VI. *Obſervationes* Martis, *Autumno Anni* 1736. Berolini *habitæ*, *a* Chriſtfr. Kirch, Regiæ Societatis *ibidem Aſtronomo.*

I.
Conjunctio Martis & μ ♓.

I. Diebus 10, 11 & 12 Octobris, cum ♂ prope μ ♓, ſtellam 5 magnitudinis tranſiret, ſequentes obſervari diſtantias centri Martis a dicta ſtella.

Stylo novo.	Temp. vero.			Partes Micro.	Valor p. Micr.
	H. ′				′ ″
D. 10 Octobr.	9. 41. veſp.	♂ μ ♓	Tub. 7 ped.	48½	19. 24.
	9. 46.	. .	Tub. 9 ped.	65	19. 21.
D. 11 Octobr.	10. 1.	♂ μ ♓	Tub. 9 ped.	22½	6. 42.
	10. 4.	. .	Tub. 7 ped.	16	6. 24
	10. 9.	. .	Tub. 7 ped.	16½	6. 36.
	10. 12.	. .	Tub. 9 ped.	22	6. 33.
D. 12 Octobr.	8. 55. veſp.	♂ μ ♓	Tub. 9 ped.	71½	21. 18.
	8. 59.	. .	Tub. 7 ped.	53	21. 12.
	9. 5.	. .	Tub. 7 ped.	53½	21. 24.

II. Ut ex his diſtantiis obſervatis eruerem Tempus conjunctionis Martis cum ſtella μ ♓, elegi 3 diſtantias ſequentes.

	H. ′		′ ″
1. D. 10. Octobr.	9. 43. veſp.	diſt. centri ♂ a μ ♓	19. 22.
2. D. 11. Octobr.	10. 6. veſp.	. . .	6. 34.
3. D. 12. Octobr.	9. 0. veſp.	. . .	21. 18.

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Et ex ephemeridibus ſuppoſui motum diurnum Martis in longitudine 19′ 30″, in latitudine 3′ 40″: eſt itaque motus diurnus Martis in orbita propria 19′ 51″, & angulus orbitæ Martis & eclipticæ (ſeu potius cum parallelo eclipticæ) 10° 39′.

III. Datis in triangulo obliquangulo $a\,\mu\,b$, tribus lateribus, [vid. Fig. I. TAB. IV.] ſcilicet

ab, motu Martis, qui competit 24h. 23′. (ſcilicet tempori inter obſervationem 1 & 2) . .	20′	10″.
$a\,\mu$, diſtantia primo obſervata . . .	19	22.
$b\,\mu$, diſtantia ſecundo obſervata . .	6	34.

Duxi $a\,\mu$ perpendicularem in orbitam Martis apparentem $\mu\,\chi$, & in triangulo rectangulo $b\,\chi\,\mu$ quæſivi particulam orbitæ Martis, $b\,\chi$, eamque inveni 1′ 51″. & diſtantiam minimam ♂ & μ, $\chi\,\mu$, quam inveni 6 18.

Particulæ orbitæ Martis, $\chi\,b$, competunt 2h. 14′

Quæ ſubtracta a tempore 2 obſervationis D. 11. Octobr. . . .	10	6. veſp.
Relinqunt temp. ver. ♂ ♂ μ ♓ in orbita D. 11. Octobr. . . .	7	52. veſp.

IV. In triangulo obliquangulo $b\,\mu\,c$, motus Martis inter 2 & 3 obſervationem, $b\,c$, eſt . . 18′ 55″.

Diſtantia ♂ a μ ♓ ſecundo obſervata, $b\,\mu$ 6 34.

Diſtantia ♂ a μ ♓ tertio obſervata, $c\,\mu$. 21 18.

Datis his tribus lateribus quæſivi angulum c, eumque inveni 17° 35′. Deinde duxi perpendicularem a μ in orbitam Martis, $\mu\,\chi$, & in triangulo rectangulo $c\,\chi\,\mu$; data hypotenuſa $c\,\mu$, quæſivi latera $\mu\,\chi$, & $c\,\chi$, & inveni $\mu\,\chi$, diſtantiam minimam 6′ 26″. & $c\,\chi$, 20′ 18″.

