VI. Obfervations *of the* Tranfit *of* Mercury *over the* Sun, Oct. 31. 1736. *communicated to the* Royal Society.

1. *An* Obfervation *of the* Tranfit *of* Mercury *over the* Sun, Oct. 31. 1736. *by Mr.* George Graham, *F. R. S. made in* Fleetftreet, London.

Oct. 31. *A. M.*
Apparent Time.

H.	M.	S.	
At 9	22	00	*Mercury* not yet feen, then Clouds.
9	25	37	I firft faw *Mercury* for a few Seconds, and judged he was got intirely within the *Sun*'s Disk, or perhaps a little more; then Clouds again, with fome Intervals of a few Moments between, which allow'd us a Sight of *Mercury* about three or four feveral times; then quite cloudy till near 12, when we had a Sight of the *Sun* for a few Minutes, and took his *Tranfit* upon the Meridian; at which time we judged *Mercury* to be about two of his Diameters, or a little more, within the *Sun*'s Disk, and a little paft the vertical Line.
12	10	27	We had again a Sight of the *Sun*, but *Mercury* was gone off.

2. *Con-*

2. *Congreffus* Mercurii *cum* Sole *in Aftronomica Specula* Bononienfis *fcientiarum Inftituti obfervatus, die* xi Novembris, MDCCXXXVI. (*N. S.*) *mane: referente* Euftachio Manfredio, *ejufdem inftituti Aftronomo. & R. S.* Lond. *S.*

CUM mihi ob adverfam valetudinem tranfitum hunc Mercurii fub Sole nonnifi per intervalla fpectare, neque in eo mihi ipfi fatisfacere licuerit, referam paucis, quæ in hac fpecula non tam a me quam a Viris doctiffimis, qui frequentes huc adventare confueverunt, obfervata fuerint, præfertim vero ab egregio juvene *Euftachio Zanotto Phil. Doc.*, qui meas in aftronomica profeffione vices gerit; deinde ea fubjungam, quæ poftmodum ex obfervationibus in typum relatis, atque ad calculos expenfis una cum illo definivi.

In fupremo fpeculæ conclavi, unde majores tubi optici promi, aptarique poffunt, intenderat *Zanottus* in Solem optimæ notæ telefcopium, a Campano elaboratum, pedes 22 Bononienfes longum, quo ipfum, fi fieri poffet, Mercurii in marginem Solis incurfum notaret; ac quando incurfum illum quorumdam aftronomorum calculi maturius, aliorum ferius, complurium fcrupulorum diffidio, pollicebantur, cum *Jofepho Roverfio* condixerat, fi quando ipfe ceffaffet, ut is confeftim eidem telefcopio fuccederet. Alii interea aliunde brevioribus tubis in idem intendebamus. Cœlum erat nitidiffimum, aer nullo ventorum flatu perturbatus. Obtigit *Roverfio,* ut omnium primus Planetam ad Solis marginem deprehenderet hora poft meridiem 22. 8. 37. ac mox interiorem ejus cum Sole contactum definiret hora 22. 11. 12. Horologiis utebamur

mur ad meridianam lineam per eofdem dies expenfis, quam ipfam lineam *Zanottus* per æquales altitudines matutinas ac vefpertinas pluries ad Solem exegit.

Obfervatoribus aliis paullo ferius Planeta in Solis limbo eft animadverfus. Mihi, ex inferiori conclavi collimanti telefcopio Campani pedum 11 non ante horam 22. 9. 5. eft confpectus, cum jam fat notabili fui parte Solem delibaret, contactus autem interior eodem tubo æftimatus hor. 22. 10. 53. Sed longe certior prior illa obfervatio, quippe quæ præftantiori inftrumento eft habita. Quoniam tamen ex temporibus egreffus Planetæ mox afferendis conftitit ejus corpufculum in exceffu impendiffe min. 3. 16. fi tantumdem ex tempore contactus interioris a *Roverfio* notati fubduxerimus, fiet contactus exterior, five primus Mercurii ad Solem appulfus adhuc certior hor. 22. 7. 56.

Deinceps obfervationes eo fpectarunt, ut puncta aliquot invenirentur ejus femitæ quam Planeta in Sole defcribere vifebatur. Ea puncta fingula ad circulum horarium, necnon ad parallelum per centrum Solis ductum retulimus, Cafliniana methodo, notatis ex horologio temporibus, quibus & limbi Solis, & Mercurius filum horarium micrometri, hic vero præterea etiam obliqua pertranfiret, interea dum Sol boreo fui margine filum ipfum parallelum perraderet. Multa ejufcemodi puncta nactus eft *Zanottus* telefcopio pedum 8; unum ego vel alterum tubo pedum 6, cui tubo micrometrum aptatum erat exquifiti operis a viro cl. *Jo. Jacobo Marinonio Mathematico Cæfareo* excogitatum, atque huic obfervatorio dono miffum. Eodem & *Roverfius*, & *Thomas Perellus, M. D.* nonnulla puncta alia determinarunt. Huc etiam pertine obfervatio a *Perello* in ipfo meridiano habita, murali

femi-

femicirculo, qua obfervatione inventa eft Planetæ af-
cenfio recta fecundis 11 $\frac{1}{2}$ temporariis major, declina-
tio autem fecundis 58 $\frac{1}{2}$ temporariis minor quam cen-
tri Solis. Illud præterea *Zanottus* fibi fumpfit, ut in-
figniorum macularum, quæ plures eo die in Sole cer-
nebantur, pofitus defcriberet. Ab iis maculis facile
erat Planetam internofcere, & quod exacte rotundus,
& quod nigerrimus, & quod nulla areola effet ob-
feptus.

