the sources cited earlier.

$$x=\rho\cos\theta=AX+FY.$$
$$y=\rho\sin\theta=BX+GY.$$
$$\text{Rel. rad. velocity}=L\frac{\delta X}{\delta M}+N\frac{\delta Y}{\delta M}.$$

Values of X, Y, $\frac{\delta X}{\delta M}$, $\frac{\delta Y}{\delta M}$ are taken from Tables of X and Y.*

In the table which follows, the first column gives the ADS or CPD number and the position for 1900. The magnitudes are Harvard photometric, two decimal places being retained for the primary when the Harvard combined magnitude is so given. The spectral types, unless bracketed, are from the same source. The numbers in the second last column are the dynamical parallax and the first and last ephemeris dates. The dynamical parallaxes are taken from the list by H. N. Russell and C. E. Moore † or computed with the aid of the former's tables; they have been omitted when one or both components are known spectroscopic binaries or do not conform to the mass-luminosity law. The date of the last measure used follows the name of the computer.

W. S. Finsen.

No. / α	Star / δ	Mags. / Spec.	P / T	e / n	a / i	ω / Ω	A / B	F / G	C / pL	H / pN	p dyn. / Eph.	Authority.
61	Σ 3062	6·46, 7·5	105·55 y	0·4664	1·44″	98·68°	− 0·773	− 1·039	± 1·025	∓ 0·157	0·053	Doberck 1905.
h m 0 01·0	° ′ +57 53	G5	1941·62	3·4107°	± 46·08°	37·42°	+ 0·652	− 0·985	±16·6	∓ 2·5	06−25	*A.N.* 173, 257; 1906.
102	Σ 2	6·84, 7·1	275	0·57	0·715	329·6	− 0·628	− 0·304	∓ 0·340	± 0·580	0·011	van Arnam 1930.
0 03·8	+79 10	A3	1889·8	1·309	± 109·8	166·8	+ 0·022	+ 0·286	∓ 2·11	± 3·60	33−51	*A.J.* 43, 59; 1933.
221	OΣ 4	8·16, 8·9	108	0·543	0·41	347·5	+ 0·400	+ 0·089	0·000	0·000	0·013	Luyten.
0 11·5	+35 56	G0	1908·0	3·33	180	—	+ 0·089	− 0·400	0·0	0·0	30−50	*A.S.P.* 45, 183; 1933.
450	A 111 AB	9·7, 9·7	10·5	0·405	0·18	30·45	− 0·032	+ 0·153	± 0·056	± 0·095	0·035	Aitken 1922.
0 27·0	− 5 44	G5	1930·25	34·3	± 142·15	125·5	+ 0·168	− 0·003	± 9·1	±15·5	23−27	*A.S.P.* 35, 259; 1923.
−63° 50	I 260	4·68, 6·7	41·3	0·668	0·477	4·6	− 0·162	+ 0·321	± 0·027	± 0·332	0·025:	van den Bos 1926.
0 27·0	−63 31	A2	1923·57	8·72	± 135·8	113·6	+ 0·438	+ 0·099	± 1·1	±13·7	27−40	*B.A.N.* 3, 260; 1927.
