On the Orientation of the Orbital Planes in The Multiple System 6 Trianguli

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In a note published recently (T. P. **30.**$_1$, p. 8, 1938) the writer, from statistical considerations, suggested the more or less close coincidence of the orbital planes in multiple systems. At the same time it is highly important to obtain information on this subject in as many individual cases as possible. As yet the coincidence of the orbital planes is known with certainty in the only case of 44 i Bootis. In the present note the writer shows that the orbital planes in the multiple system 6 Trianguli are also probably closely coinciding, which result furthermore speaks in favour of the suggestion made in the above-mentioned paper.

The star 6 Tri [$\alpha\,(1900) = 2^h\,6^m.6$; $\delta\,(1900) = +29^\circ\,50'$] consists of two visual components with the apparent visual magnitudes 5.4 and 7.0 (T. P. **25.**$_6$). Each component is a spectroscopic binary with two spectra visible, both spectroscopic orbits having been computed. Thus, we know the minimum masses of each of the four bodies of the system. Our aim is to compute the inclinations of the spectroscopic orbits. The procedure is as follows. From the corresponding mass ratios we get the individual apparent magnitudes by the use of an empirical mass-luminosity relation (T. P. **30.**$_1$, p. 2). The bolometric corrections are given by the spectra. Now, if we know the parallax of the system, the absolute bolometric magnitudes can be computed. From the mass-luminosity relation we obtain the absolute masses, whence the inclinations of the orbits become known. The results are as follows:

	Sp.	$\mu_1 \sin^3 i$	μ_2/μ_1	Δm	m_{vis}		m_{bol}		$\pi = 0''.010$			$\pi = 0''.020$		
									M_{B1}	μ_1	i $(180^\circ - i)$	M_{B1}	μ_1	i $(180^\circ - i)$
6 Tri A	$G4$	1.12	1.0	0.0	6.1	6.1	5.8	5.8	0.8	2.15	$53^\circ.7$	2.3	1.60	$62^\circ.5$
6 Tri B	$F2$	0.91	0.94	0.35	7.6	7.9	7.4	7.7	2.4	1.57	$56^\circ.3$	3.9	1.17	$66^\circ.7$

Here μ denotes the mass, m the apparent magnitude, M_{B1} the bolometric absolute magnitude of the primary, i the inclination of the orbit.

The parallax determinations of 6 Tri give values ranging from 0.″002 to 0.″035. The spectroscopic determinations are 0.″013 (6 Tri A) and 0.″016 (6 Tri B) (F. Schlesinger and L. Jenkins, Yale Catalogue of Parallaxes, 1935).

In any case it seems to be probable that the true parallax lies between 0.″010 and 0.″020. These two values, as the most probable limits, are used above in our computation. As shown by these data, the absolute inclinations of the two spectroscopic orbits are in good agreement with each other (actually the agreement refers to sin i). It is remarkable that, although the uncertainty in the parallax affects appreciably the absolute values of the inclinations, the difference between the two inclinations remains qualitatively unaffected.

There remains, of course, an uncertainty with respect to the choice between i and 180^0—i; further, equal inclination to the line of sight does not mean yet the parallelity of the two planes: it is a necessary, although not a sufficient condition for parallelity. If, nevertheless, the individual data referring to 44 i Bootis and 6 Trianguli, as well as the statistical evidence put forward in our preceding paper *(loc. cit.)* may be considered as arguments in favour of a close coincidence of the orbital planes in multiple systems, the reason for that may be sought in cosmogonical considerations: a correlation between sin i_1 and sin i_2 can, from this standpoint, be reasonably understood only as produced by a more or less close coincidence of the orbital planes.

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