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COMMUNICATION FROM THE OBSERVATORY AT LEIDEN.

The orbit of Bu. G. C. 11125 = β 1212 = 24 Aquarii, by *G. P. Kuiper*.

R. A. 1925 : $21^h\ 35^m\ 39^s$ magn. 7·33 — 7·83
Decl. 1925 : — 0° 24′ spec. F 8.
p. m. ″/a·236 in 86°·4.

The duplicity of 24 Aquarii was discovered by BURNHAM with the 36-inch in 1890. The system has since shown rapid orbital motion. In 1922·8 AITKEN found the pair too close for accurate observation, while a recent interferometer measure by MAGGINI, 1923·9, evidently shows the companion after periastron passage, a total arc of over 250° having been discribed since discovery. The angles and distances were plotted against the time and the interpolation curves tested for the law of areas. For the computation of a provisional orbit according to the method of T. N. THIELE (*Undersögelse af Omlöbsbevaegelsen i Dobbelstjernesystemet Gämma Virginis*, 1866), I first adopted the following 3 normal places

1894·00	261°·5	″·52	read from the curves
1921·66	321 ·1	·22	AITKEN
1923·88	153 ·5	·152	MAGGINI

The resulting orbit with a period of 87.2 years did not prove satisfactory. A better agreement with the observations was obtained, when AITKEN'S distance from 1921·66 was slightly diminished, viz: from ″·22 to ″·19.

This done the elements of the apparent orbit were in THIELE'S notation found to be:

μ : 0·0885 , T : 1922·94 , e : 0·893 , a : 0″·267 ,
A : 71°·81 , b : 0″·316 , B : 149°·51.

Precession has been neglected.

The true elements are in CAMPBELL'S notation:

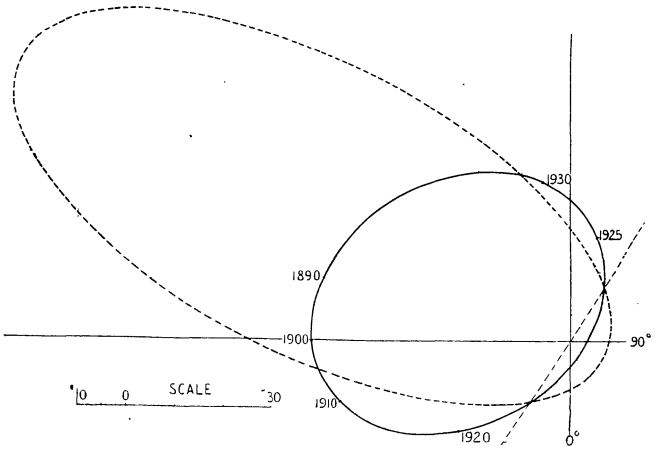
P : 71·00 years , T : 1922·94 , e : 0·893 , a : 0″·659 ,
i : ± 66°·78 , ω : 275°·87 , Ω : 147°·19; angles increasing.

The accompanying diagram shows the shape of the apparent orbit (full line) and of the true ellipse (broken line). It will be noted that, in spite of the great excentricity, we find in the apparent orbit $b > a$.

The shortest distance in the apparent orbit is 0″·03.

				°	″		″	″
1890·75	β	36	3n	254·5	0″·45	— 2·3	— ″·020	— ″·06
1891·75	β	36	4n	261·0	·55	+ 3·8	+ ·034	+ ·03
1892·40	Sp	18	2n	256·2	·38	— 3·0	— ·027	— ·14
1893·68	Wils		3n	260·5	·55	— 0·5	— ·005	+ ·03
1893·88	Barn	36	1n	262·8	·59	+ 1·5	+ ·013	+ ·07
1894·82	Barn	36	7n	264·7	·52	+ 1·7	+ ·015	± ·00
1894·86	Sp	18	3n	261·5	·45	— 1·6	— ·014	— ·07
1897·81	A	36	3n	263·5	·65	— 3·5	— ·031	+ ·13
1897·89	Brown	26	1n	267·4	·73	+ 0·3	+ ·003	+ ·21
1898·78	A	36,12	3n	269·0	·49	+ 0·6	+ ·006	— ·03
1898·84	β	36	1n	269·0	·54	+ 0·5	+ ·005	+ ·02
1900·67	Solà	6	1n	205·1	·50 ±	— 66·0	— ·475	— ·02 ±
1900·75	Do	14	2n	272·2	·55	+ 1·0	+ ·009	+ ·03
1901·54	G. O.	28	10n	269·4	·49	— 2·9	— ·027	— ·03
1901·73	Bry	28	9n	270·2	·48	— 2·4	— ·022	— ·04
1901·79	A	36	2n	274·0	·55	+ 1·3	+ ·012	+ ·03
1902·00	Doo	18	11n	273·0	·57	± 0·0	± ·000	+ ·05
1903·86	Bies	15	2n	273·8	·54	— 1·9	— ·017	+ ·03
1904·67	A	36	1n	278·6	·49	+ 1·6	+ ·015	— ·02
1910.72	G. O.	28	5n	278·2	·43	— 8·4	— ·069	— ·04
1914·00	G. O.	28	8n	292·5	·47	—. 0·2	— ·002	+ ·03
1914·63	A	36	2n	291·3	·47	— 2·8	— ·021	+ ·04
1916·52	Lv. Ol.	26	6n	294·8	·50	— 3·6	— ·025	+ ·11
1921·66	A	36	3n	321·1	·22	± 0·0	± ·000	+ ·03
1922·81	A	36	1n	40 ?	< ·10	+ 25·7?	+ ·016?	comp. ·037
1923·88	Magg.	int.f.	3n	153·5	·152	± 0·0	± ·000	± .000

In the list of observations given on the preceding page the columns contain respectively the date, the observer, the aperture of the telescope in inches, the number of nights, the observed angle and distance, and the residuals observed minus computed in angle, in angle reduced to arc, and in distance.



On the whole the measures are satisfactorily represented. The residual in angle for AITKEN's observation in 1922 can fully be ascribed to the very short distance at that time.

Adopting EDDINGTON's mass-luminosity curve (*M. N.* lxxxiv, 311; 1924) in connection with the apparent magnitudes 7·33 and 7·83 and the hypothetical parallax $a.P^{-\frac{2}{3}}$ the following masses and absolute magnitudes for the two components together with the parallax p of the system are computed:

m_1 : 1·1 ⊙, m_2 : 0·9 ⊙, M_1 : 4·27, M_2 : 4·77, p : ″·024.

The absolute magnitude estimated spectroscopically at Mount Wilson is 4·0.

The maximum relative radial velocity at the nodes will be about 25 KM per second.

Ephemeris.

y	°	″
1924·8	164·4	0″·210
1925·8	171·9	·248
1926.8	177·6	·275
1927·8	182·4	·300
1928·8	186·6	·313
1930·8	193·9	·340
1932·8	200·2	·362
1934·8	205·9	·380
1936·8	211·1	·396