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- New findings on ancient heliocentrists, pre-Hipparchos precession, Mayan eclipse math, Columbus' landfall, Comet Halley apparitions, Peary's fictional Crocker Land.
- Entire *DIO* vol.3 devoted to 1st critical edition of Tycho's legendary 1004-star catalog.
- Investigations of science hoaxes of the –1st, +2nd, 16th, 19th, and 20th centuries.

Paul Forman (History of Physics, Smithsonian Institution): "*DIO* is delightful!"

E. Myles Standish (prime creator of the solar, lunar, & planetary ephemerides for the pre-eminent annual *Astronomical Almanac* of the US Naval Observatory & Royal Greenwich Observatory; recent Chair of American Astronomical Society's Division on Dynamical Astronomy): "a truly intriguing forum, dealing with a variety of subjects, presented often with [its] unique brand of humor, but always with strict adherence to a rigid code of scientific ethics. . . . [and] without pre-conceived biases [an] ambitious and valuable journal."

B. L. van der Waerden (world-renowned University of Zürich mathematician), on *DIO*'s demonstration that Babylonian tablet BM 55555 (100 BC) used Greek data: "*marvellous.*" (Explicitly due to this theory, BM 55555 has gone on permanent British Museum display.)

Rob't Headland (Scott Polar Research Institute, Cambridge University): Byrd's 1926 latitude-exaggeration has long been suspected, but *DIO*'s 1996 find "has clinched it."

Hugh Thurston (MA, PhD mathematics, Cambridge University; author of highly acclaimed *Early Astronomy*, Springer-Verlag 1994): "*DIO* is fascinating. With . . . mathematical competence, . . . judicious historical perspective, [&] inductive ingenuity, . . . [*DIO*] has solved . . . problems in early astronomy that have resisted attack for centuries"

Annals of Science (1996 July), reviewing *DIO* vol.3 (Tycho star catalog): "a thorough work extensive [least-squares] error analysis . . . demonstrates [Tycho star-position] accuracy . . . much better than is generally assumed excellent investigation"

British Society for the History of Mathematics (*Newsletter* 1993 Spring): "fearless [on] the operation of structures of [academic] power & influence . . . much recommended to [readers] bored with . . . the more prominent public journals, or open to the possibility of scholars being motivated by other considerations than the pursuit of objective truth."

DIO

The International Journal
of Scientific History

Galileo's
Observations of
Jupiter's Moons

The Original
Manuscripts
With English Translations

DIO 19 at www.dioi.org/vols/wj0.pdf, downloadable.

Translations & Reproductions of Galileo's Notebooks

With the encouragement of Myles Standish of CalTech and *DIO*, Prof. Charles J. Donovan here brings us English translations of the complete original mss of Galileo's observation books for the nights when he discovered and tracked the Jovian satellite system 4 centuries ago, 1610/1/7-1613/2/29.

These observations created the historical watershed of convincing scholars that celestial bodies could move non-geocentrically — a realization which jumpstarted general acceptance¹ of heliocentrism.

Of special interest to *DIO* readers will be the latter pages, which contain the first observations ever made of Neptune (1613/1/27-28), which only became known to us due to the original genius of Steve Albers and the late immortal discoverer Charlie Kowal (long of *DIO*'s Board, until his recent death), both of whom won *DIO* prizes (see www.dioi.org/pri.htm) for their rôles in the shockingly unexpected 1980 discovery of Galileo's Neptune sightings — which occurred nearly a century before the 1st (by J.Flamsteed 1690, Greenwich) of 23 accidental prediscovery observations of the much nearer and brighter also-then-unsuspected planet Uranus (discovered by Wm. Herschel, 1781/3/13).

Galileo's sighting was the 1st of no less than 8 prediscovery observations of Neptune (1613-1846), all of which are listed at *DIO* 2.3 ¶7 §B.

Galileo's observations occurred over 2 centuries before Leverrier's ever-glorious *pre-dictive* discovery of Neptune (quickly captured 1846/9/23 at the Berlin Observatory on his directions), the history of which has been analyzed² more extensively and originally in *DIO* than anywhere else.

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Publisher: Dennis Rawlins (DR), address above.

