The colour of Sirius in the sixth century

ON the basis of Gregory of Tours' description of the star called 'Rubeola' or 'Robeola' in his '*De cursu stellarum ratio*'[1-4], Schlosser and Bergmann[5] have proposed that Sirius appeared red in the sixth century, an appearance which would raise serious astrophysical questions. From close examination of the text, the identification of Sirius with 'Rubeola' cannot be supported.

Gregory's treatise appears in eight manuscripts, two of which[1,2] include the astronomical portions, and two printed editions[3,4], both of which include identifications of the constellations by the astronomer, J. F. Galle. Galle identified 'Rubeola' as Arcturus, a nearby companion as η Boo, and the central star of Gregory's constellation 'Quinio' (the five) as 'undoubtedly Sirius'. He considered 'Rubeola' to be Arcturus because of its colour (which we should not take into account) and its monthly appearances as recounted by Gregory.

There are several independent sources of evidence in '*De cursu stellarum ratio*'. In the first section Gregory describes a number of constellations, giving their month-by-month visibility from heliacal rising to heliacal setting, depicting (in the eighth-century Bamberg MS) the constellations as they appear rising on the eastern horizon, and in some cases expressing their declination in terms of the path that the Sun takes in a given month.

In the second section Gregory uses these constellations to time the pre-dawn office of matins[6,7] for each month, telling the reader the number of psalms to be chanted, beginning when a star rises or more commonly when it reaches a given hour of the day. The latter expression apparently indicates the time when the star reaches the position that the Sun would attain at the given hour of the day, that is, so many hours after the star rises. These two sections employ general terms rather than exact measurements and are not fully consistent; it therefore seems wisest to consider all the available evidence rather than a selected set.

From the fact that 'Rubeola' is twice described as rising heliacally in September and is also visible for an hour after sunset the same evening, we can compute limits for right ascension and declination. From the contradictory data for a maximum visibility of 8 hours from December through February, which I would question on textual grounds, alternative limits can be computed (W. Schlosser and W. Bergmann, personal communication).

The Local Sidereal Time of rising (LST_r) can be computed from 'Rubeola's rising one month before 'Stefadium' (Corona Borealis), from the duration of visibility each month between its rising and sunrise, and from the number of psalms that can be sung after its rising or after its appearance at a given place in the sky. The Local Sidereal Time of setting (LST_s) can be determined in like manner from the duration of visibility each month between sunset and the star's setting. Positions were adjusted for precession and proper motion; times of rising and setting were computed for the latitude of Tours (47.3° N) without corrections for refraction. First nighttime visibility is taken as when a bright star is on the horizon[8].

Turning to the constellation 'Quinio', which has also been identified as Sirius[3], we can determine its declination because it follows the path that the Sun does in February. Because it rises one hour after a pair of stars that can be identified on the basis of their declination, their rising time, and their depicted orientation to the horizon as α and β Canis minoris, we can determine 'Quinio's LST_r. Lastly, we must not ignore the depiction of 'Quinio', which matches the pattern of Sirius and its companions at their rising[1,4].

Comparing the limits thus obtained with the positions of the stars computed for AD 600 at the latitude of Tours (Table 1). It is apparent that 'Quinio' is Sirius and 'Rubeola' is most likely Arcturus, a star widely noted for its ruddy colour. The importance of Arcturus for monastic timekeeping is reinforced by its appearance as one of seven bright stars in an eleventh-century monastic timetable from northern France, in which Sirius does not appear[9]. Gregory's description of 'Rubeola' cannot be added to the ancient reports of a reddish Sirius[10].

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Table 1 Positions of 'Rubeola' and 'Quinio'

From '*De cursu stellarum ratio*'	'Rubeola'	Sirius	Arcturus
September heliacal rising			
Dec. (deg.)	>14.3	−15.75	26.95*
RA (h:min)	10:47-12:32	5:43	13:12
December opposition (doubtful)			
Dec. (deg.)	<0	−15.75*	26.95
RA (h:min)	4:40-10:50	5:43*	13:12
Appears one month before 'Stefadium'			
LST_r (h : min)	0:56-4:51	0:55	4:58
Monthly visibilities			
LST_r (h : min)	3:18-7:16	0:55	4:58*
LST_s (h : min)	12:02-19:07	10:32	21:26
Times for Nocturnal Psalms			
LST_r (h : min)	2:19-4:57	0:55	4:58
	'Quinio'		
Dec. (deg.)	−7.0 to −16.6	−15.75*	26.95
LST_r (h : min)	23:57-1:22	0:55*	4:58

* Star within the range computed for the constellation.

SCHLOSSER and Bergmann[1] (hereafter SB) have recently presented new evidence apparently corroborating the well-known Greek-Roman and Babylonian references to a red-coloured Sirius in antiquity[2,3]. The purpose of this letter is to show that they have erroneously confounded Sirius with Arcturus (α Boo), a star which is indeed reddish ($B-V=1.2$). SB based their analysis on '*De cursu stellarum ratio*' (hereafter CS), a text written sometime between 575 and 582 by Georgius Florentius Gregorius, Bishop of Tours. This text was published twice in the previous century by Haase[4] and Krusch[5] (hereafter H and K). The text (CS 20, 36-39) refers to a '*stella splendida*', named 'Robeola' (=reddish). According to the editions of H and K, 'Robeola' = Arcturus, but SB (without even acknowledging the earlier work of HK) argue rather that 'Robeola' = Sirius.

Their novel identification is partly based on the singular description of 'Robeola' as a '*stella splendida*', which, as SB argue, can apply only to the brightest star in the