A quo ſubtractum latus $b\,c$	18	55.
Relinquit $b\,\chi$	1	23.

Cui

Cui competunt in tempore . . .	1h.	40′.
Quæ ſubtracta a tempore 2 obſervationis 11 Octobr.	10	6. veſp.
Dant tempus verum diſtantiæ minimæ, ſive conjunctionis Martis & μ ♓ in orbita 11 Octobr. . . .	8	26. veſp.

V. Deducta in his duobus proxime antecedentibus paragraphis, ut fieri ſolet, paululum inter ſe differunt. Si motum Martis diurnum quadrante circiter minuti minorem aſſumſiſſem, diſcrepantia foret minor. Interim, ſi ex deductionibus utriſque medium eligo, a veritate vix aut parum aberrare potero. Et ſic colligitur *tempus verum* ♂ ♂ μ ♓ *in orbita Martis*, 11 *Oct.* 8h. 9′. *diſtantia minima* ♂ *a* μ ♓ 6′ 22″. *Septentrionalis.*

VI. Quamvis hæc ſufficere mihi potuiſſent, tamen de novo calculum inſtitui, ſupponens motum ♂ diurnum in longitudine . . . . . 19′ 15″.
in latitudine . . . . . 3 40.
Fuit itaque motus ♂ diurnus in orbita . . 19 36.
Et angulus orbitæ Martis cum parallelo eclipticæ 10° 47′ intervalla temporum inter obſervationem 1 & 2, & inter 2 & 3, dato hoc motu Martis diurno in orbita 19′ 36″, dant *ab* 19′ 55″, & *bc* 18′ 42″; diſtantiæ *a*μ, *b*μ, & *c*μ, manent eædem, quæ in ſuperioribus calculis. His datis primo per triangulum *ab*μ, inveni μχ 6′ 22″, & *b*χ 1′ 37″ ½.

Quibus reſpondent	1h.	59′.
quæ ſubtracta a D. 11 Octobr.	10	6. veſp.
Relinquunt tempus diſtantiæ minimæ D. 11 Octobr.	8	7. veſp.

Deinde per triangulum *bc*μ, inveni μχ 6′ 21″.
Et

Et $b\chi$ 1′ 38″, quibus respondent in tempore	2h. 0′.
Quæ subtracta a temp. 2 observationis D. 11 Octobr. . . .	10 6. vesp.
Relinquunt tempus distantiæ minimæ D. 11 Octobr.	8 6. vesp.

Ut itaque hi calculi optime inter se, & cum supra electo medio priorum calculorum, conveniant.

VII. Si ex μ ducitur linea recta μd, quæ cum linea $\chi\mu$, perpendiculari in orbitam Martis, ad μ faciat angulum æqualem angulo orbitæ Martis cum parallelo eclipticæ, $d\mu$ erit perpendicularis in eclipticam. Hunc angulum primo deduxi 10° 39′ (§. II.) deinde mutato sive correcto motu diurno Martis, eum inveni 10° 47′ (§. VI.) In triangulo rectangulo $d\chi\mu$, jam præter angulos notum est latus $\chi\mu$ 6′ 22″, & reliqua latera quæruntur. Assumto angulo $\chi\mu d$, 10° 39′ latus χd eruitur 1′ 12″. Si vero correctiorem angulum adhibeo 10° 47′, illud latus χd erit 1′ 13″.

Cui competunt in tempore	1h. 29′.
Quæ addita ad tempus distantiæ minimæ 11 Octobr.	8 7.
dant *tempus verum* ♂ ♂ & μ ♓ *in ecliptica* 11 *Octobr.*	9 36.

$d\mu$, sive differentia latitudinis Martis a latitudine stellæ in ♂ in ecliptica, eruitur . 6′ 29″.

Quæ subtracta a latitudine stellæ .	3° 4 25. Mer.
Relinquit *Latitudinem Martis* .	2 57 56. Mer.

Longitudo Martis est æqualis longitudini stellæ, scilicet ex accuratissimo *stellarum inerrantium catalogo Britannico* . . . . . ♈. 19° 25′ 40″.