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The circumstance that most *DIO* articles are written by scholars of international repute need not discourage other potential authors, since one of *DIO*'s purposes is the discovery & launching of fresh scholarly talent. Except for equity&charity reply-space material, submissions will be evaluated without regard to the writer's status or identity. We welcome papers too original, intelligent, and-or blunt for certain handsome journals. (Dissent & controversy are *per se* obviously no bar to consideration for *DIO* publication; but, please: spare us the creationist-level junk. I.e., non-establishment cranks need not apply.)

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DIO invites communication of readers' comments, analyses, attacks, and-or advice.

Written contributions are especially encouraged for the columns: Unpublished Letters, Referees Refereed, and regular Correspondence (incl. free erftime for opponents). Contributor-anonymity granted on request. Deftly or daftly crafted reports, on apt candidates for recognition in our occasional satirical *J. for Hysterical Astronomy*, will of course also be considered for publication.

Free spirits will presumably be pleased (and certain archons will not be surprised) to learn that: at *DIO*, there is not the slightest fixed standard for writing style.

Contributors should send (expendable photocopies of) papers to one of the following *DIO* referees — and then inquire of him by phone in 40 days:

Robert Headland [polar research & exploration], Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER, UK; tel (44) 1223-336540.

Keith Pickering [navigation, exploration, computers, photography, science ethics],
10085 County Road 24, Watertown, MN 55388; tel 952-955-3179; fax 952-955-2398.

E. Myles Standish [positional & dynamical astronomy], Jet Propulsion Laboratory 301-150,
Cal Tech, 4800 Oak Grove Drive, Pasadena, CA 91109-8099. Ret. Tel 864-888-1301.

F. Richard Stephenson [ancient eclipses, ΔT secular behavior], Department of Physics,
University of Durham, Durham DH1 3LE, UK; tel (44) 191-374-2153.

Christopher B. F. Walker [Mesopotamian astronomy], Dep't of Western Asiatic Antiquities,
British Museum, Great Russell Street, London WC1B 3DG, UK; tel (44) 171-323-8382.

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¹See, however, the hitherto unperceived parallel with the motion of Mercury & Venus revealed at the AAS Planetary Division 1991 meeting at Charlottesville: "Figleaf Salad", *DIO* 1.1 ¶7. Galileo's discovery of the phases of Venus further restricted options for persisting in geocentrism, but heliocentrism did not disappear from the Church's Index of Prohibited Books until the 1830s.

²See *DIO* 2.3, *DIO* 4.2, *DIO* 7.1, & *DIO* 9.1.

E. Myles Standish's comments on Charles J. Donovan's translations:

Galileo's notes on his observations of Jupiter's moons, found in the notebook known as "la vacchetta" (literally *the small cow, the calf*), because of the leather of its binding, were deciphered, edited and translated by Charles Donovan, Professor Emeritus of El Camino College. His UCLA doctorate is in Romance Literature and Linguistics with a specialization in Medieval Latin, Old French and Italian.

Notes by Charles J. Donovan:

The stilted language of my translations of *Le Opere Vol III part 2* should not be attributed to a deliberate and perverse attempt to do violence to the venerable, though too often over-venerated, Saxon tongue. Take it rather as an attempt to remain as close as possible to Galileo's originals in structure and choice of vocabulary. Granted, this very often results in abnormal word order, and always in the preference for the Latin based word over the Germanic, as in choosing to diminish over to lessen in translating diminuire. I have done this, however, in the hope that it might serve as an aid to anyone up to tackling, on his or her own, the grand old Tuscan's Latinity, his penmanship, and his liberal use of abbreviations.

OSSERVAZIONI

(7 GENNAIO 1610 — 29 MAGGIO 1613).

428 Observations Mss. Gal., P.III, T.III, car.30t (1610)

[from here on, texts in Latin; digressions into Italian so noted]

(short note in Italian) These are to be engraved in wood in one piece, with the stars white and the rest black, and then they are to be sawed into pieces.

The preceding constitution was at Hr 3 of the night, but at Hr 7 there were only three stars with (diagram) Jupiter in such appearance: the smallest was closest to Jupiter, the remaining two twice greater than the small one and equal to each other. The distance from Jupiter to the nearest was increased; the closest was the second, namely by half of the diameter of Jupiter. The third was a bit more distant from the second than the second from Jupiter. Indeed, another hour later the two middle stars were closer still to the extent that the space between them occupied by the smallest star was less, namely about 40 second minutes

16 Jan 1st hour of the night. Such was the constitution. 3 stars only were visible, two close to Jupiter, (diagram) that is each distant from it by a fourth part of its (Jupiter's) diameter, always 1'; however a third star to the west was distant from it (Jupiter) by four times its (Jupiter's) diameter; those closer to Jupiter did not seem larger than the one farther off but brighter.