Ad Mercurii egreffum quod attinet, *Francifcus Al-
garottus*, *R. S. Lond. S.* qui nuper ex Gallia & Britannia
in Italiam redux hujufce phænomeni fpectandi gratia Bo-
noniam fe contulerat, tubo pedum 8 ufus initium notavit
hora a meridie o. 50. 1,finem hor. o. 53. 6; ego vero tele-
fcopio illo 11 pedum initium hor. o. 51. 7, finem hor. o.
53. 44; *Roverfius* telefcopio pedum 14 finem tantum
advertit hor. o. 54. 1 ; verum hæ obfervationes minus
certæ cum ob mediocrem tuborum præftantiam, tum
quod ventus id temporis coortus tubos ipfos nonnihil
agitaret. Præferenda ergo hifce omnibus obfervatio
telefcopio illo pedum 22 habita, quo *Francifcus Van-
dellius*, in hoc fcientiarum Inftituto *militaris archi-
tecturæ profeffor*, interiorem contactum definivit hor.
o. 50. 50, exteriorem hor. o. 54. 6, unde mora pla-
netæ in limbo min. 3, 16, & tempus egreffus centri
hor. o. 52. 28, quod ex mea obfervatione foret hor.
o. 52. 25.

Hactenus obfervationes ipfæ; nunc quæ ex earum
inter fefe collatione una cum *Zanotto* deduxerim, per-
fequar. Affumpta Solis diametro min. 32. 34, ac
tempore ejus tranfitus per circulos horarios min. 2. 17.
(quos numeros & recentiorum aftronomorum tabulæ
exhibent, & obfervationes ipfæ comprobarunt) puncta

O   illa

illa planetariæ femitæ obfervando definita in typum
retulimus; ac cum ob exiguas obfervationum fallacias
minime omnia examuſſim in eandem rectam lineam
inciderent, nullam eorum conciliandorum rationem
aptiorem invenimus, quam ſi ſtatueremus perpendicu-
larem lineam ex centro Solis ad planetæ femitam
ductam angulum cum horario circulo comprehendere
grad. **23**. **40** ad ortum: ejus vero perpendicularis lon-
gitudinem a centro ad ipfam femitam poneremus min.
13. **58** ad boream.   Ex his reliqua omnia calculo de-
duximus in hunc modum.

		Hor.	$'$	$''$
Initium ingreſſus Mercurii in So-				
lis difcum	hor.	22	7	56
Ingreſſus centri	hor.	22	9	34
Totalis ingreſſus	hor.	22	11	12
Initium egreſſus	hor.	0	50	50
Egreſſus centri	hor.	0	52	28
Totalis egreſſus	hor.	0	54	6
Mora centri Mercurii in difco				
Solis	hor.	2	42	54
Semimora	hor.	1	21	27
Tempus medii tranſitus	hor.	23	31	1

		$\circ$	$\prime$	$''$
Angulus lineæ perpendicularis ad				
femitam planetæ cum circulo				
horario ab obfervationibus defi-				
nitus, ad ortum	gr.	23	40	0
Angulus eclipticæ cum horario ex				
tabulis aſtronomicis ad ortum	gr.	105	48	0

Inde

		°	′	″
Inde angulus eclipticæ cum perpendiculari ad Mercurii femitam apparentem	gr.	82	8	
Et angulus femitæ app. cum ecliptica	gr.	7	52	

		°	′	″
Diſtantia femitæ a centro Solis ab obſervationibus inventa ad bor.	gr.	0	13	58
Semidiameter Solis	gr.	0	16	17
Longitudo femitæ intra Solis diſcum	gr.	0	16	45
Ejus longitudinis dimidium	gr.	0	8	22
Ex his motus horarius Mercurii in femita apparenti	gr.	0	6	10
Motus horarius apparens in ecliptica	gr.	0	6	6

		°	′	″
Inde portio femitæ inter medium tranſitus & conjunctionem	gr.	0	1	58
Portio femitæ ab ingreſſu ad conjunctionem	gr.	0	10	20
Portio ejuſdem a conjunctione ad egreſſum	gr.	0	6	24
Differentia longitudinis Mercurii & Solis in ingreſſu	gr.	0	10	15
Differentia longitudinis in egreſſu	gr.	0	6	21

		°	′	″
Tempus a medio tranſitus ad conjunctionem	hor.	0	19	2
Tempus ipſum conjunctionis Bononiæ	temp. ver. hor.	23	50	3
	temp. med. hor.	23	34	25

O 2

Lon-

	☉	′	″
Longitudo Solis & Mercurii in ipfa conjunctione e Caffinianis tabulis *Scorpii* gr.	19	23	30

Huic longitudini refpondet intra fec. 4. obfervatio a *Petro Lilio J. U. D.* eodem die habita gnomone meridiano ad Divi Petronii.