490	Ho 212 AB	5·66, 6·5	6·91	0·73	0·244	73	+ 0·007	− 0·231	+ 0·184	+ 0·056	—	Luyten 1930.
0 30·1	− 4 09	G0	1932·85	52·10	+ 52	24	+ 0·160	− 0·055	+45·4	+13·9	—	*Ap. J.* 78, 225; 1933.
520	β 395	6·37, 6·6	25·0	0·171	0·66	152·7	+ 0·160	+ 0·248	± 0·294	∓ 0·569	0·061	Aitken 1911.
0 32·2	−25 19	K0	1924·50	14·40	± 76·0	112·8	− 0·569	− 0·224	±20·0	∓38·8	13−22	*Lick P.* 12, 7; 1914.
588	OΣ 18	7·77, 9·8	182·75	0·50	0·96	202·9	+ 0·155	+ 0·880	∓ 0·139	∓ 0·330	0·025:	Hussey 1899.
0 37·2	+ 3 37	F8	1949·50	1·9699	± 21·9	78·0	− 0·937	+ 0·195	∓ 1·30	∓ 3·08	00−50	*Lick P.* 5, 37; 1901.
671	η Cas	3·64, 7·9	478·7	0·495	11·92	82·8	− 9·677	+ 1·357	− 6·934	− 0·876	0·173	Volet.
0 43·0	+57 17	F8	1888·7	0·7520	− 35·9	102·4	− 0·598	−11·810	−24·7	− 3·1	30−70	*J.d.O.* 16, 107; 1933.
684	β 232	8·68, 8·9	91·2	0·326	0·387	317·7	− 0·040	− 0·320	∓ 0·185	± 0·203	0·015	Kuiper 1929.‡
0 44·8	+50 05	F5	1914·9	3·947	± 45·6	129·2	+ 0·337	+ 0·075	∓ 3·46	± 3·79	30−44	*B.A.N.* 5, 231; 1930.
746	OΣ 20	6·10, 7·2	139·10	0·6340	0·773	262·62	− 0·177	− 0·213	∓ 0·738	∓ 0·096	0·020	Zagar 1926.
0 49·3	+18 39	A0	1939·30	2·5881	± 105·67	104·08	− 0·147	+ 0·737	∓ 9·05	∓ 1·17	28−50	*Padova Pub.* No. 7; 1929.
755	Σ 73	6·09, 6·7	119·0	0·73	1·00	73·5	− 0·722	+ 0·129	± 0·690	± 0·204	0·029	Berman 1926.§
0 49·6	+23 05	K0	1936·3	3·025	± 46·0	109·2	+ 0·049	− 0·970	± 9·88	± 2·93	25−37	*A.J.* 37, 116; 1926.
−30° 181	δ 31 AB	7·85, 8·0	4·56	0·30	0·173	319·4	− 0·040	− 0·166	∓ 0·028	± 0·033	0·056	Dawson 1930.
1 30·4	−30 26	G5	1932·53	78·95	± 14·6	143·4	+ 0·166	− 0·035	∓10·6	±12·4	—	*A.J.* 43, 15; 1933.
−56° 329	p Eri	6·00, 6·03	218·9	0·721	8·025	301·40	+ 4·126	+ 6·882	∓ 6·245	± 3·812	0·21:	Dawson 1919.
1 36·0	−56 42	G5, G5	1806·14	1·6446	± 114·26	1·11	+ 2·895	− 1·585	∓48·7	±29·7	20−40	*A.J.* 32, 144; 1920.
1538	Σ 186	6·93, 6·9	158·4	0·69	1·00	216·7	− 0·469	+ 0·634	∓ 0·561	∓ 0·752	—	Volet.
1 50·7	+ 1 21	G0	1891·7	2·2727	± 69·7	41·0	− 0·682	+ 0·182	∓ 6·03	∓ 8·10	30−70	*J.d.O.* 16, 107; 1933.
1598	β 513	4·72 7·1	63·3	0·385	0·66	341·6	+ 0·172	− 0·536	− 0·109	+ 0·327	0·028	Bennot 1925.
1 53·7	+70 25	A3	1904·8	5·687	+ 31·5	90·5	+ 0·628	+ 0·204	− 2·93	+ 8·82	—	*P.A.* 33, 307; 1925.

