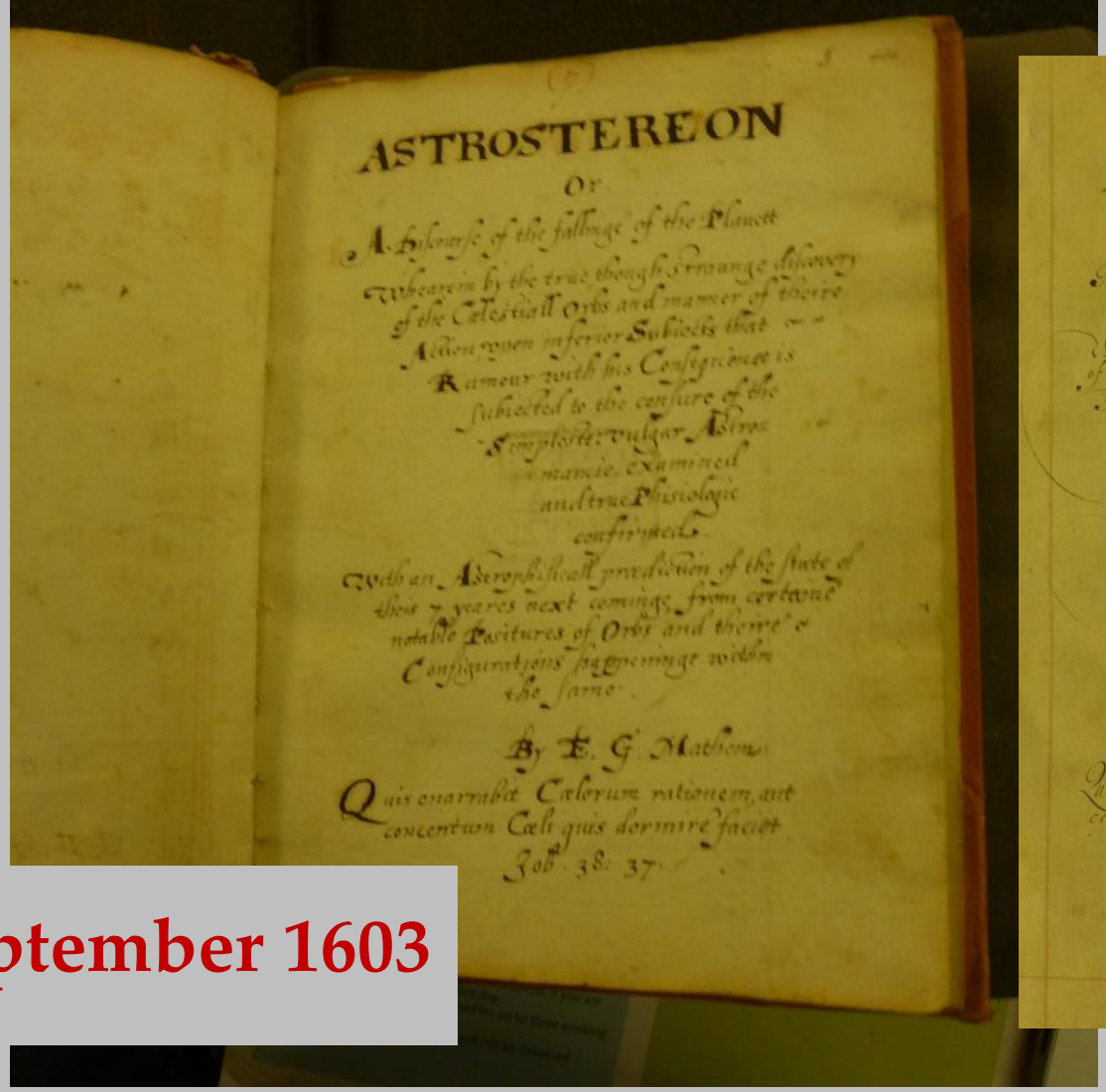
'And here appeareth the lawfull use of Astrologie': On the Distances and Sizes of the Planets in the Heliocentric Cosmos as Discussed in London in the Year 1603

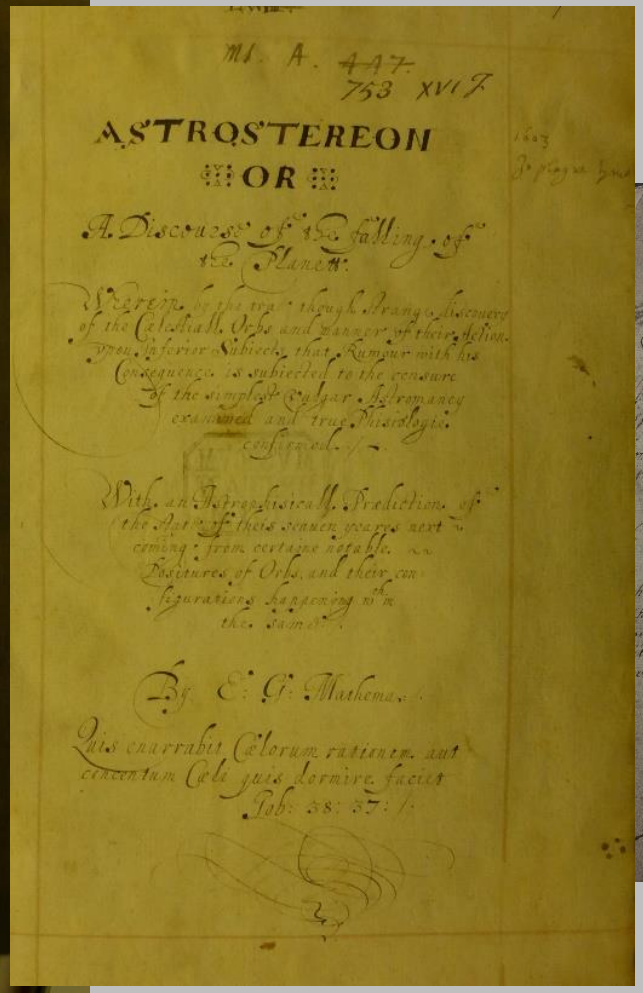
Jarosław Włodarczyk

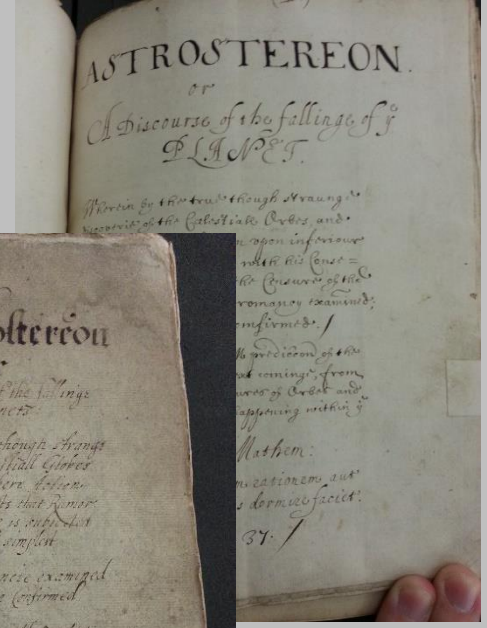
INSTITUTE FOR THE HISTORY OF SCIENCE, POLISH ACADEMY OF SCIENCES, Warsaw, Poland