VIII.

VIII. Ad tempus conjunctionis Martis & μ ♓ in ecliptica, ſcilicet Berolini, tem. vero. 11 Oct. 9h. 36″.
Et Bononiæ tempore medio . . 11 Oct. 9 14.
Ex ephemeridibus Cel. Manfredii eruitur longitudo Martis . } ♈. 19° 14′ 40″.
Quæ deficit ab obſervatione . . . . . 11 0.
Ephemerides Ghiſlerii dant longit. ♂ ♈. 19° 4′ —
22 fere minutis ab obſervatione defi- cientem, & ephemer. Dni. Deſplaces } ♈. 19 25 —
Obſervationi ſatis congruam.

Manfredianæ ephemerides dant latitudinem Martis meridionalem . . . . . 2° 57′.—
Id eſt; 1 minuto fere minorem latitudine obſervata; ex ephemeridibus Ghiſlerianis illa colligitur . 2° 57′½.
& ex Deſplaces ephemeribus . . . . 2 59½.

II.
Locus Martis in oppoſitione Solis.

I. Tempore conjunctionis Martis & μ ♓ in ecliptica, ex Manfredianis ephemeribus eruitur locus Solis . . . . . 6 ♎ 18° 46′ 21″.
Quo tempore longitudo Martis fuit 0 ♈ 19 25 40.
Itaque ♂ fere fuit in oppoſitione Solis, & tantum 39′ 19″. abfuit a loco Soli oppoſito.
Motus diurnus Solis fuit . . . . 0° 59′ 34″.
Et Martis retrogradi motus diurn. in eclipt. 19 15.
Summa dat motum ☉ a ♂ diurnum . 1 18 49.

II. Ut 1° 18′ 49″. motus diurnus ☉ a ♂, ad 24 horas, ita 39′ 19″ diſtantia ♂ ab oppoſito Solis ad 11h 58′.
Quæ addita ad tempus verum ☉ ♂ μ ♓ in ecliptica 11 Octobr. . . . . } 9 36.

Dant

Dant *tempus oppositionis Martis & Solis Berolini, tempore vero* 11 *Oct.* . } 21h 34′.
Æquatio temporis subtrahatur . . . 13½.
Et restabit tempus medium Berolini 11 Oct. 21 20½.
Pro differentia meridianorum inter Bononiam & Berolinum subtrahe . } 8½.
Restat tempus medium Bononiæ 11 Oct. 21 12.

III. Ut 24 horæ ad 19′ 15″ motum diurnum Martis in longitudine, ita 11h. 58′. tempus inter ♂ ☌ & μ ♓ in ecliptica & oppositionem ☉ & ♂, ad 0° 9′ 36″.
Quæ subtracta a Long. ♂ in ♂ ☌ & μ ♓ 0 ♈ 19 25 40.
Relinquunt *Longitud.* ♂ *in* ☌ ☉ . 0 ♈ 19 16 4.
Locus Solis ex ephemeridibus Manfredianis
D. 11. Oct. 21h. 12′. tempus medium Bononiæ eruitur . . } 6 ♎ 19 16 3.
Differentia tantum unius minuti secundi (præter semicirculum) a loco Martis, quæ tuto negligitur.

VI. Ut 24 horæ ad 3′ 40″, motum diurnum Martis in latitudine, ita 11h. 58′ ad . 0° 1′ 50″.
Quæ subtracta a Latitudine Martis
In conjunctione ♂ & μ ♓ in ecliptica 2 57 56 Mer.
Relinquunt *Latitudinem* ♂ *in* ☌ ☉ 2 56 6 Mer.

III.

Observationes Martis circa stationem ejus secundam, mense Novembri, *ann.* 1736.