* *U.O.C.* 71, Appendix; 1926.
† *A.J.* 39, 165; 1929.
‡ The original values of a, ω, i were slightly in error. The values given above are quoted from a letter from Kuiper.
§ Corrected values of P and n were supplied by Berman.

G.P.-S.8363—1938—350.

UNION OF SOUTH AFRICA.

CIRCULAR No. 100, 1938, AUGUST 18,

OF THE

UNION OBSERVATORY.

Long., $1^h\ 52^m\ 18^s{\cdot}0$ E. Lat. 26° 10′ 55″·3 S. Altitude, 1,806 metres.

CONTENTS.

SECOND CATALOGUE OF ORBITS OF VISUAL BINARY STARS.

Since the appearance of the former orbit catalogue in 1934 * so many new and revised orbits have been published that it is already quite out of date, and a new edition is desirable.

In the present catalogue an attempt has been made to classify the orbits according to reliability :—

Class I.	Definitive Orbits.	Complete revolution, or more, well observed.
Class II.	Reliable Orbits.	Elements liable to corrections of a minor nature.
Class III.	Preliminary Orbits.	Elements likely to be a fair approximation.
Class IV.	Parabolic Orbits.	Observed arc satisfactorily represented by a parabola.
Class V.	Indeterminate Orbits.	Orbits computed from inadequate data, including ambiguous cases arising from uncertainty of quadrant.

It should be noted that pairs in Class IV (Parabolic Orbits) may also appear in Class V (Indeterminate Orbits); in such cases the parabolic elements should be preferred.

The notation and conventions used in this catalogue are defined below. Further particulars and full explanation of the use of the Thiele-Innes constants will be found in earlier numbers of these Circulars.† The formulae there given are valid only for the following system of elements :—

P — Period in years, unless some other unit is indicated.

$n=360°/P$ — Mean motion ; *always positive.*

T — Epoch of periastron passage.

e — Eccentricity.

a — Semi-axis major, in seconds of arc.

i — Inclination of plane of true orbit to tangent plane. For *direct motion* i ranges from 0° to 90°, for *retrograde motion*, from 90° to 180°. It will be noticed that in the event of the motion changing from direct to retrograde, or vice versa, as a consequence of proper motion, the inclination in this system passes smoothly through the value 90° from one quadrant to the next. Furthermore, the $\pm$ sign in the formula

$$\tan(\theta-\Omega)=\pm\tan(v+\omega)\cos i$$

becomes redundant, the correct sign being supplied by the term $\cos i$.

Ω — Position angle for Equinox 1900 of the ascending node (where the radial velocity of *the companion relative to the primary* attains its maximum positive value) in the cases where this discrimination is possible. Otherwise the node between 0° and 180° is chosen.

ω — Longitude of periastron : angle in plane of true orbit, *counted always in the direction of motion*, from the ascending node to periastron. This is in agreement with the usual convention for spectroscopic binary orbits. When the ascending node is unknown, ω is measured from the node as given (i.e. $\Omega<180°$) ; should this eventually prove to be the descending node, both Ω and ω should be increased by 180°.

A, B, C — The x, y, z co-ordinates of periastron, referred to the centre of the relative orbit as origin.

F, G, H — The x, y, z co-ordinates of that point, on the circle in the true orbit plane having the major axis as diameter, which is 90° from periastron *in the direction of motion.* These co-ordinates are also referred to the centre as origin.

L, N — Coefficients for the calculation of relative radial velocity. The tabulated quantities pL, pN (p=absolute parallax) thus permit the calculation of the relative radial velocity as a function of the parallax.

The Thiele-Innes constants A, B, F, G are equivalent to the classical elements a, i, ω, Ω. When, owing to lack of radial velocity information, it is not possible to discriminate between the ascending and descending nodes, this is indicated by attaching double signs to C, H, pL, pN. The upper signs are correct if the node as given (i.e. $\Omega<180°$) is in reality the ascending node ; if this is the descending node the lower signs apply.

* *U.O.C.* 91 ; 1934.

† *U.O.C.* 68 and 71, 1926 ; 82, 1930 ; 86, 1932 ; 95, 1936. The summary given in *Trans. I.A.U.* 5, 332, 1935, contains an error :

page 334, line 2, for $\frac{+B-F}{+A-G}$ read $\frac{+B-F}{+A+G}$.

For a circular orbit e and ω are zero and T indicates the time when the position angle equals ☊. An orbit perpendicular to the line of sight, motion direct, is to be indicated by $i=0°$, ☊$=0°$, so that ω is the position angle of periastron; if the motion is retrograde, by $i=180°$, ☊$=0°$, so that $360°-\omega$ is the position angle of periastron.

In the case of parabolic orbits * the elements are modified as follows:—

σ	Areal constant in the true orbit, expressed in square seconds of arc per year.
q	Periastron distance in the true orbit, expressed in seconds of arc.
$n=\sigma/q^2$	"Mean motion".
A, B, C	The x, y, z co-ordinates of periastron, referred in this case to the primary as origin.
F, G, H	The x, y, z co-ordinates of that point, on the circle in the true orbit plane with centre at the primary and radius q, which is 90° from periastron *in the direction of motion*. These co-ordinates are also referred to the primary as origin.

The remaining elements are unchanged.