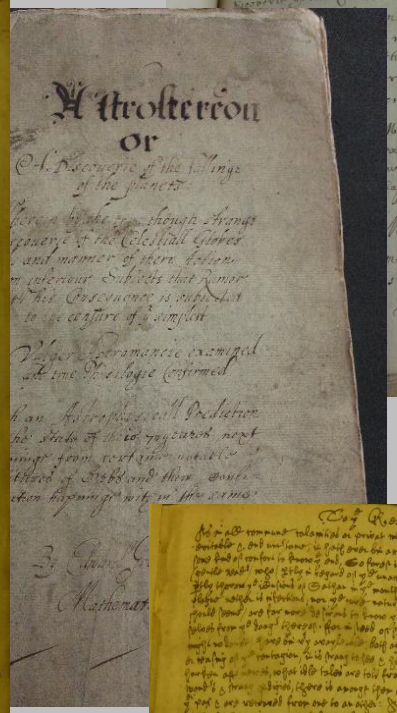


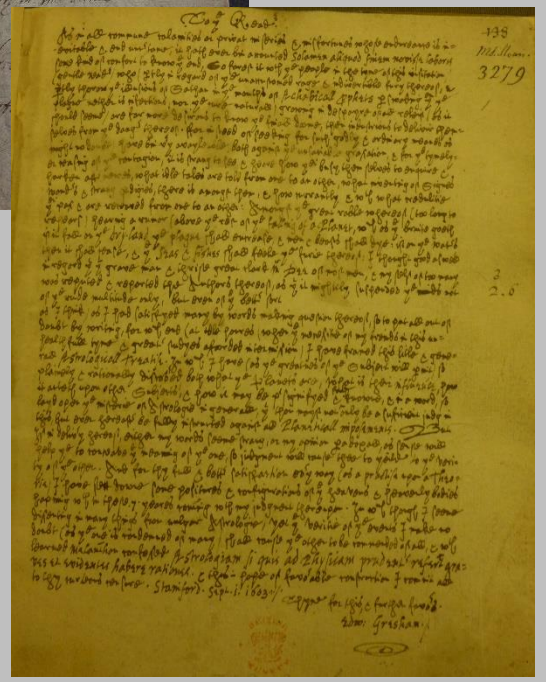
Visscher's panorama of London c.1600











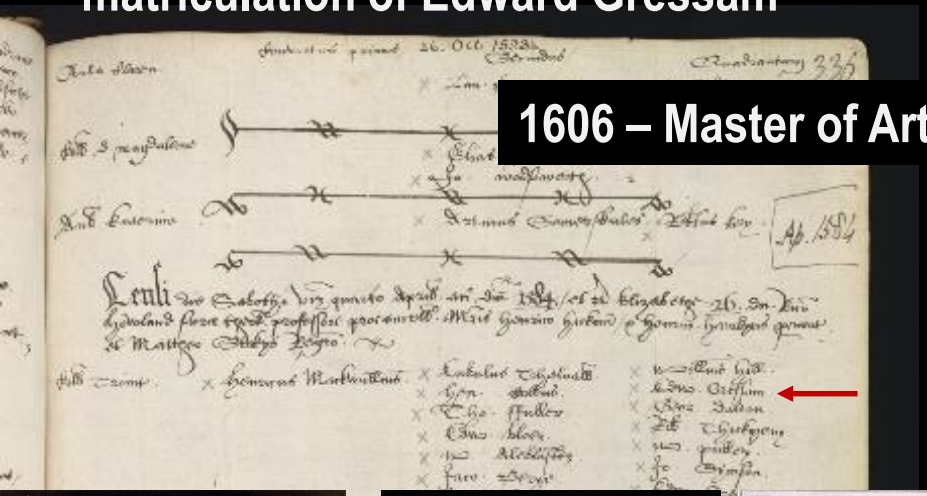
1 September 1603

British Library, London
MS Sloane 753
MS Sloane 3279
MS Sloane 3936

Bodleian Library, Oxford
MS Ashmole 192
MS Ashmole 1807

Edward Gresham (1565–1613), Stainford & Londyn

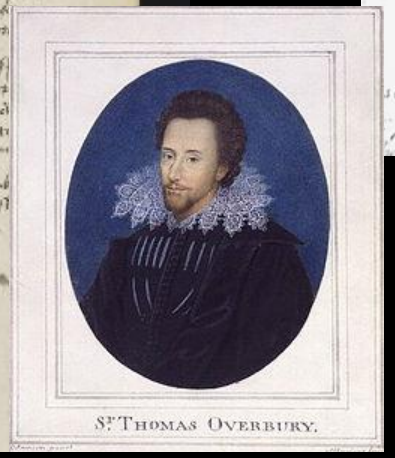
Cambridge University Record 1584:
matriculation of Edward Gressam



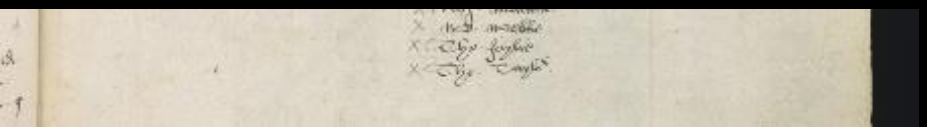
1606 – Master of Arts





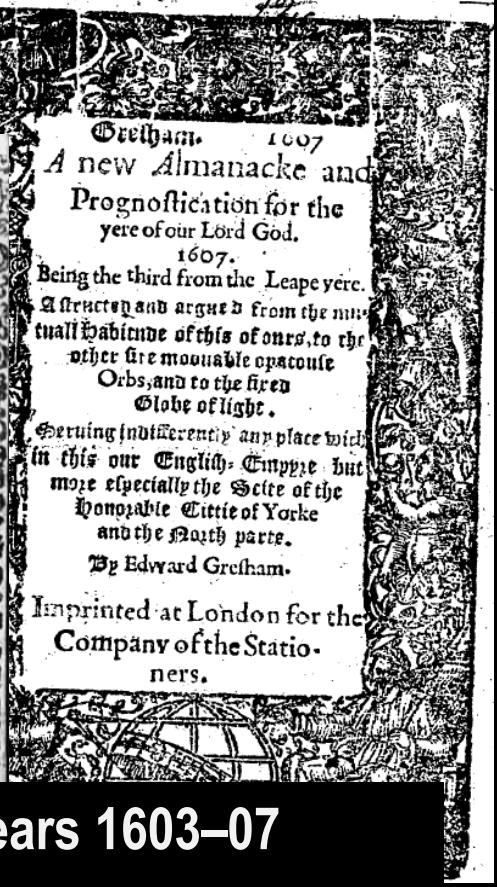


Robert Devereux, third Earl of Essex, Francis Howard,
and Sir Thomas Overbury







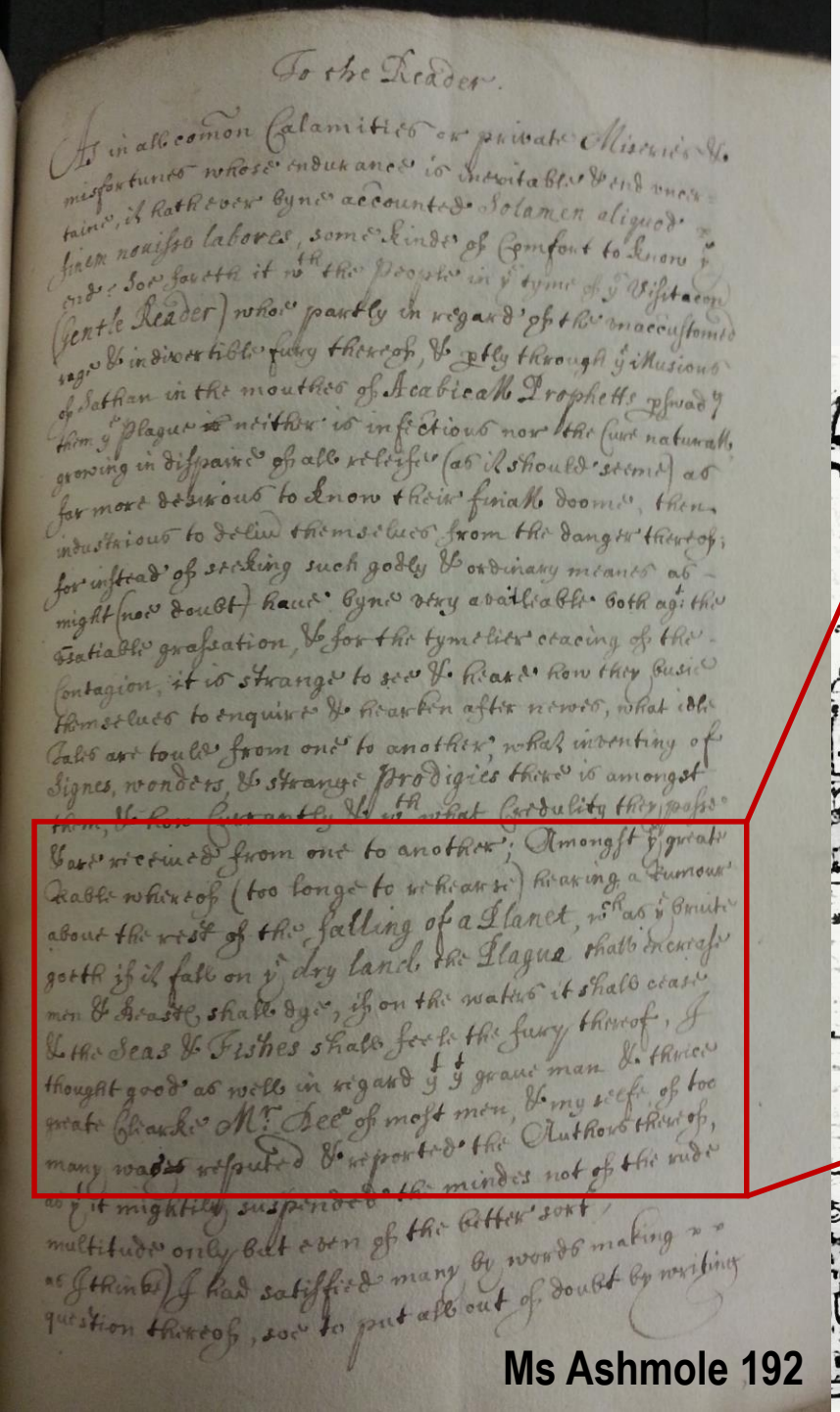


Astrological almanacs for the years 1603–07

For 1605 – no extant copies

„When the **Famous Popish Gun-Powder-Plot** was discovered, there was one **Gresham**, (a Papist and small Pretender to the Mathematicks) was violently suspected to have some Hand in't, because he wrote so near the Matter **in his Almanac**."

