An Extract of Mr. Flamsteads *Letter of* April. 19. 1673. *containing some more accurate Observations of his own, about* Jupiter's *Transits near some Fixed Stars; useful for determining the Inclination of that Planet to the Ecliptique.*

SIR,

THE inclosed Paper contains some Observations of *Jupiter,* which being made from a more convenient Station, than I commonly have used, are more accurate than my former ones: And, the Planet being in a fit place of his Orbite, they are the most useful for determining his *Inclination* to the *Ecliptique,* that we can again expect this six years, or perhaps before he returns again to this place. Had the Latitudes of the Fix't Stars of *Tycho's* constitution been exact and coherent, we should easily have determined the *precise* quantity of this Inclination and those regular Inequalities we find in this and in all the other Planets, which are found irrepresentable by numbers, only by reason of some latent errors in the Places and Latitudes of the Fixed.

It would be a task deserving the pains and accuracy of the Learned *Cassini,* and of all others that have good Observatories and Instruments, to endeavour the Restoring of the Fix't Stars, especially of those that are near the *Ecliptique.* Had I only a convenient place for observing, a ready Assistant, and other necessary accommodations, I should not doubt in a few nights to rectifie many of *Tycho's* errors; and to add some Stars to his Catalogue, as well visible to the bare eye, (yet omitted,) as Telescopical ones.

I have made lately some Observations of the utmost Elongations of the three Inmost *Satellits*; which I find greater than Signor *Cassini* states them, but almost the very same with Mr. *Townley's.* But I have just cause to suspect some Excentricity in the *third*;for I find (except I mistook in my measures,which, I think, I could not possibly do,) its Elongation greater on the one hand of *Jupiter* than on the other. I intend, at another opportunity, to make more Tryals as carefully as I can, either to confirm or destroy this observation.

Fffff 2   *Ob-*

Obſervationes ipſæ Joh. Flamſtedii.

QUas tibi Jovis, prope Fixas tranſeuntis, obſervationes jam antea, Clariſſime Oldenburgi, impertii, ejus in Tabulis motus fieri tardiores quàm in cœlis, (quod & Horroccio pridem ſuboluerat,) evidentiſſimè oſtenderint: Latitudines etiam obſervatæ, minores ſemper ſupputatis, vel ſatis non promotum Nodi locum, vel juſto latiorem Plani orbitæ Jovialis inclinationem conſtitutam, videbantur innuere. Nodum, numeris Rudolphinis promotiorem cœlitùs poni, à ſuis ſe obſervationibus reperire ſcribit Clar. Caſſinus: Orbitæ minorem eſſe aliquantulum inclinationem ad Eclipticam, quàm ſtatuit Keplerus (ſi Fixarum latitudinibus, in catalogo Tychonica exaratis, fidendum eſt;) ab obſervationibus infrà deſcriptis oſtendam.

Anno inſtanti 1673. Martii 13. ſt. Jul. veſperi, Jupiter Aphelius, pronus ad phaſin Acronicam, & limitem orbitæ Boreum paululùm tranſgreſſus, Retrogradus inceſſit verſùs 9am ℥' lucis 4tæ, è qua (alto eo ſex circiter gradus) limbi ejus remotiſſimi diſtantiam, ſeptempedali tubo & micrometro Townleiano cæpi 4560 = 52'-34".

Martii 17 die Dr', circa horæ dimidiam poſt exortum Jovis, ejus, eodem tubo, limbi remotiſſimi à Fixa cepi iterum diſtantiam 2073 = 23'-54".

Martii 20. die ♃', è loco multùm commodiori, ſequentes habui obſervationes. Primam breviori tubo, digitorum tantùm 85, reliquas longiori, videl. 164. dig. V. Fig. 2.