Versabatur Mars inter stellas *e*, ε & ζ Piscium, aliasque stellas minores; a quibus distantias Martis sæpius dimensus sum, tribus diversis tubis, scilicet tubo 7, tubo 9, & tubo 2 pedum, semel etiam tubo 18 pedum. Per tubos longiores distantiæ accuratiores capi possunt: quia vero spatium non adeo magnum simul comprehendunt, minores tantum distantias per ipsos

ipſos dimetiri potui. Per tubum 2 pedum majores quidem diſtantiæ obſervari potuerunt; illæ tamen non adeo accuratæ eſſe ſolent, quin aliquando dubium 1 vel 2 minutorum irrepere poſſit, præſertim ſi diſtantiæ nimis magnæ ſunt, ut capacitatem tubi fere expleant. Tales errores maxime ſe produnt, quando ſitus ſtellarum in chartam delineatur, & diſtantiæ planetæ a diverſis ſtellis, non in uno puncto, ſe interſecant. Excerpſi ſtellas, a quibus Martem dimenſus ſum, ex catalogo Britannico, & per diſtantias Martis ab his ſtellis, locum planetæ ope circini indagavi. Primo enarrabo diſtantias captas; deinde exhibebo loca Martis per illas eruta. Ubi notandum eſt, me delineatione uſum fuiſſe, in qua magnitudines graduum, & diſtantiæ ſtellarum, duplæ fuerunt earum, quas ſchema adjectum exhibet. [Vid. Fig. 2. TAB. IV.]

Stylo novo.	Temp. vero veſperi.			Partes Microm.	Valor parium Microm.
	H. ′				° ′ ″
D. 27 Oct.	8. 58.	♂ e ♓	Tub. 7 ped.	121.	2. 48. 24.
D. 29 Oct.	8. 30	♂ e ♓	Tub. 7 ped.	6.	24. 48.
	8. 38.	. .	Tub. 9 ped.	83.	24. 43.
D. 1 Nov.	11. 6.	♂ e ♓	Tub. 9 ped.	38.	11. 18.
	11. 10.	. .	Tub. 7 ped.	28.	11. 12.
D. 5 Nov.	7. 22.	♂ a.	Tub. 7 ped.	34½.	13. 48.
	7. 26.	♂ e ♓	. . .	100½.	40. 12.
	8. 14.	♂ c.	. . .	105.	42. 0.
	8. 21.	♂ a.	Tub. 9 ped.	44.	13. 6.
D. 6 Nov.	7. 28.	♂ a.	Tub. 7 ped	17.	6. 48.
	7. 34.	♂ e ♓	. . .	116.	46. 24.
	7. 40.	♂ c.	. . .	110.	44. 0.
		vel.		110½.	44. 12.
	7. 44.	♂ a	Tub. 9 ped.	23½.	6. 59.