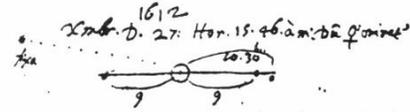
17 Jan 1/2 (?) hour from sunset. The configuration was of this sort. The easterly star was distant from (diagram) Jupiter by 3'. The westerly by 11'. The easterly seemed twice greater than the other. No more than these two stars were visible. But after four hours had gone by, namely on the 5th hour, a third star began to appear which, as I conjecture, was joined with the easterly one and such was their appearance: the middle one was now as close as (diagram) possible to the more easterly, namely distant from it by 20 second minutes and deflecting a bit towards the south from a straight line drawn through the outermost stars and Jupiter.

18 Jan Hr 0.20 from sunset. Such was the appearance. The more easterly star was greater than the (diagram) other; the interval between the one to the East and the center of Jupiter was less than that between Jupiter and the one to the west, 11'. According to my estimation the diameter of Jupiter occupies 3' or something less.

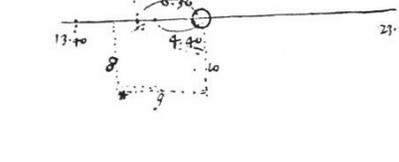
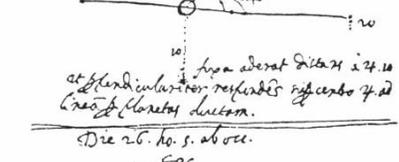
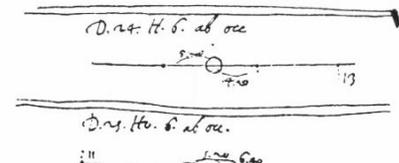
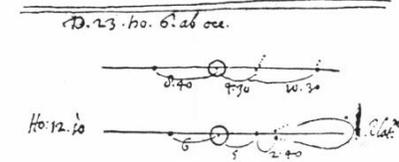
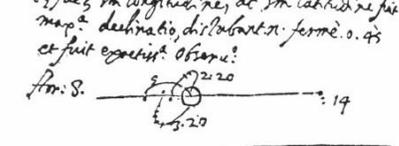
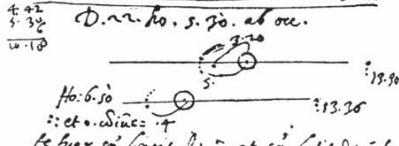
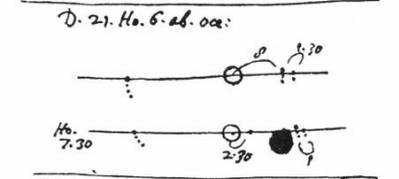
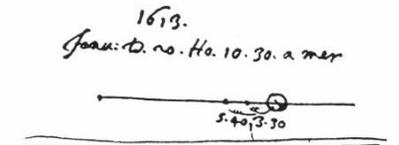
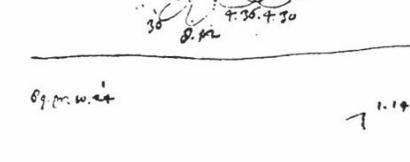
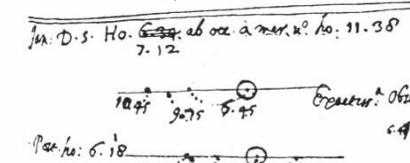
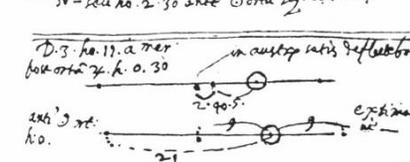
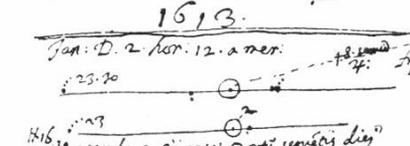
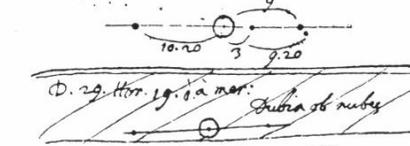
19 Jan Hr 2 Thus was the configuration; namely according to a most straight line through Jupiter (diagram) with three the stars. Between the star to the east and the center of Jupiter the interval was 6'; between Jupiter and the next 5'; between this one and the one to the west 4'. The easterly one was a bit larger than the others. I was undecided whether a star was between the easterly one and Jupiter but close to Jupiter so as almost to touch it; but at (diagram) the 5th hour I manifestly saw it now occupying the middle place between Jupiter and the easterly star, so that the constitution was thus. However on the last viewing this star was very small; however at the 6th hour it approximately equalled the others in size.