Fix. alt	hor. ſup ♄		Limbi. ph.		Centri.	
o '	h '		'	"	'	"
1 6 — 0	7—14	Limbi ♃' remotioris à Fixa diſtantia — 850	9 —	48	9 —	24
2	. . . .	Eadem diſtantia tubo majori capta —— 1650	9 —	52	9 —	28
3 14—40	8—16	Limbus ♃' infimus depreſſior ac fixa — 784	4 —	41	4 —	17
4 15—40	8—23	Altitudinum eadem repetita differentia — 786	4 —	41	4 —	17
5	. . . .	Jovis diameter ——— 135	0 —	48		
6 16—25	8—29	Limborum iterum capta diſtantia —— 1665	9 —	57	9 —	33
7 . . .	. . . .	Denuo ———————— 1658	9 —	54	9 —	30
8 19—00	8—50	Differentia altitudinum limbi ♃' & Fixæ 838	5 —	00	4 —	36

Inde ad diem 26. nubes & pluviæ, continua ferè, Jovis omnem obſervationem prohibuere; hujus tamen veſperi, cœlo præter ſpem facto ſereno, alto ♃', 15°—40', limbi ſui remotioris à Fixa diſtantiam, eodem minori tubo, dimenſus ſum 4205=48'. 30".

Nocte etiam proximà ſequente, Jovem à Fixa plus remotum vidi; ſed accuratè metiri diſtantiam, nubium, cœli locum ſubtercurrentium, ſpiſſities haud permiſit.

Ad

Ad Planetæ locum ex his annotationibus eliciendum, struĉtis suppu̇tationi-bus, invenio

	hor.	h.			hora	h.	
		8 — 16				8 — 50,	

		°	'			°	'
Angulum parallaĉticum		34 — 44			37 — 30		

			'	"			"
Centrum ♃ⁱˢ *à Fixa diftitit*		9 — 28			9 — 30		
Altitudinum differentia erat		4 — 17			4 — 36		
Ergo, Angulus erat pofitionis	80 — 06			78 - 21			
Et ♃upiter in antecedentia Fixæ	1 — 38			1 — 55			
cum latitudine minori	9 — 19¼			9 — 18			

Fixæ mihi locus, accepto motu annuo 50", *erit* ♎ 13°-37'-11"; *quem vult author* Carolinus 13° 33'-47"; *latitudo ejus Borea* 1°-45': *Lo-cus ergo verus* JOVIS *erit mihi,*

	h.	°	'	"		°	'	"
Hora	8 — 16 ♎	13 — 35 — 33			*Latitudo vera*	1 — 35 — 40¼;		
	8 — 50 ♎	13 — 35 — 16				1 — 35 — 42.		

X^2 ·17. X·1½.

JOVIS *tunc locus in Ephemeride* Heckeri *eſt* ♎ 13-22, *juſto minor, fa-tem* 14' *min. Motus retrogradus eſt* 8' *min. Propterea fcrupulis hora* 3 4' *recefferit Planeta fcrupulos fecundos* 11" *fere; noſtra obfervatio dat* 17"; *quæ exigua differentia ejus præcifionem admodum commendat.*

At Fixæ conceffo loco Carolino, *prodibit* ♃ *locus* ♎ 13°-32'-09". *qui ab iſtis* Tabulis *eruitur* 13°-27'-32", *à cœlis fuis deficiens* 4'-37" *latitudo ab iis fuppu̇tata reperietur* 1°-37'-21", *cœlos exfuperans* 1'-41".

Loco fic Planetæ cum latitudine, & Tabularum à cœlis deviationibus perceptis, ne commodiſſimæ obfervationis ulteriorem fummumq́; fruĉtum per-damus, Orbitæ *♃ovialis ad* Terreſtris *orbitæ* Planum *inclinationem inde eruere conabimur.*

Huic equidem inveniendæ, unà cum loco Solis, *ejufdem, ♃ovis, & Terræ inter mutua diſtantia poſtulantur: quas à Tabulis quibufvis probatioribus tutiſſimè haurire licet: Ego Tabulis utor plerumque* Carolinis; *quippe quas, utut nonnunquam deviantes, cœlorum motibus propius annuentes, accuratiores, & faciliores cæteris omnibus comperi, ex quibus ad* 8 h.-16'.p.m. *deprompfi;*

Solis locum verum ♈ 10°. 40'-18".
diſtantiam à Terra 100084
♃ovis à Sole diſtantiam 544921
a Terra 444952

♃am in appofita figura 3. *fint,* S Sol, T Terra, ♃ Planeta, S E Radius Ecliticæ, *ad* ♃' *orbitam protenfæ, & angulus* ♃ T S, *vifa Planetæ à Terra Latitudo* 1°-35'-40¼.