Stylo novo.	Temp. vero vesperi.			Partes Micro.	Valor partium Microm.
	H. ′.				° ′ ″.
D. 7 Nov.	6. 4.	♂ a.	Tub. 18 ped	16.	2. 17.
	7. 47.	♂ a diffic.	Tub. 7 ped	5½.	2. 12.
	7. 50.	♂ e ♓	. . .	129.	51. 36.
	7. 53.	♂ c.	. . .	118.	47. 12.
D. 12 Nov.	9. 19.	♂ a.	Tub. 7 ped	52.	0. 20. 48.
	9. 27.	♂ e ♓	. . .	172.	1. 8. 48.
	9. 38.	♂ c.	. . .	165.	1. 6. 0.
D. 13 Nov.	7. 32.	♂ a.	Tub. 9 ped.	77.	0. 22. 56
	7. 36.	♂ a.	Tub. 7 ped.	58.	0. 23. 12.
	7. 40.	♂ e ♓.	. . .	175.	1. 10. 0.
	7. 44.	♂ c.	. . .	171.	1. 8. 24.
D. 15 Nov.	7. 2.	♂ a.	Tub. 7 ped.	72.	0. 28. 48.
	7. 9.	♂ e ♓.	. . .	179.	1. 11. 36.
	7. 13.	♂ c.	. . .	186½.	1. 14. 36.
	7. 18.	♂ a.	Tub. 9 ped.	96.	0. 28. 35.
D. 26 Nov.	6. 11.	♂ e ♓.	Tub. 2 ped.	91.	1. 22. 6.
		♂ ζ ♓.	. . .	106.	1. 35. 38.
		♂ ε ♓.	. . .	94.	1. 24. 48.
		♂ c.	. . .	143.	2. 9. 2.
		♂ a.	. . ♓.	113.	1. 41. 57.
		♂ e ♓.	. . .	92.	1. 23. 0.
	6. 32.	♂ a.	. . .	103.	1. 32. 55.
D. 28 Nov.	6. 43.	♂ e ♓.	Tub. 2 ped.	104.	1. 33. 50.
	6. 46.	♂ ζ ♓.	. . .	82.	1. 13. 59.
	9. 34.	♂ ε ♓.	. . .	103.	1. 32. 55.
	9. 37.	♂ e ♓.	. . .	105.	1. 34. 44.
	9. 41.	♂ ζ ♓.	. . .	82.	1. 13. 59.
		melius.		81.	1. 13. 5.
D. 3. Dec.	9. 41.	♂ e ♓.	Tub. 2 ped.	160.	2. 24. 23.
		♂ ε ♓.	. . .	157.	2. 21. 40.
	9. 52.	♂ ζ ♓.	Tub. 7 ped.	56.	0. 22. 24.
	10. 1.	♂ ζ ♓.	Tub. 9 ped.	75½.	22. 29.
		vel.		76.	22. 38.
D. 6. Dec.	5. 33.	♂ ε ♓.	Tub. 2 ped.	201.	3. 1. 22.
	5. 39.	♂ e ♓.	. . .	204.	3. 4. 4.
	5. 44.	♂ ζ ♓.	. . .	50.	0. 45. 8.
		♂ ζ ♓.	Tub. 7 ped.	113½.	0. 45. 24.
	5. 57.	♂ ζ ♓.	Tub. 9 ped.	153.	0. 45. 34.

Hæ diſtantiæ ſemper a centro Martis intelligendæ ſunt, præſertim per tubos longiores.

Sequuntur loca Martis, ex diſtantiis recenſitis deducta, & loca ejuſdem ex diverſis ephemeridibus excerpta, ut conſenſus ſive diſſenſus appareat inter calculos & obſervationem.

Stylo novo.	T. ver. veſperi.		Longitudo Martis.	Latitudo Martis.
	H. ′.		♈ ′ ″.	° ′ ″.
D. 5 Nov.	8. 18.	Obſervatio	♈ 13. 37. 0.	1. 17. 0. M.
		Manfredii.	13. 26. —	1. 16. 30.
		Ghiſlerii.	13. 42. —	1. 20. 30.
		Deſplaces.	13. 35. 30.	1. 17. 30.
D. 6 Nov.	7. 26.	Obſervatio	♈ 13. 32. 0.	1. 13. 15. M.
		Manfredii.	13. 22. —	1. 13. —
		Ghiſlerii.	13. 37. 30.	1. 16. —
		Deſplaces.	13. 31. —	1. 14. —
D. 7 Nov.	7. 50.	Obſervatio	♈ 13. 27. 40.	1. 9. 30 M.
		Manfredii.	13. 17. 40.	1. 9. 20.
		Ghiſlerii.	13. 32. 40.	1. 12. —
		Deſplaces.	13. 27. —	1. 10. —
D. 12 Nov.	9. 28.	Obſervatio	♈ 13. 20. 0.	0. 50. 40. M.
		Manfredii.	13. 8. —	0. 51. —
		Ghiſlerii.	13. 19. 30.	0. 53. —
		Deſplaces.	13. 18. —	0. 51. 30.
D. 13 Nov.	7. 38.	Obſervatio	♈ 13. 20. 30.	0. 48. 0. M.
		Manfredii.	13. 9. 15.	0. 48. —
		Ghiſlerii.	13. 19. —	0. 49. 30.
		Deſplaces.	13. 19. —	0. 48. —
D. 15 Nov.	7. 12.	Obſervatio	♈ 13. 23. 30.	0. 42. 0. M.
		Manfredii.	13. 13. —	0. 41. —
		Ghiſlerii.	13. 21. 30.	0. 43. —
		Deſplaces.	13. 21. 30.	0. 41. —
D. 26 Nov.	6. 20.	Obſervatio	♈ 14. 35. 0.	0. 9. 0. M.
		Manfredii.	14. 26. —	0. 9. —
		Ghiſlerii.	14. 37. —	0. 12. —
		Deſplaces.	14. 34. —	0. 9. 30. M.