ANONYMOUS PAMPHLET (London, 1680)

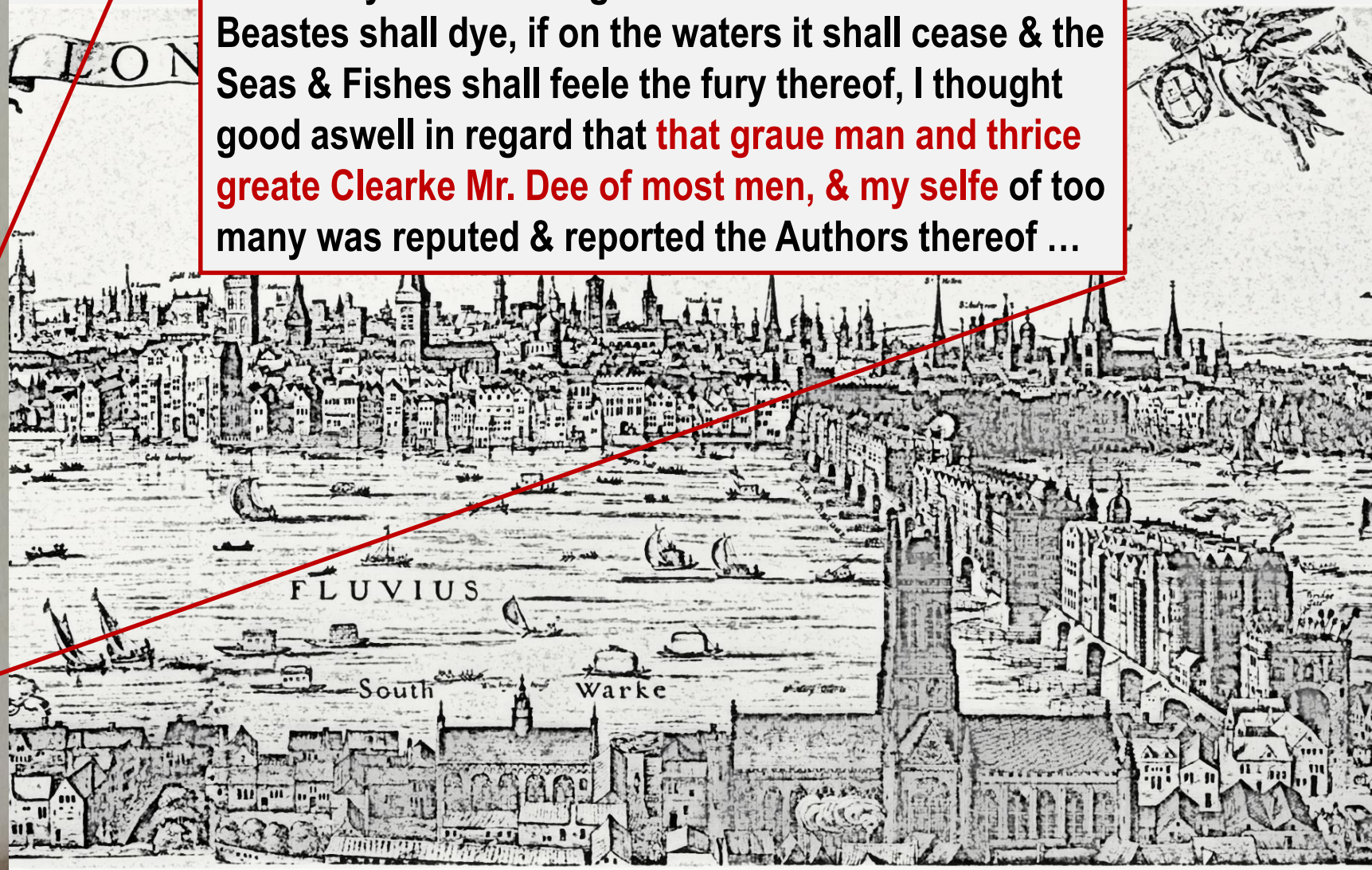


To the Reader.

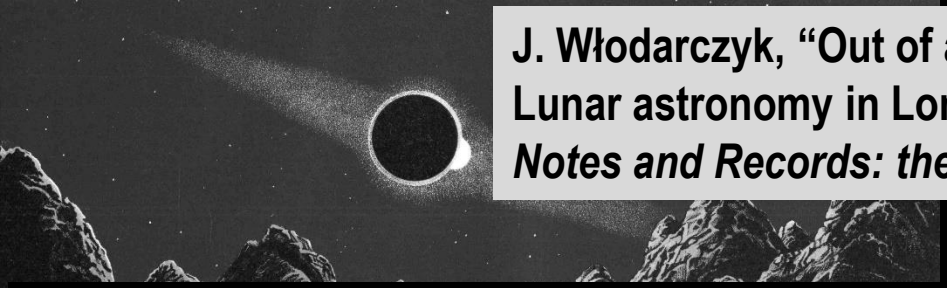
As in all comon Calamities or private Miseries & misfortunes whose endurance is inevitable & endurable, if rather eyne accounted Solamen aliquod finem nonisso laboris, some kinde of Comfort to know y^e ende: Soe fareth it w^th the People in y^e tyme of y^e Visitacon (Gentle Reader) who^e partly in regard of the unaccustomed rage & indevertible fury thereof, & partly through y^e illusions of Sathan in the mouthes of Acabicall Prophetts p^swad^g them y^e plague is neither infectious nor the cure naturall, growing in dispaire of all reliefe (as it should seeme) as far more desirous to know their finall doome, then industrious to delive themselues from the danger thereof; for instead of seeking such godly & ordinary meanes as might (noe doubt) have eyne very available both ag^t the Fatiable grasation, & for the tymelier ceasing of the Contagion, it is strange to see & heare how they busie themselues to enquire & hearken after newes, what idle Tales are toulde from one to another, what inventing of Signes, wonders, & strange Prodigies there is amongst them, & how Currantly & w^th what Credulity they passe Vare receaued from one to another; Amongst y^e greate Rable whereof (too longe to rehearse) hearing a Rumour about the rest of the falling of a Planet, w^ch as y^e Bruite goeth if it fall on y^e dry land the Plague shall increase men & Beaste shall dye, if on the waters it shall cease & the Seas & Fishes shall feele the fury thereof, I thought good as well in regard y^t y^e graue man & thrice greate Clarke Mr Dee of most men, & my selfe of too many was reputed & reported the Authors thereof, as it mightily suspended the mindes not of the rude multitude only but eaen of the better sort as I thinke I had satisfied many by words making question thereof, soe to put all out of doubt by writing

Ms Ashmole 192

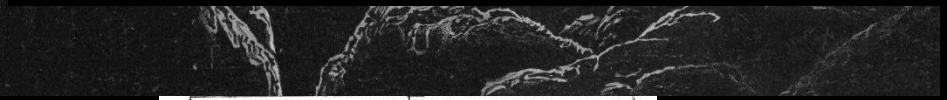
Amongst the greate ra[b]ble whereof (too long to rehearse) hearing a Rumour about the rest of the falling of a Planet, which as the bruite goeth if it fall on the dry land the Plague shall increase men & Beastes shall dye, if on the waters it shall cease & the Seas & Fishes shall feele the fury thereof, I thought good aswell in regard that that graue man and thrice greate Clearke Mr. Dee of most men, & my selfe of too many was reputed & reported the Authors thereof …

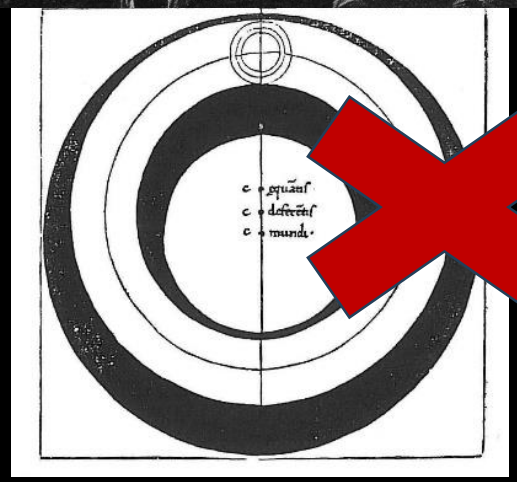


J. Włodarczyk, “Out of a greate Laborinth of errors”: Lunar astronomy in London before Kepler, *Notes and Records: the Royal Society…*, 76(3), 2022.



… the Earth to them in the Moone seemeth to mouve as fast, as we thincke she doth. And so the other Planets mutually make like apparance of motion one to another.





That they [planets] fre[e]ly move in space, without vection traction or expulsion of any heavens … and that the Scriptures speake nothinge against movinge of the Earth and the Suns standinge still.

B. Bienias, The place of Edward Gresham’s ‘Astrostereon’ (1603) in the discussion on cosmology and the Bible in the early modern period, *The British Journal for the History of Science*, 53(4), 2020.

