

VIII. *Double Stars discovered in 1779, at Frampton-house, Glamorganfhire. By Nathanael Pigott, Esq. F. R. S. Foreign Member of the Academies of Bruffels and Caen, and Correspondent of the Royal Academy of Sciences at Paris; communicated by Nevil Maskelyne, D. D. F. R. S. and Astronomer Royal.*

Read January 11, 1781.

TO THE REV. NEVIL MASKELYNE.

REV. SIR,

October 27, 1779.

**I**NCLOSED are the determinations of the places of three double stars, which I discovered this summer; at least, I presume, they have not been observed before, because I do not find them inserted in Dr. BRADLEY's catalogue, published in the Nautical Almanac 1773, or in the *Connoissance des Temps*, no more than in other catalogues in my possession.  $\gamma$  Delphini, indeed, is in M. DE LA CAILLE's catalogue; but not as a double star. The instrument he used was not, probably, powerful enough for that purpose. In the two-feet telescope of my quadrant it appears only as a single star. These stars were observed by me in a three-feet achromatic telescope of a transit instrument, with an object-glass near two inches diameter. The R. A. are nicely determined by several observations, which always agree with each to a fraction of a second in time. The declinations

declinations were deduced from the difference of altitudes between the double stars and the known stars, to which they were compared, as shewn by the graduated semi-circle of the transit instrument, which, being divided to two minutes only, cannot be supposed to give any great precision: however, I believe, their declinations, hence deduced, to be correct to one minute, or one minute and a half.

In observing the double star compared to  $\zeta$  Pegasi, I found it impossible to illuminate the wires of the transit instrument, without nearly obliterating the star. This difficulty led me to a method, which, as it completely succeeded, may, under similar circumstances, possibly be of use to others. A person illuminating the wires very faintly, so that I could just perceive the double star, at a signal totally withdrew the light: this signal I made when the double star was nearly as far distant from the first wire as the five wires are distant from each other, which, in this case, was  $13''$  by the clock. I then counted the seconds, and did not fail to see the star disappear a second or two within the time expected. On its disappearing, I made a signal to write down; and then beginning to count again, did the same at each wire. I have since tried this method with other stars, and think they may be thus observed, even with greater precision than when the wires are illuminated. Hence the troublesome business, well known to astronomers, of illuminating faint objects, may be removed.

The preceding star of each double star was observed on the first, third and fifth wires, and the following one on the second and fourth wires; and thus their difference in R. A. in time, converted into parts of a great circle, obtained. Supposing the apparent R. A. and App. declinations of  $\alpha$  Delphini,  $\beta$  Aquarii, and  $\zeta$  Pegasi, as here assumed, the places of these double stars were found to be as follows.

I beg you to communicate these observations to the Royal Society; and to receive my thanks for those I received in your letter of the 7th instant.

I am, &c.

N. PIGOTT.

September 5, 1779.

App. R. A.			App. declination.
307 21 5	$\alpha$ Delphini, 3d mag.	-	15 8 53 N.
309 6 30	2d or brightest of $\gamma$ Delphini 4.		15 20 40 N.
o 9 $\frac{1}{2}$	diff. R.A. of the 2 stars in $\gamma$ Delphini.		

Note, both the stars in  $\gamma$  Delphini have the same, or nearly the same, declination. The 1st is of the 6th, the 2d of the 4th mag.

September 19.

319 59 27+	$\beta$ Aquarii, 3d mag.		6 31 34 S.
318 3 21	preceding double star, 5th mag.		7 40 34 S.
o 11	- diff. R.A. between 1st and 2d of the double star.		

Note, the 1st seemed of the 5th, the 2d of the 7th mag.  
The 1st is perhaps 6" or 8" S. of the following one.

337 36 55+	$\zeta$ Pegasi, 3d mag.	-	9 41 24 N.
346 53 36 $\frac{1}{2}$	double star, 8th, 9th mag	-	3 59 17 N.

Note, both the stars of this double star have the same, or nearly the same, R. A.; their difference in declination is 15" or perhaps 20'.