Stylo novo.	T. ver. vesperi.		Longitudo Martis.	Latitudo Martis.
	H. ′.		° ′ ″	° ′ ″
D. 28 Nov.	9. 35.	Observatio	♈ 14. 57. 0.	0. 3. 30. M.
		Manfredii.	14. 49. 30.	0. 4. — M.
		Ghislerii.	14. 59. —	0. 7. — M.
		Desplaces.	14. 57. 30.	0. 5. — M.
D. 3 Dec.	9. 48.	Observatio	♈ 16. 1. 0.	0. 6. 30. S.
		Manfredii.	15. 57. —	0. 7. 40. S.
		Ghislerii.	16. 3. —	0. 5. — S.
		Desplaces.	16. 2. —	0. 7. — S.
D. 6 Dec.	5. 46.	Observatio	♈ 16. 46. —	0. 16. — S.
		Manfredii.	16. 40. 30.	3. 13. 30.
		Ghislerii.	16. 47. 30.	0. 10. 30.
		Desplaces.	16. 50. 33.	0. 13. 30. S.

Duobus ultimis diebus, scilicet 3. & præsertim 6 Decembris, loca Martis, ex observatione deducta, sunt incerta: Illa itaque, si cui ita visum fuerit, plane omitti possunt.

Loca stellarum fixarum in schemate adjecto, ex catalogo Britannico ad initium anni 1690. sine ulla reductione excerpta sunt: quare longitudinibus Martis, quas figura nobis exhibuit, 39′ 0″, vel 39′ 5″, addenda fuerunt, pro motu stellarum fixarum in 46 annis, & 10 vel 11 circiter mensibus.

Omissæ sunt supra observationes diei 9 Novembr. quas hic adjiciam, cum loco Martis ex illis deducto.

Stylo novo.	Temp. vero vesperi.			Partes Micro.	Valor partium Microm.
	H. ′.				
D. 9 Nov.	9. 28.	♂ *a.*	Tub. 7 ped.	25.	0. 10. 0.
	9. 30.	♂ *e* ♓.	. . .	152.	1. 0. 48.
	9. 34.	♂ *c.*	. . .	136.	0. 54. 24.
	9. 41.	♂ *a.*	Tub. 9 ped.	32½.	0. 9. 40.

Stylo

Stylo novo.	Temp. vero vesperi.		Longitudo Martis.	Latitudo Martis.
			° ′ ″	° ′ ″
D. 9 Nov.	9. 34.	Observatio	♈ 13. 22. 20.	1. 1. 30. M.
		Manfredii.	13. 22. —	1. 0. 30.
		Ghislerii.	13. 11. —	1. 3. 30.
		Desplaces.	13. 25. —	1. 2. 30.

VII. *A Collection of the* Observations *of the Remarkable* Red Lights *seen in the Air on* Dec. 5. 1737. *sent from different Places to the* ROYAL SOCIETY.

1. *An Account of the* Red Lights, *on* Dec. $\frac{5}{16}$. 1737. *as observed* (*at* Naples) *by the Prince of* Cassano, F. R. S. *and by him sent in a Letter to the* President: *Translated from the* Italian *by* T. S. *M. D.* F. R. S.

A *Phænomenon* of a fiery Meteor is my Motive for troubling you, Sir, with this other short Narrative; being persuaded that it will be as agreeable to you to peruse, as it was to me to draw it up with all the Circumstances of Truth, to which I was an Eye-witness.

Dec. 16. 1737. (*N. S.*) in the Evening, the Sun being about 25 Degrees below the Horizon, a Light was observed in the North, as if the Air was on Fire, and flashing; the Intenseness of which gradually increasing, at the Third Hour of the Night it spread Westward in such a Manner, that if a Perpendicular was let fall from the Polar Star, and afterwards a

Pa-

Fig. 1.