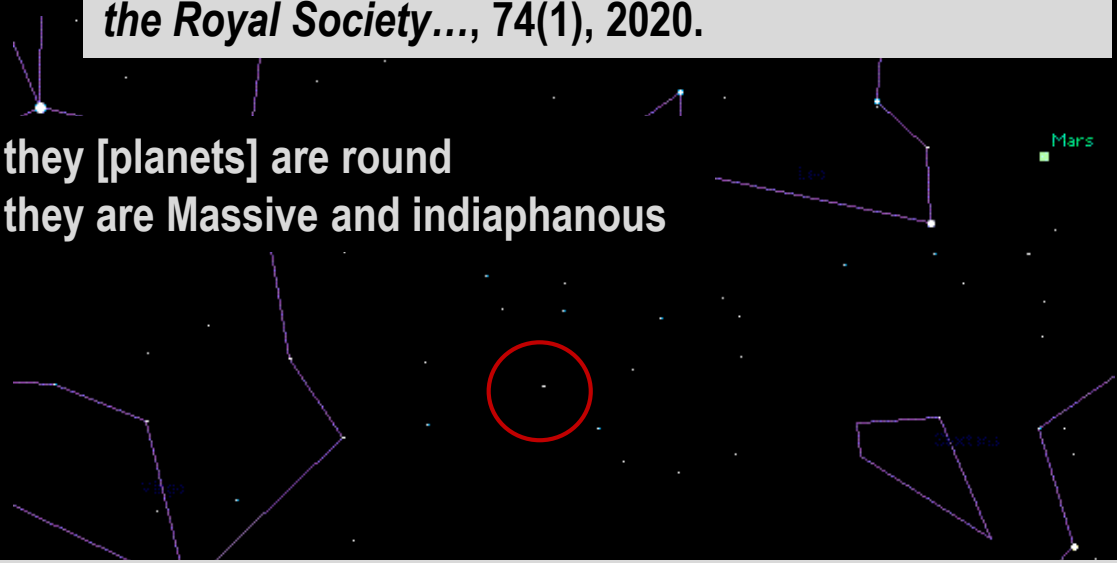
Thomas Harriot’s first drawing of the Moon, 26 July/5 August 1609



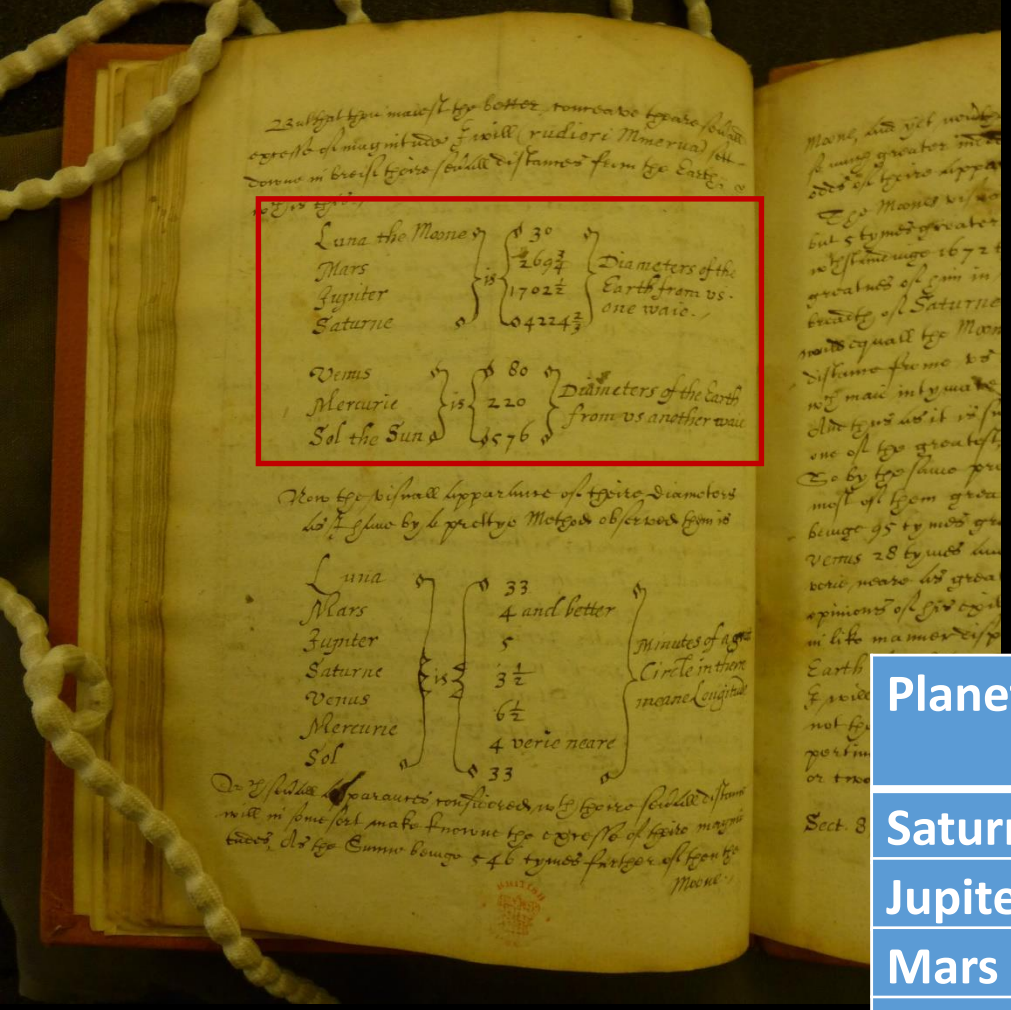
…the Moone is an Eartlie Bodie, with many Lands, Oceans, Capes, Bayes, Istlims, Ilandas, Mounts…

J. Włodarczyk, The pre-telescopic observations of the Moon in early 17th-century London: the case of Edward Gresham (1565–1613), *Notes and Records: the Royal Society…*, 74(1), 2020.

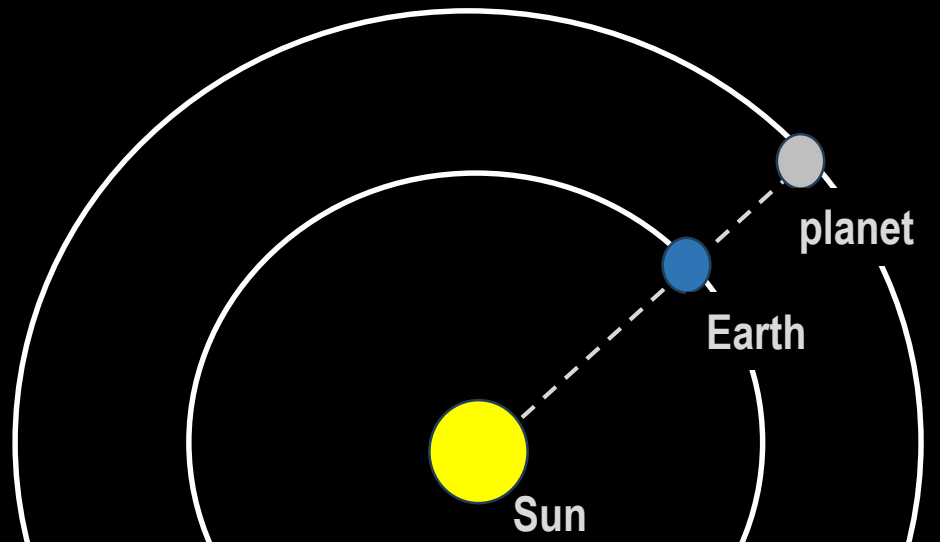
That they [planets] are round
That they are Massive and indiaphanous



J. Włodarczyk, R.L. Kremer, H.C. Hughes, Edward Gresham, Copernican Cosmology, and Planetary Occultations in Pre-Telescopic Astronomy, *JHA*, 49(3), 2018.

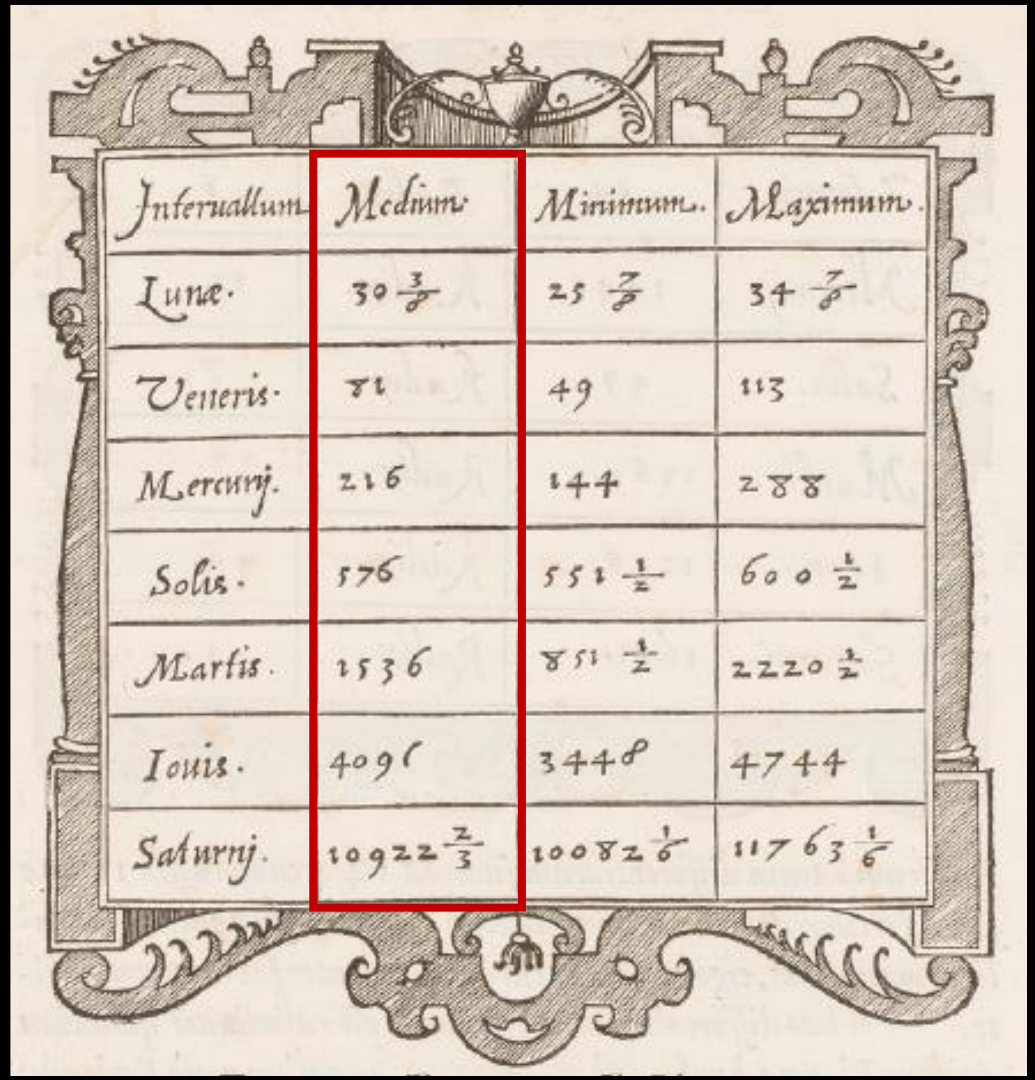


Ms Sloane 3936



Planet	Distance from the Earth (in e.r.)	
	Gresham	Copernicus
Saturn	8449 1/3	9335
Jupiter	3405	4818
Mars	593 ½	594
EARTH		
Venus	160	321
Mercury	440	712
Sun	1152	1142

