XXV. *Extract of a Letter from Mr.* Lexel *to Dr.* Morton. *Dated* Peterſburg, June 14, 1774.

Redde, Mar. 16, 1775.

AS I propoſe to make ſome reſearches concerning the difference of the meridians of the principal Obſervatories of Europe, which I am perſuaded can beſt be aſcertained by the occultations of the fixed ſtars by the Moon; it would be of great ſervice to me to be furniſhed with the obſervations that have been made, or that will be made, this year, of the occultations of α or of γ Tauri by the Moon. I beg, therefore, SIR, you will pleaſe to deſire Mr. MASKELYNE to communicate them to me, towards the beginning of the next year, directed to Mr. EULER, ſecretary of our Academy. It would alſo be of great uſe to me to have the obſervation of the occultation of the Pleiades by the Moon the 15th of March, 1766, in caſe it has been taken at Greenwich.

Here are ſome obſervations of Mr. Wargentin, of the occultations of α and γ Tauri.

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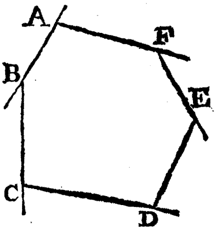
	h	′	″	
1773, Nov. 1	11	56	12	Emerſion of α, uncertain to ſome ſeconds.
1774, Jan. 22	6	0	26½	Immerſion of the eye of ♉, } both very certain.
	7	15	51	Emerſion, } both very certain.
Feb. 18	6	39	51	Immerſion of γ, very certain.
	7	19	33	Emerſion, within two ſeconds.

The following are my obſervations.

	h	′	″	
1773, Nov. 1	12	56	47	Emerſion of α almoſt certain; the immerſion was not obſerved on account of clouds.
1774, Jan. 22	7	2	52	Immerſion, } both certain.
	8	20	44	Emerſion, } both certain.
April 14	8	28	34	Immerſion of α, very certain.
	9	3	20	Emerſion of the ſame.
15	9	32	0	Immerſion of FLAMSTEAD's 115 in ♉.
16	10	21	31	Immerſion of a ſtar of the 6th magnitude in ♊.
May 22	13	2	20	Immerſion of m Virginis, very certain.

I have lately diſcovered two curious theorems, which I ſhall here communicate to the Royal Society.



THEOREM.

Let A, B, C, D, E, F, be a polygon whoſe ſides are named a, b, c, d, e, f; and the exterior angles α, β, γ, δ, ε, ζ, ſo that the ſide a be placed between the angles α and β, b between β, γ, &c.

$$1.\ \overline{a \times \text{ſin.}\,\alpha} + \overline{b \times \text{ſin.}\,(\alpha+\beta)} + \overline{c \times \text{ſin.}\,(\alpha+\beta+\gamma)} + \overline{d \times \text{ſin.}\,(\alpha+\beta+\gamma+\delta)} + \overline{e \times (\text{ſin.}\,\alpha+\beta+\gamma+\delta+\varepsilon)} + \overline{f \times \text{ſin.}\,(\alpha+\beta+\gamma+\delta+\varepsilon+\zeta)} = 0.$$

2.

2. $\overline{a \times \text{cosin.}\ \alpha} + \overline{b \times \text{cos.}\ (\alpha+\beta)} + \overline{c \times \text{cos.}\ (\alpha+\beta+\gamma)} + \overline{d \times \text{cos.}\ (\alpha+\beta+\gamma+\delta)}$
$+ \overline{\epsilon \times \text{cos.}\ (\alpha+\beta+\gamma+\delta+\iota)} + \overline{f \times \text{cos.}\ \alpha+\beta+\gamma+\delta+\iota+\zeta)} = 0.$

In fact it is sin. $(\alpha + \beta + \gamma + \delta + \varepsilon + \zeta) =$ sin. $360° = 0.$ and cos. $(\alpha + \beta + \gamma + \delta + \varepsilon + \zeta) = + 1.$; but in order to give the same form to the two expressions, I rather chose to represent them as I have done. By means of these two theorems the solution of polygons will be as easy as that of triangles by common trigonometry.