The formulae for ephemeris calculation are given below; for other formulae reference should be made to the sources cited earlier.

$$M=n(t-T)$$

$$x=\varrho \cos \theta=AX+FY$$

$$y=\varrho \sin \theta=BX+GY$$

Radial velocity (companion−primary) $=L\frac{dX}{dM}+N\frac{dY}{dM}$

Values of X, Y, $\frac{dX}{dM}$, $\frac{dY}{dM}$ are taken, for elliptic orbits, from tables of *Elliptic Rectangular Co-ordinates* † with arguments M and e; for parabolic orbits, from tables of *Parabolic Rectangular Co-ordinates* ‡ with argument M.

In the catalogue which follows the elements have been modified when necessary so as to conform with the foregoing notation. The first column gives the ADS or CPD number and the position for 1900. The magnitudes are Harvard photometric, two decimal places being retained for the primary when the Harvard combined magnitude is so given. The spectral types, unless bracketed, are from the same source. The numbers in the second last column are the dynamical parallax and the first and last ephemeris dates, the century being omitted. The dynamical parallaxes are taken from the list by H. N. Russell and C. E. Moore § or computed with the aid of the former's tables; they have been omitted when one or both components are known spectroscopic binaries or white dwarfs. The date of the last measure used follows the name of the computer.

The present catalogue contains 196 systems, compared with 144 in the former. Of the previously catalogued orbits, 64 have been revised.

W. S. Finsen.

* *U.O.C.* 95; 1936.
† *U.O.C.* 71, Appendix; 1926.
‡ *U.O.C.* 95; 1936.
§ *A.J.* 39, 165; 1929.

CLASS I. DEFINITIVE ORBITS.