Ex datis (in triangulo ♃ ST) *angulo,* ♃ TS, *vifa latitudin's ad Circu-lum complemento;* ♃ S, *&* ♃ T, *Planetæ à Sole & Terra diſtantiis, ut fuprà, repertis, eruetur angulus* ♃ S E, *latitudo five Inclinatio Planetæ à Sole confpeĉta,* 1°. 18'.7.

JOVI:

Jovis *locus Geo-centricus erat* ♎ 13°. 35'. 33" ; *ab iis ergò datis* ♃ *&*
Terræ à Sole distantiis, invenietur locus Helio-

Parallaxis orbis invenitur
32'. co". quæ loco Jovis
Geo-centrico Subducta lo-
cum dabit Helocentricum.

centicus planetæ ♎13°·03'-33" ; *è quo sub-*
ductis sigillatim iis nodi locis, quos autores, quo-
rum nomina in sequenti tabella exaravimus, af-
sumpserunt, annexa produnt argumenta Latitu-
dinis ; è quibus videre est, nullis
plus Jovem à limite promotum ha-
beri quàm 6°·29'·56", nec mi-
nus quàm 3ª·58'·59" , quæ ,
quantavis videtur differentia ,
in maxima orbita inclinatione in-
vestiganda, errorem scrupulis se-
cundis 23" majorem inferre ne-
quit.

Authores	☊ loca	Argumenta latitudinis
	s ° ' "	s ° ' "
Keplerus	3-06-33-37	3-06-29-56
Streetius	3-06-33-47	3-06-29-46
Wingius	3-07-11-39	3-05-21-54
Ricciolus	3-07-18-00	3-05-45-33
Cassinus	3-08-45-00	3-04-18-33
Bullialdus	3-09-04-34	3-03-58-59

Iste nodi locus, quem Clariss-
mus Cassinus *elegerit, mihi eti-*
amsi aliquantulum justo promotior videtur, magis tamen cæteris, variis de
causis, placet : sumptis propterea, in Triangulo ♃ *A* ☊, *argumento lati-*
tudinis ☊ *A* 94°-18'-33", *& inclinatione* ♃ *A* 1°-18'-07", *eruetur An-*
gulus inclinationis plani orbitæ Jovialis ad Eclipticam 1°-18'-20" ; *quem*
statuunt Keplerus 1°-19'-00", Streetius 1°-20'-00". Bullialdus *&*
Wingius 1°-21'-48" ; *omnes, justo nonnihil majorem.* V. fig. 4.
   Tantamque esse inclinationem, vel saltem non majorem, cum hesternæ
noctis, tum Mensium Februarii, Martii *&* Maii *Anni elapsi observati-*
ones suadent. Interea verò non dissimulandum, posse & majorem (scilicet
1 ° 20'-20") *à transitu* ♃ *prope* 8ᵐ ♍, *Anno* 1649.Maii 29 *&* 30, St.

*Vid.*Almag.Novum
part. 1. pag. 710.

Juliano, Bononiæ *&* Majorcæ à Ricciolo ✶ *&*
Muto, *viris doctissimis, observato, demonstrari : id*
quod nobis (si quidem orbitarum inclinationes ab omni-
bus invariabiles habentur,) videtur innuere, errorem
vel huic, vel illis Fixarum latitudinibus *à* Tychone *assignatis, inesse ali-*
quem : quæ propterea donec accuratius restituantur, à præcisa hujus Inclina-
tionis quantitate determinanda meritò nos arcent : Hoc tantùm, quoniam
fixarum eæ latitudines etiam immutabiles reperiuntur , ausim affirmare ;
Angulum maximæ inclinationis plani orbitæ Jovialis ad Eclipticam
minorem esse scrupulis 26'-40" quam latitudo stellæ 9ˣ ♍ lucis 4ᵗˣ,
quæ Tychoni dicitur,ultima quatuor in sinistra ala Virginis : *quæ prop-*
terea si quando corrècta dabitur, eadem certa dabitur inclinatio.

                                                                J.F.

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