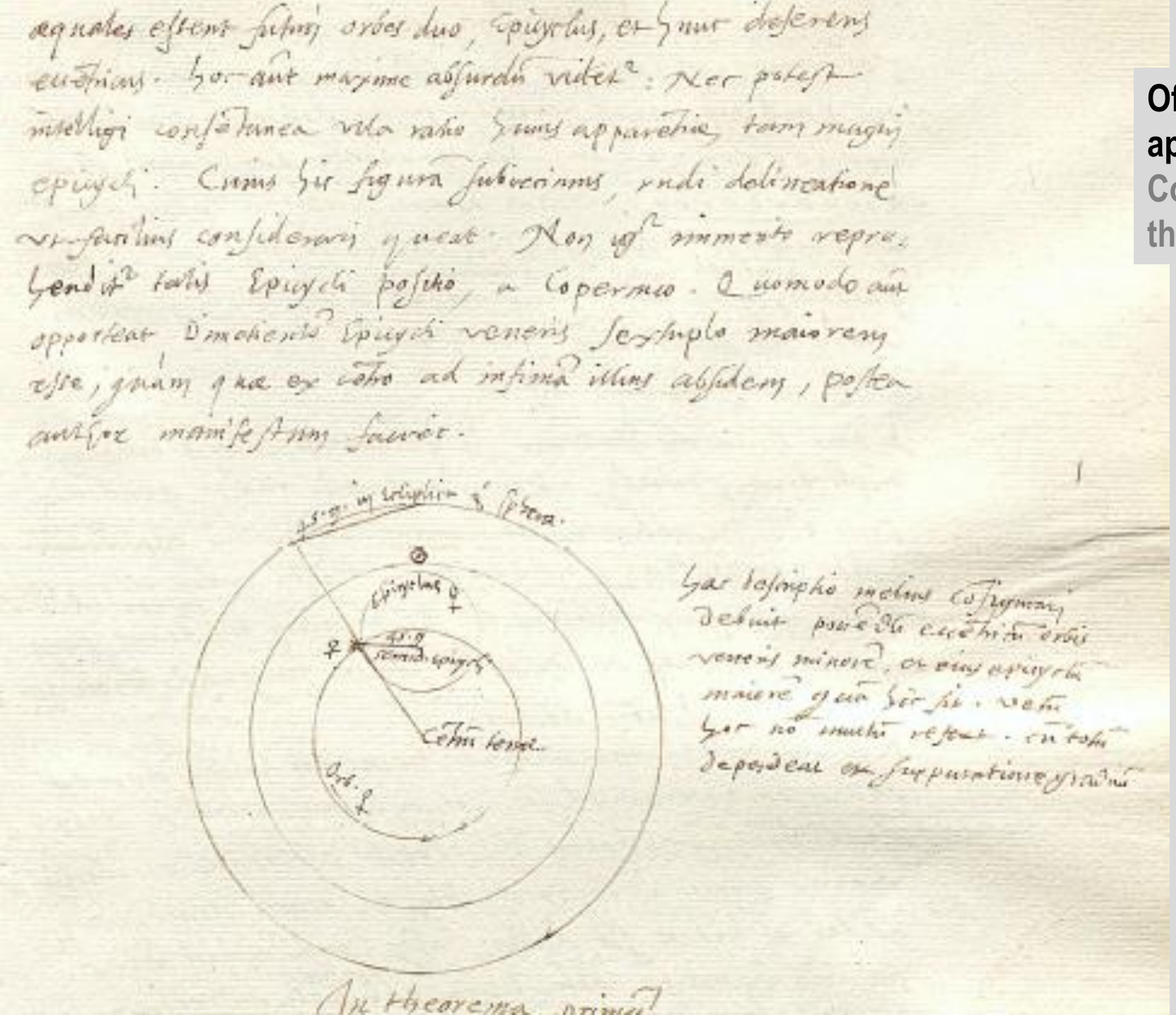
Planet	Distance from the Earth (in e.r.)		
	Gresham	Copernicus	Offusius
Saturn	8449 1/3	9335	21845 1/3
Jupiter	3405	4818	8192
Mars	593 1/2	594	3072
EARTH			
Venus	160	321	162
Mercury	440	712	432
Sun	1152	1142	1152



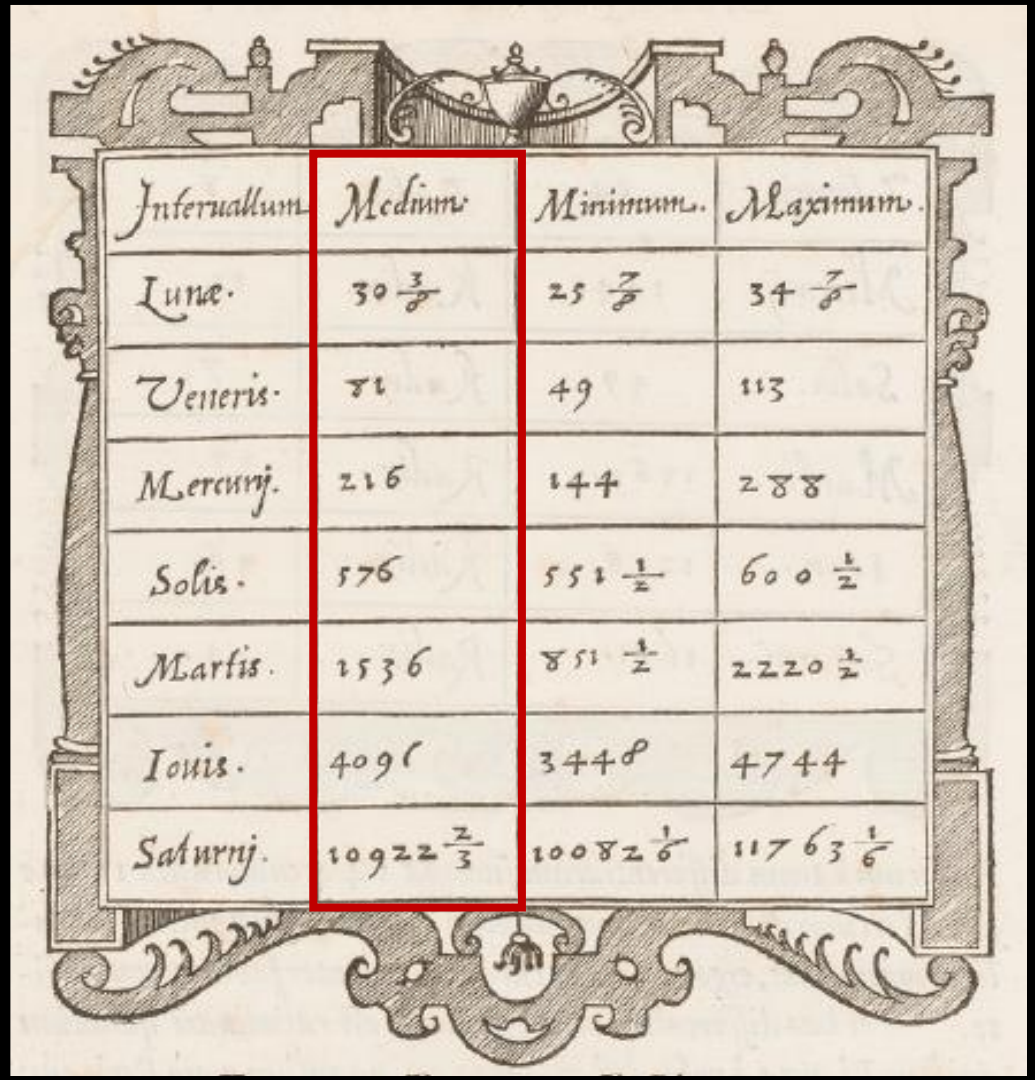
Johannes Francus Offusius, *De divina astrorum facultate in larvatam astrologiam* (Paris, 1570)
[distances are given in terrestrial diameters]