No. α	Star δ	Mags. Spec.	P T	e n	a i	ω Ω	A B	F G	C pL	H pN	p_{dyn} Eph.	Authority.
61 h m 0 01·0	Σ 3062 ° ′ +57 53	6·46, 7·5 G5	y 107·25 1943·82	0·445 3·3566	″ 1·444 ° 44·06	° 97·97 ° 41·43	″ − 0·830 + 0·638	″ − 0·977 − 1·054	″ ± 0·994 ± 15·8	″ ∓ 0·139 ∓ 2·2	″ 0·052 36—50	Volet 1935 *J.d.O.* 20, 59; 1937.
490 0 30·1	Ho 212 AB − 4 09	5·66, 6·5 Go	6·91 1939·76	0·73 52·10	0·244 52	73 24	+ 0·007 + 0·160	− 0·231 − 0·055	+ 0·184 + 45·4	+ 0·056 + 13·9	— —	Luyten 1930 *Ap. J.* 78, 225; 1933.
520 0 32·2	β 395 −25 19	6·37, 6·6 Ko	25·00 1949·00	0·22 14·40	0·670 78·0	142·0 112·0	+ 0·118 − 0·521	+ 0·256 − 0·341	± 0·404 ± 27·5	∓ 0·517 ∓ 35·2	0·063 1 rev.	Van den Bos 1936 *U.O.C.* 98; 1937.
−30° 181 1 30·4	δ 31 AB −30 26	7·85, 8·0 G5	4·60 1937·39	0·27 78·2	0·175 24	352 125	− 0·081 + 0·155	− 0·144 − 0·071	∓ 0·010 ∓ 3·7	± 0·070 ± 26·1	0·056 —	Colacevich 1932 *Rend. Accad. Lincei* 18, 386; 1933.
1630 1 57·8	γ And BC +41 51	5·39 6·6 Ao	56·0 1946·5	0 92 6·43	0·32 109·2	154·1 100·6	+ 0·099 − 0·277	− 0·068 − 0·156	± 0·133 ± 4·05	∓ 0·274 ∓ 8·35	0·013 38—47	Woolley and Symms 1937 *M.N.* 97, 438; 1937.
3475 4 45·7	β 883 +10 54	7·71, 7·7 F5	16·34 1939·71	0·445 22·03	0·1895 11·6	71·2 153·9	− 0·133 − 0·131	+ 0·135 − 0·134	± 0·036 ± 3·76	± 0·012 ± 1·25	0·022 1 rev.*	Kuiper 1935 *Ap. J.* 86, 166; 1937.
3841 5 09·3	Capella +45 54	0·74, 1·2 Go	d 104·022 JD2422596·79	0·0086 3·46081	0·05360 138·92	294·30 218·70	+ 0·0058 − 0·0425	− 0·0485 − 0·0176	− 0·0321 −192·2	+ 0·0145 + 86·8	0·058 —	Merrill 1921 *Ap. J.* 56, 44; 1922.
5423 6 40·8	Sirius −16 35	−1·58, 8·4 Ao, F	49·94 1943·96	0·588 7·209	7·62 135·51	145·87 43·77	− 2·482 − 6·527	− 6·145 + 0·234	+ 3·050 +104·2	− 4·500 −153·7	— 31—50	Volet 1929 *Bull. Ast.* 7, 30; 1931.
6251 7 34·1	Procyon + 5 29	0·48, 10·8 F5	40·23 1926·73	0·310 8·9485	4·26 30·6	65·7 127·8	− 3·716 − 0·663	+ 1·187 − 3·993	+ 1·976 + 83·8	+ 0·892 + 37·8	— 28—49	Spencer Jones 1924 *M.N.* 88, 438; 1928.
6420 7 47·1	β 101 −13 38	5·83, 6·4 Go	23·18 1938·89	0·69 15·53	0·58 77·8	67·7 103·3	− 0·160 + 0·186	+ 0·077 − 0·528	+ 0·520 + 38·3	+ 0·214 + 15·7	0·056 35—44	Woolley and Symms 1934 *M.N.* 97, 438; 1937.
6554 7 58·8	β 581 +12 35	8·7, 8·7 G5	44·0 1953·75	0·39 8·18182	0·38 47·7	292·3 116·1	+ 0·149 + 0·234	− 0·242 + 0·273	∓ 0·260 ∓ 10·1	± 0·107 ± 4·1	0·025 26—33	Aitken 1924 *Lick B.* 12, 47; 1925.
6650 8 06·5	ζ Cnc AB * +17 57	5·56, 6·02 Go	59·60 1930·62	0·314 6·0403	0·949 150·60	189·08 10·33	− 0·945 − 0·040	+ 0·001 + 0·830	∓ 0·074 ∓ 2·1	∓ 0·460 ∓ 13·2	0·046 —	Makemson 1926 *A. J.* 42, 153; 1933.
6993 8 41·5	ε Hya AB * + 6 47	3·72, 5·2 F8	15·15 1931·65	0·73 23·77	0·29 62·8	263·5 117·3	+ 0·130 + 0·031	− 0·117 + 0·259	− 0·256 − 28·8	− 0·029 − 3·3	0·028 1 rev.	Slonim 1933 *Tashkent B.* 5; 1935.
7284 9 12·0	Σ 3121 +29 00	7·88, 8·2 Ko	34·20 1946·70	0·35 10·526	0·660 77·0	130·0 25·0	− 0·432 − 0·076	− 0·418 − 0·300	± 0·492 ± 24·6	∓ 0·413 ∓ 20·6	0·055 1 rev.*	Van den Bos 1937 *U.O.C.* 99; 1938.
−39° 3651 9 26·8	ψ Arg −40 02	4·03, 4·9 F5	34·90 1936·79	0·37 10·316	0·914 56·2	39·2 296·8	+ 0·606 − 0·487	+ 0·091 + 0·693	+ 0·480 + 23·5	+ 0·589 + 38·5	0·059 25—32	Dawson 1924 *A.J.* 36, 23; 1924.
8119 11 12·8	ξ UMa A+a, B+b +32 06	4·41, 4·87 Go	59·863 1935·027	0·4128 6·0137	2·5355 122·801	127·176 101·400	+ 1·376 − 1·286	− 0·414 − 2·144	+ 1·698 + 48·4	− 1·288 − 36·7	— 1 rev.	Van den Bos 1926 *Danske Vidensk. Selsk; Naturvidensk. Afd.* 8, XII, 2; 1928.
	A+a, A	4·41 Go	1·8321 1939·065	0·531 196·49	0·0514 95·5	320·0 309·4	+ 0·0274 − 0·0284	+ 0·0181 − 0·0279	− 0·0329 − 30·6	+ 0·0392 + 36·5		

β 883: Ephemeris in angle only. ζ Cnc: See also Class II and Class V. ε Hya: See also Class V.