Mss. Gal., P. III, T. IV, car. 139r.

Mss. Gal., P. III, T. IV, car. 139r.



1612. Jan. D. 27. Hor. 15. 46. a. m. 22. q. v. m. i. e. ... Areae ... 2. occidentales ...



452 Observations Mss. Gal., P.III, T.IV, car.139r
1612

27 Dec Hr 15.46 from noon, while Venus was rising (diagram) Before sunrise 0.30 two westerly ones were closely conjoined; they were distant now 0.20 according to longitude, but the more westerly had such great longitude that it appeared that in this connection it almost and just almost touched the other; and at the same hour a fourth star was present from the west and the easterly one was made more remote; and such was the configuration; and the tables corresponded to a hair. (diagram)

29 Dec Hr 19.0 from noon doubtful because of clouds
1613

2 Jan Hr 12 from noon (diagram) (diagram) Hr 16.30 or Hr 2.30 before sunrise of the following day

3 Jan Hr 11 from noon after the rising of Jupiter Hr 0.30 it was deflecting fairly to the south. (diagram) before sunrise Hr 0 (diagram) by estimation

5 Jan Hr (6.34 lined out) 7.12 from sunset, from noon truly Hr 11. 38 (diagram) most exact observation after Hr 6.18 (diagram)

452 Observations Mss. Gal., P.III, T.IV, car.139r
1613

20 Jan Hr 10.30 from noon (diagram)

21 Jan Hr 6 from sunset (diagram) Hr 7.30 (diagram)

22 Jan Hr 3.30 from sunset (diagram) Hr 6.50 (diagram) (#4) and (#1) conjoined = .4 and they were thus according to longitude, but according to latitude there was a most great turning away; they were now distant nearly 0.45; and this was a most exact observation. Hr 8 (diagram)

23 Jan Hr 6 from sunset (diagram) Hr 12.50 (diagram) in latitude

24 Jan Hr 6 from sunset (diagram)

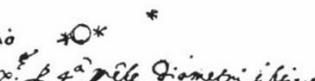
25 Jan Hr 6 from sunset (diagram) A fixed star was present distant 10 from Jupiter and corresponding perpendicularly through the center of Jupiter to a direct line through the planets.

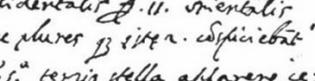
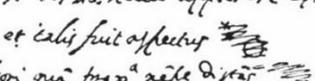
26 Jan Hr 5 from sunset (diagram)

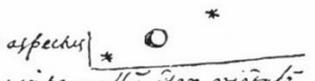
foras; Cinghies & ligno nota in u. parte, et Cistula. Cistula illo modo nota
fuit in apparatu, fuit

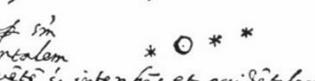
fuit procedens Distributio hora noctis 3. sed hora -7. & des. tantum
aderant stellule cu 7 e tali aspectu  minima
erat inu uicini^o relique 2. maiores

duplo. et ser se equal. Distantia a 7 ad prop^o aucta erat; ista
uicini^o erat 2. nefe & dimidia diametri 7 3. Distabant a 2.
paulo plus qd ista n. a 7. Post 4. ab hora 2. medie stellule erant
ad huc uicini^ores adeo ut inter istos spaciū medietat. ista minima stella
minus; subat circa minuta secunda 40.

Hic 16. hora p. noctis talis fuit distributio 
3. n. cu cernebat stellule due 7. prop^o 4. nefe diametri ipsius
parte ab eo utriusq distantes ^{hinc inde} u. occidentalis & quadrupla diam
tri ipsius ab illo aberat; prop^o 4. ad maiora apparabant remotiora
sed lucidiores.