Latitudo Mercurii in ingreffu bor.	gr.	0	12	37
Latitudo in egreffu bor.	gr.	0	14	54
Inde motus horarius in latitudinem	gr.	0	0	50½
Et latitudo in ipfa conjunctione bor.	gr.	0	14	1

Ex his intervallum temporis a tranfitu Mercurii per nodum afcendentem ad conjunctionem	hor.	16	39
Et tempus ipfum tranfitus per nodum t. ver.	hor.	7	11
t. med.	hor.	6	55

Ex tabulis Caffinianis motus Mercurii in orbita e Sole vifus intertervallo horarum 16, 39 circa hoc tempus, feu argumentum latitudinis in conjunctione	gr.	4	15	47
Idem motus ad eclipticam reductus	gr.	4	13	56

Inde locus nodi afcendentis Mercurii e Sole vifus *Tauri* gr.	15	9	34

Diftantia

Diſtantia Mercurii a Sole ad tem-
pus conjunctionis e tabulis Caſ-
ſinianis   Log.   449301
Diſtantia Telluris a Sole ex iiſdem
tabulis   Log.   499503

Inde latitudo Mercurii in con-
junctione, e Sole viſa bor.   gr.   0   30   31
Unde inclinatio orbitæ Mercurii
ad eclipticam   gr.   6   51   0

Tempus a contactu interiori Mer-
curii ad exteriorem in egreſſu
ex obſervatione   bor.   0   3   16
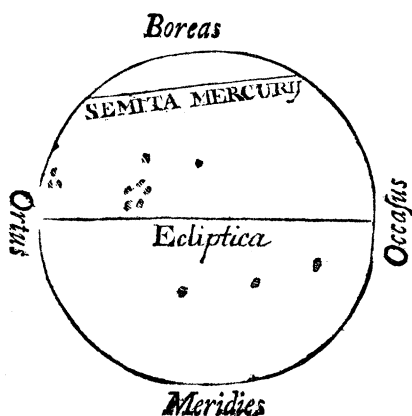Portio ſemitæ hoc tempore a Mer-
curio peragrata   gr.   0   0   20
Angulus ſemitæ ipſius cum ſemi-
diametro Solis in egreſſu   gr.   58   50   0
Inde diameter apparens Mercurii
quamproxime   gr.   0   0   10

3. Ex-

3. *Extracts of a Letter from Mr.* *Profeſſor* Weidler, *F. R. S.* &c. *to* *Dr.* Mortimer, *Secr. R. S. dated at* Wittemberg, Jan. 1, 1737. *N.S. Tranſlated from the* Latin *by* T. S. M.D. F. R. S.
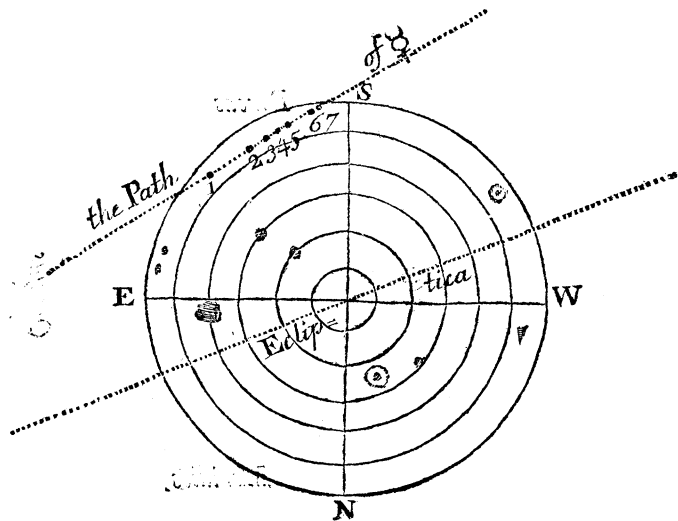
I Have lately anſwer'd your agreeable Letter of *Oct.* 26. 1736. and now ſend you a printed Copy of my Obſervation of the *Tranſit* of *Mercury* over the *Sun*, on *Nov.* 11. for though the uncertain State of the Weather was ſome Hindrance to a complete Obſervation, yet what I obſerv'd, I thought proper not to deprive others of; chiefly becauſe it does not appear to me, that this *Phænomenon* has hitherto been ſeen with better Succeſs.

I beg you will ſend the other Copy to Dr. *Halley.*

Dr. Weidler'*s Obſervations of* Mercury'*s* Tranſit; *extracted from the printed Account.*

Mercury appear'd within the *Sun's* eaſtern Limb (as in the Scheme)

H.	M.	S.		
10	49	20	at	1
11	36	00	- ☿ abt.	2
11	52	20	- at	3
12	2	30	-	4
	4	30	-	5
	44	20	-	6
	52	45	-	7

VII. *A*