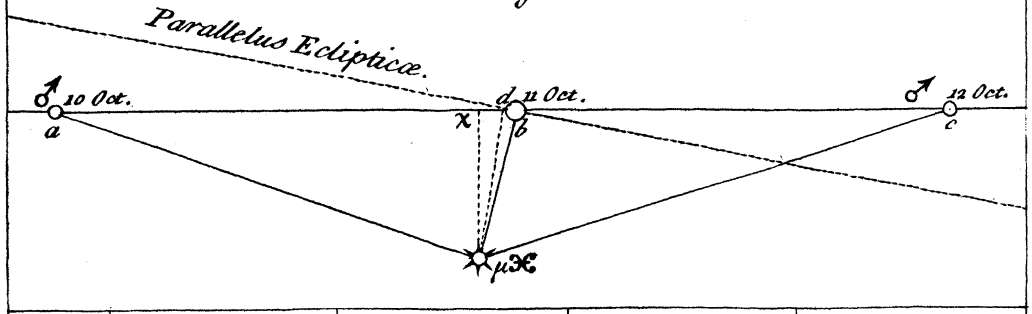
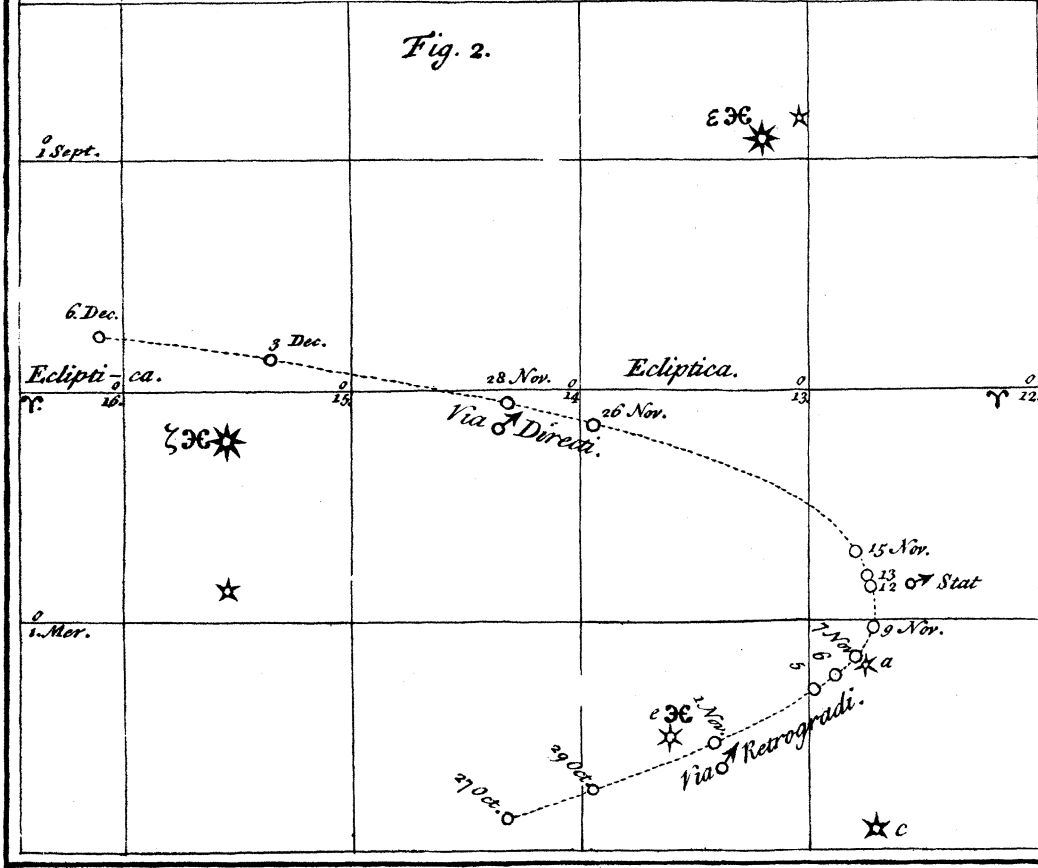


Fig. 2.



J. Mynde sc.