Hic 17. 1/2 hor. ab Occasu eiusm. fuit configuratio 
stella orientalis a 7 & 3. Distabant occidentalis qd. ii. orientalis
apparabat duplo maior reliqua, nec plures qd site n. distabant
stellule. Sed 4. horis transactis hora nefe 5. tertia stella apparere co-
pit que antea in orientali, erat iuncta et talis fuit aspectus 
eas  erat. n. media orientali qua prop^o nefe distat
ab ea p. minuta secunda no. fere, et a linea recta qd extremos et 7.
Quota paululu uertus auct; deflectit.

Hic 18. hor. o. m. no. ab Occasu talis fuit aspectus 
erat stella orientalis maior reliqua; in uertutu iter orientate
et cetera 7 mix: p. g. inter 7 et occidentate stella. ii. Secundum
mā existimatione 7 diameter occupat 3. aut qd minus.

Hic 19. H. 2. ita se habebat configuratio; nempe in
noctis a linea 7. cu 3. stellis. inter orientalem
et 7. erat interuallu 6. inter 7. et sequete 5. inter hoc et occidentalem
qd orientalis erat paululu maior reliqua; omnes era nūq inter orientate
et 7. stellula mediorat sed 7. prop^o qd ut illu fore cogebat; at hora 5. a
hac se manifeste uidi mediu in inter 7. et orientate stella locu occu-
pante, ita ut talis erat distributio  erat aut hgc ult. inspecta
stellula ad modū apogua; uertusq hora 6. reliqua prop^o mag^o equabat

451 Observations Mss. Gal., P.III, T.IV, car.73r
1612

after Hr 3.20 thus: (diagram) after Hr 4.30 (diagram) finally before sunrise Hr 0.30 (diagram)
9 Dec Hr 1.40 before sunrise, which is 8 Dec Hr 17.56 from noon (diagram) after Hr 1.0 (diagram).

11 Dec Hr 1.25 before sunrise; on 10 Dec Hr. 1.25 [lined out?] from noon (diagram)
13 Dec Hr 4.30 before sunrise; on 12 Dec Hr 15 from noon (diagram) after Hr 1 (diagram) after the rising of Venus Hr 0.30 at Hr 16 from noon after Hr 2 (diagram) from first observation at Hr 17 from noon (diagram) and after first observation Hr 2.40 Hr 0.30 before sunrise the 2 closer to Jupiter were almost touching each other and perhaps were truly touching each other and therefore by means of this most exact observation a correction of the tables can be arrived at.

14 Dec Hr 2.15 before sunrise; on 13 Dec Hr [entry inked out] from noon (diagram) (diagram) after an hour (diagram) before sunrise Hr 0.40

15 Dec Hr 4.30 before sunrise; on 14 Dec Hr 15.6 from noon (diagram) after Hr 3 slightly to the south (diagram)

451 Observations Mss. Gal., P.III, T.IV, car.138t
1612

16 Dec Hr 1 .30 before sunrise; on 15 Dec Hr 18.8 from noon (diagram) to the north slightly after Hr 1 thus (diagram)

17 Dec Hr 0.20 after the rising of Venus, which was Hr 3. before sunrise; on 16 Dec Hr 15.47 from noon. (diagram) The westerly ones were 2, conjoined, namely (#2) and (#3) and stayed ever in conjunction, so that scarcely at Hr 0.20 before sunrise something of the beginning of a separation was able to be discerned, truly thus, and the more westerly seemed to be raised slightly to the north; and was then distant from Jupiter 8 semidiameters, which observation marvelously leads to an emendation of the tables.

18 Dec Hr 0.20 after the rising of the moon, which was Hr 4.0 before sunrise; on 17 Dec Hr 15.37 from noon. (diagram) After 2 Hrs when the ones closer to Jupiter were indeed more fully separated, one of them, falling into the shadow of Jupiter, no longer appeared; the other truly was distant from Jupiter 3.20.

19 Dec Hr 0.30 before sunrise; on 18 Dec Hr [blank] (diagram)

20 Dec Hr 1 after rising of Jupiter; on 19 Dec Hr [blank] (diagram) The others were hidden behind Jupiter and the westerly one hastened to conjunction. We wanted to stay up all night so that we might see the separation of the others, which after 4 hours we did not see; thence, seized and overcome by sleep, it did not befall us any longer to observe.

Mss. Gal., P. III, T. III, car. 31r.