Offusius's commentary on Venus appended to his copy of *De revolutionibus*

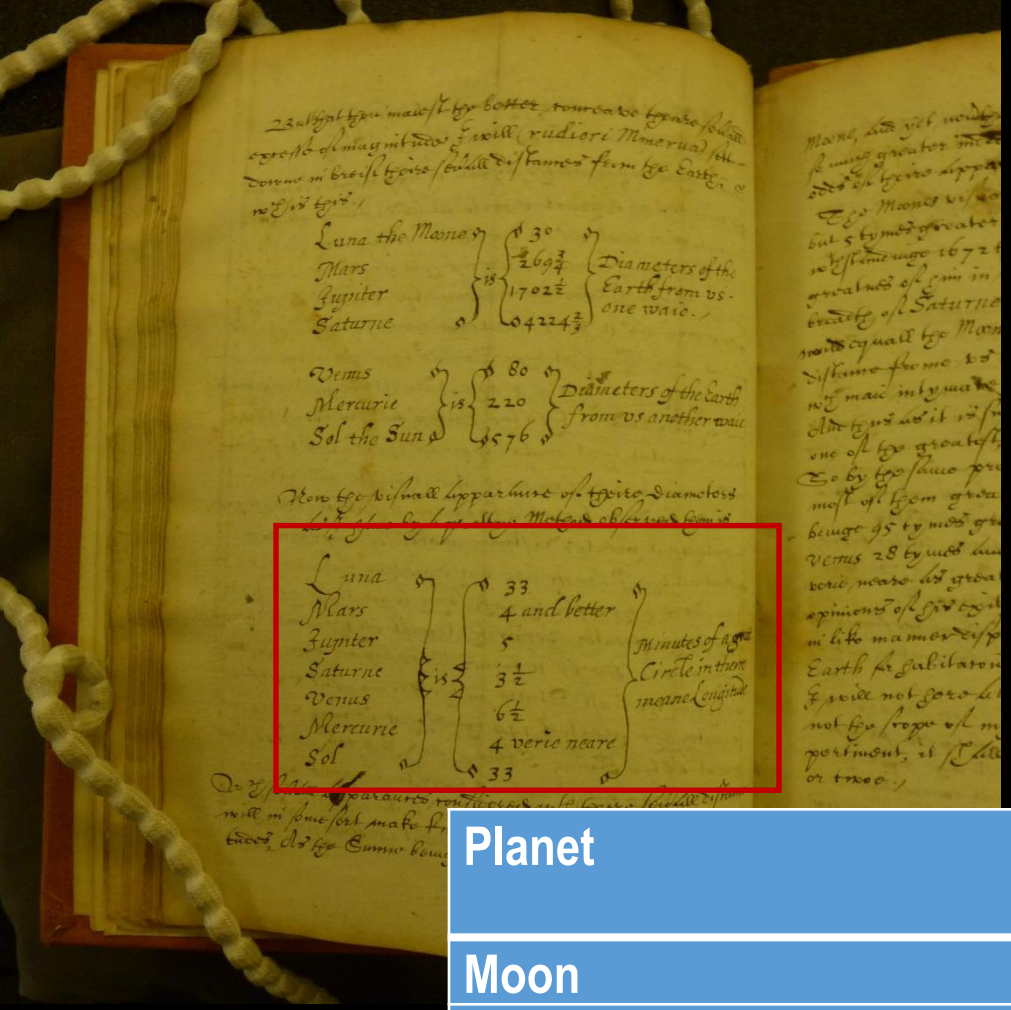
Courtesy of the Trustees of
the National Library of Scotland



Planet	Distance from the Earth (in e.r.)		
	Gresham	Copernicus	Offusius
Saturn	8449 1/3	9335	21845 1/3
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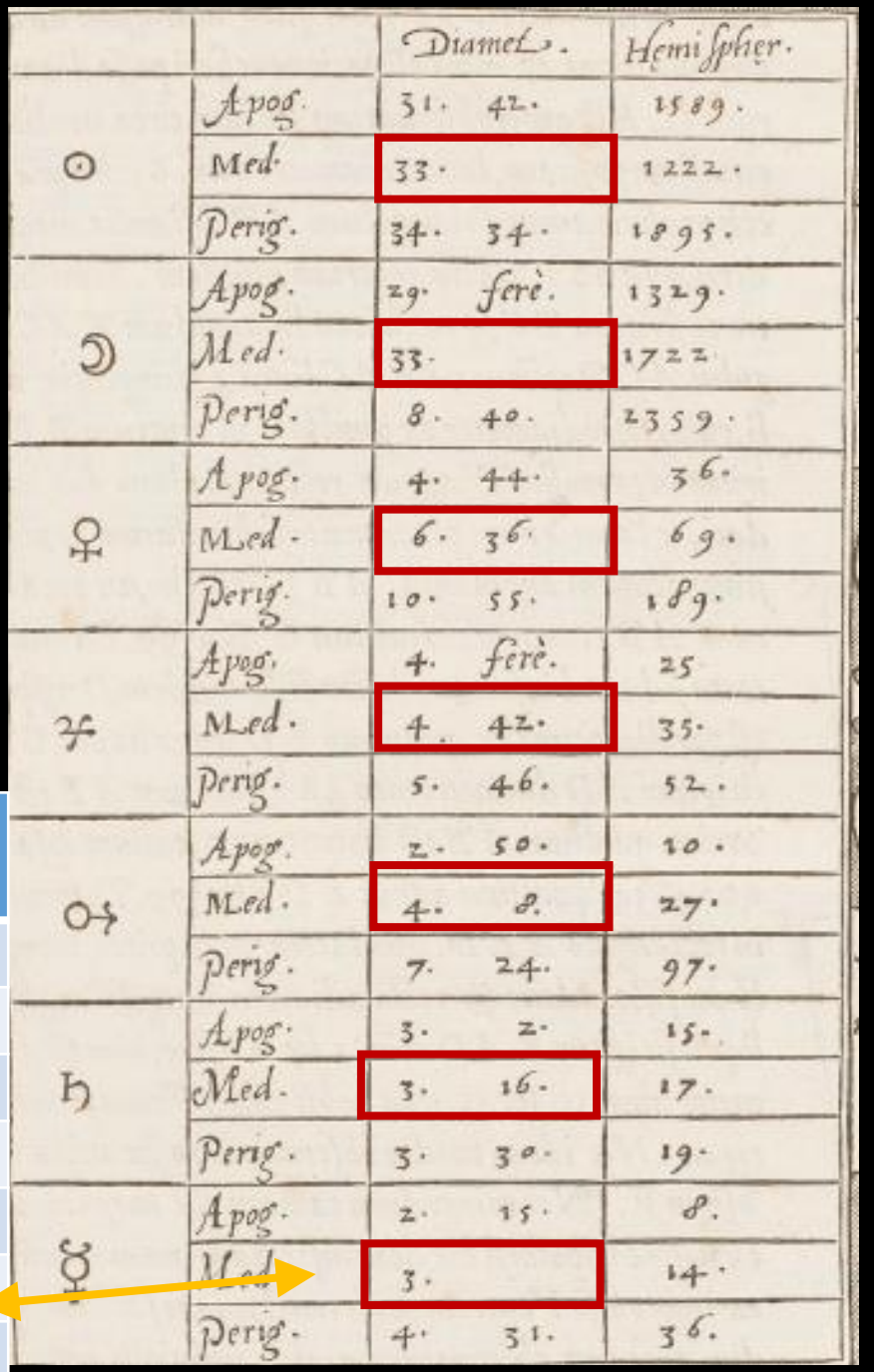
Johannes Francus Offusius, *De divina astrorum facultate in larvatam astrologiam* (Paris, 1570)
[distances are given in terrestrial diameters]



Ms Sloane 3936

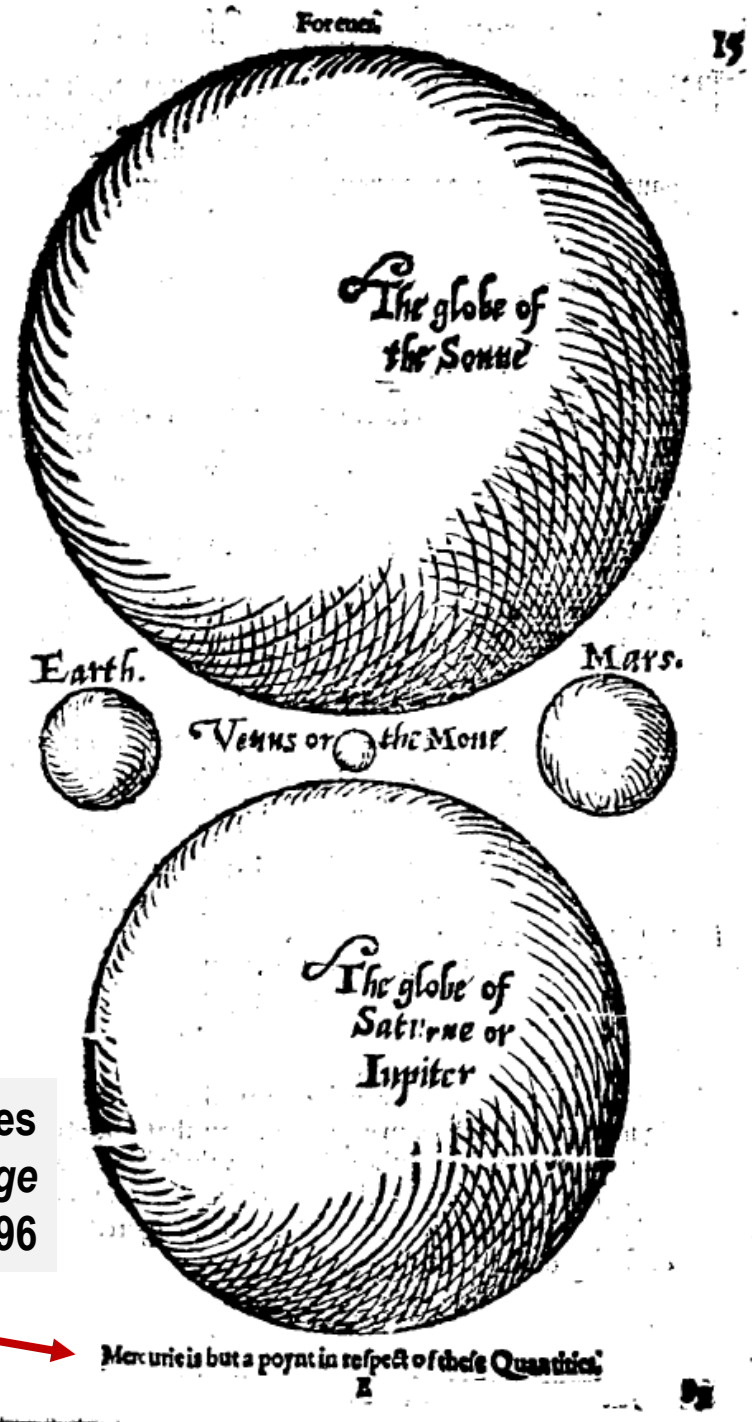
Johannes Francus Offusius, *De divina astrorum…*

Planet	Apparent Diameter at Mean Distance
Moon	33’
Mars	4 and better
Jupiter	5
Saturn	3 ½
Venus	6 ½
Mercury	4 very near
Sun	33



Planet	Volume (Earth = 1)		
	Gresham	Ptolemy / Al-Farghānī	Tycho Brahe
Moon	1/39	1/39	1/40
Mercury	~1	1/22000	1/19
Venus	1/28	1/37	6/37
Sun	160	166	140
Mars	2	1 ½ + 1/8	1/13
Jupiter	95	95	14
Saturn	91	91	22

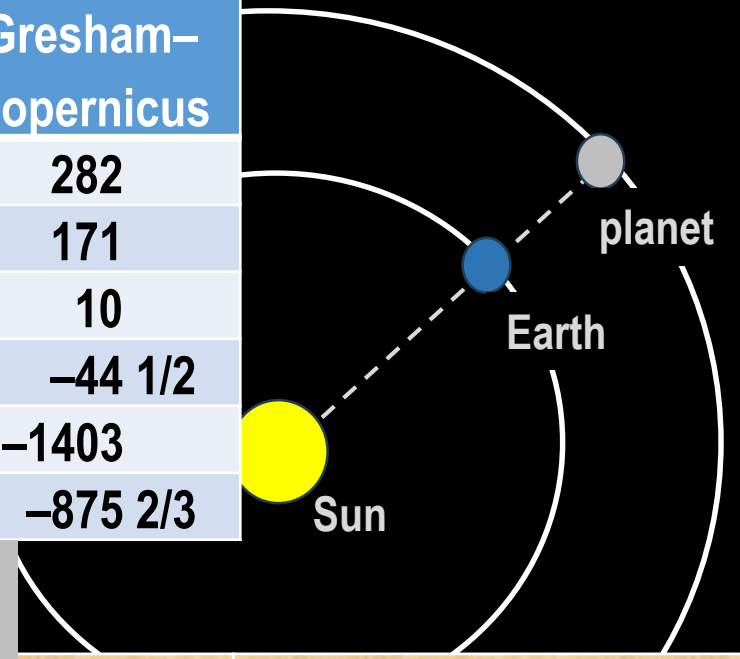
"very near as great as the Earth, notwithstanding old opinions of his exility"

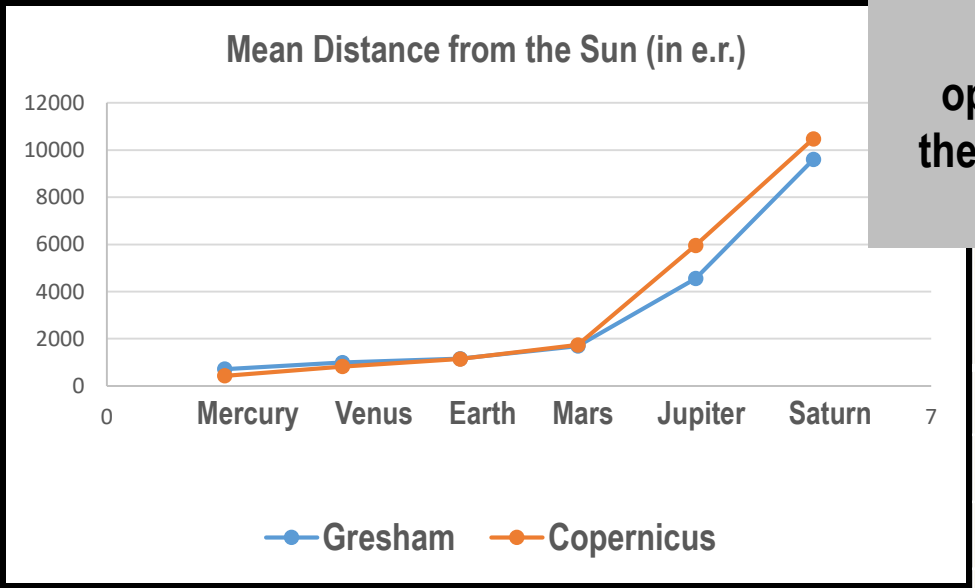


Leonard Digges
Prognostication euerlastinge
London, 1596

Mercury is but a point in respect of these quantities

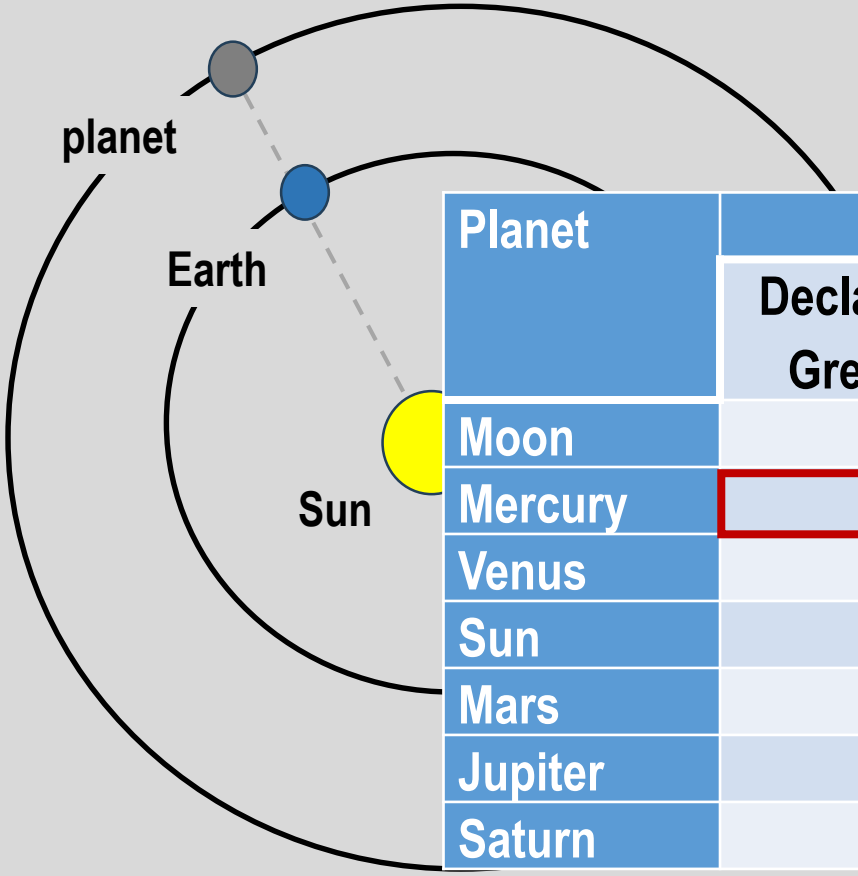
Planet	Mean Distance (in e.r.)		Gresham–Copernicus
	Gresham	Copernicus	
Mercury	712	430	282
Venus	992	821	171
Earth	1152	1142	10
Mars	1691 1/2	1736	–44 1/2
Jupiter	4557	5960	–1403
Saturn	9601 1/3	10477	–875 2/3



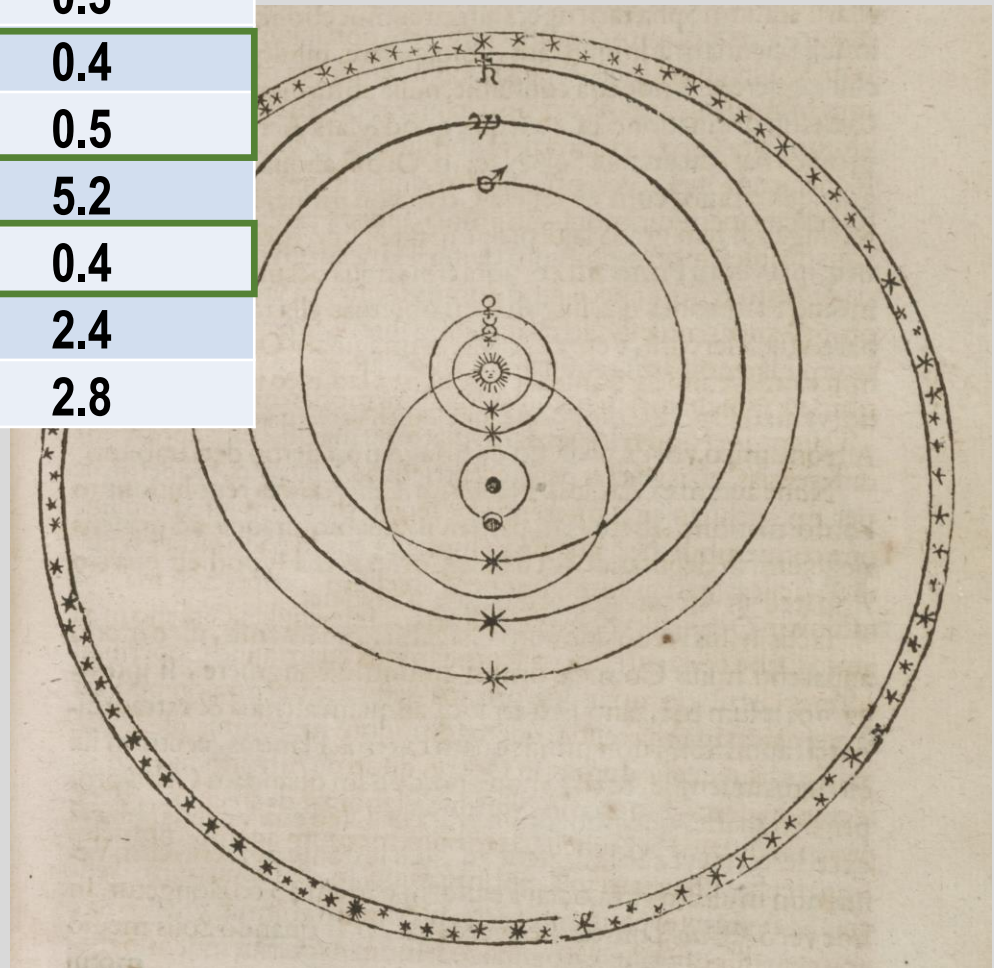


"the planets are such solid, grosse and opacouse bodies and of such greatnes that they are (most of them) by many parts greater then this Earthlie orbe we live upon"

	arth = 1)	Declared–Computed
	by Gresham	omputed from Gresham	
Moon	0.3	0.3	0.0
Mercury	~1	0.4	0.6
Venus	0.3	0.9	–0.6
Sun	5.5	5.5	0.0
Mars	1.3	1.0	0.3
Jupiter	4.6	3.3	1.3
Saturn	4.5	4.9	–0.4

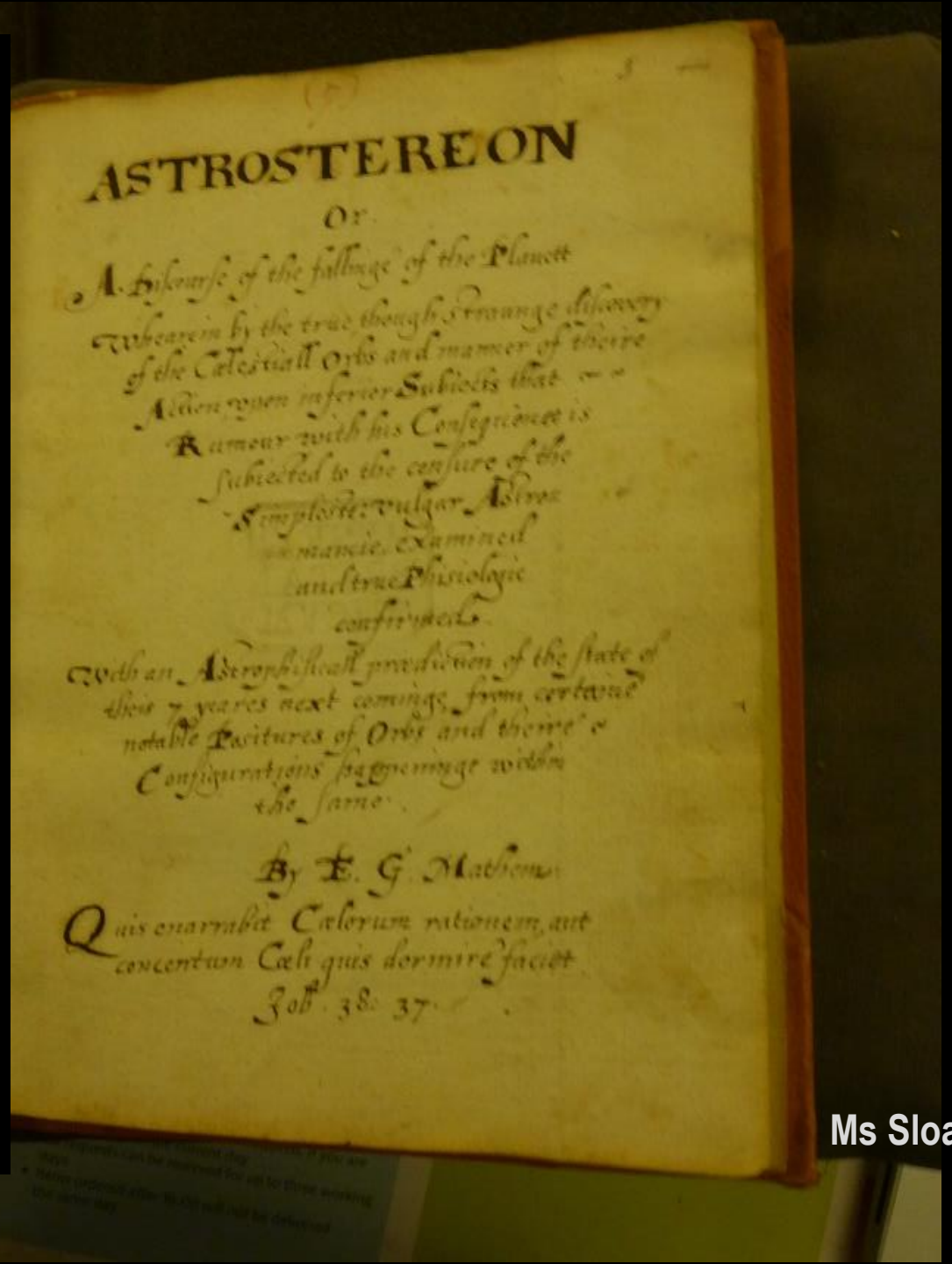


Planet	Actual Diameter (Earth = 1)		
	Declared by Gresham	Computed from Gresham	Tycho Brahe
Moon	0.3	0.3	0.3
Mercury	~1	0.4	0.4
Venus	0.3	0.9	0.5
Sun	5.5	5.5	5.2
Mars	1.3	1.0	0.4
Jupiter	4.6	3.3	2.4
Saturn	4.5	4.9	2.8

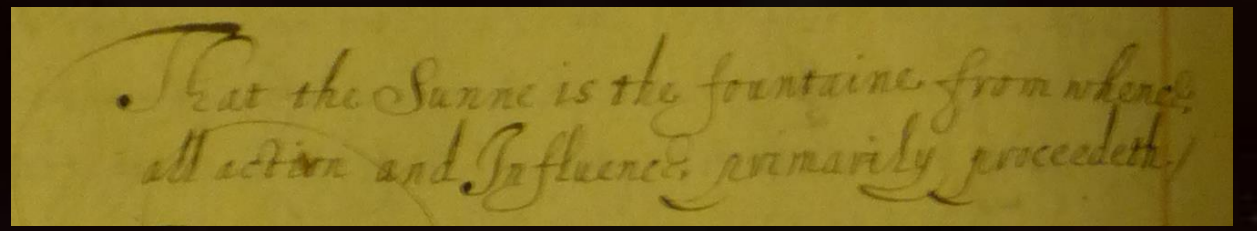


ASTROSTEREON
Or
A Discourse of the fallinge of the Planett
Wherein by the true, though straunge[,] discovery
of the Celestiall Orbs and manner of theire
Action, upon inferior Subiects that
Rumour with his Consequence is
Subiected to the censure of the
Simpleste: vulgar Astro=
mancie, examined
and true Phisiologie
confirmed.
With an Astrophisicall proediction of the state of
theis 7 yeares next cominge, from certaine
notable Positures of Orbs and theire
Configurations happening within
the same.

By E : G : Mathem:
Quis enarrabit Caelorum rationem, aut
concentum Caeli quis dormire faciet.
Iob. 38: 37


ASTROSTEREON
Or
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By E. G. Mathem:
Quis enarrabit Caelorum rationem, aut
concentum Caeli quis dormire faciet
Iob. 38. 37.

Ms Sloane 3936


That the Sunne is the fountaine from whence all action and Influence primarily proceedeth.

That the Sunne is the fountaine from whence all action and Influence primarily proceedeth.



So maie the Radiall Emanations of Saturne, Jupiter, Venus and Mercurie be united or resemble some ffigure either on the Bodie, or within the attractive Orbe of the Earth. And the Earth, Saturne, and Jupiter (in another respect and with some ffixed Starrs) make some Lineall and formall Influxe upon or within the Orbe of Attraction of Mars, and he with them. The Earthly Orbe and Venus, and other ffixed Starrs, maie likewise impresse Mercurie or some portion of his Systeme, and soe consequentlie one another, and all one make some impression in all. *Atque hic \ad/ veram Astromanteiam patet aditus, Sic orbis orbem mouet, impellit, imprimit non secus ac homo homini deus est.* [And here begins the path to true prognostication from stars, as an orb moves, impels and impresses on another orb, likewise man becomes god for another man.]