Die 20. H. 1. 15. ita se habebat configuratio \odot^{**} . erat 3 stelle
q^{ue} ab eo exigue ut uix capi poterat, superiorib^{us} s^{ed} rotata flexu
quadruple maior appareret a γ et inter se s^{ed} magi dista-
bat minuto uno; ~~inter~~ interer^{at} era^t n^{on} ex oculi d^{ist} 2. an 3.
italy extaret. Circa H. 6. ita se habebat \odot^{**} . aderat
orientalis stella a γ , 2. media a γ , 40. ab occidentali
u. 2. s^{ed} mea ex^{ist}imati^one. Hora u. 7. ita \odot^{**} erat
a γ occidentales stelle. for^{is} γ distabat ab ea. 20.
inter h^{as} et occidentaliore erat distantia 40. ab γ h^{is} defle-
bat paululu ad meridie alia stellula que ab occidentaliore distabat
nu^m amplius q^{uam} 10. iuxta mea ex^{ist}imati^one.

Hora ^{H. 30} 3. stellule erat ex parte orientali equate \odot^{**}
inter γ et a γ distantes, erat aut^{em} interstitia s^{ed} ex^{ist}imati^o
ne 10. aderat et stella ex^{ist}imati^one a centro γ distans 5.
orientalis γ prope^{re} erat s^{ed} minima, relique u. 3.
aliquanto maiores et inter se equalis.

Die 21. H. 2. tahi erat \odot^{**} 
Distantia: a stella orientali
ad γ erat 6. a centro γ ad stella occidentaliore 7.
Due intermedie distabat ad iuncta 40. inter γ et sibi prope.
1. s^{ed} medie stellule minor erat extremis, erat u^t
e^{ss}e recta linea secundu^m Zodiaci longitudine, nisi q^{uod} media
 γ que γ remotior erat, paululu declinabat ad oriente

Hora 6. ita apparebat \odot^{**}
orientalis omnia exigua
erat distans a γ ut antea. 3. occidentales
et a γ et ad iuncta equate distabat, erat
distantia regula 13 prope. et stella γ
minor relique^{re} equalis sequenti^{er} erat
minor, erant o^mni^{um} ex^{ist}imati^one in eode^m recta
linea

Die 23. H. 0. 40 ab occasu
ita se habuit configuratio \odot^{**}
cio; erat 3. stelle in linea
recta s^{ed} Zodiaci longitudine; orientalis dista-
bat a sequenti^{er} 7. super^{ius} ab occidentali
a 6. γ media^m line^{am} inter h^{as} obtinebat
erat^{is} aliquantulu^m minor medie; magni
aut^{em} distans prope equalis.

430 Observations Mss. Gal., P.III, T.III, car.31t (1610)

Hr truly 5 Two small stars which were near to Jupiter are no longer discerned of which the (diagram) constitution was such (large grid) (in Italian) one of the three of Orion's Belt (diagram) Canis Around Canis besides others there are 7 stars in exactly similar configuration of which the distant of the largest from Canis does not surpass 20 minutes. (diagram) Canis Minor, I believe Star A is not seen without the lens. However, seen with the lens it appears to be of so great a size that the others are seen to be of 2nd, 3rd and 4th magnitude less than it.

450

OSSERVAZIONI.

Mss. Gal., P. III, T. IV, car. 72r.

Mss. Gal., P. III, T. IV, car. 72r.

1612
 Novembri 7. Hor. ante ortum Jovis
 Die 6. Hor. post mer.

Die 20. Hor. ante ortum Jovis
 Die 19. Hor. post merid

Sept. minuti du
 bus 1/2

Post hor. ubi fuit
 distantia

Remissio eade tempore
 vidit, et eius visus apparuit prop. ut in
 aut paulo major. Eius a Jovis tunc
 nro 5^o parte dist. 2 quadrat

Die 20. H. 0.30. ante ortum Jovis, fuit h. 1. 22
 Hor. a merid

Die 25. H. 2 ante ortum Jovis, f. 27. h. 17. 3/4 m.

Post hor. sic; gra.
 hora Jovis erat gr. a. 30. fuit h. 1. 15.
 ante ortum et h. 1. 18. v. 2 m. Et post h. 0. 30. sic
 f. 27.

Die 27. H. 2. ante ortum Jovis, h. 25. H. a merid
 Stellula 9. 42 m
 A. in parte ubi fuit
 Jovis erat

ante ortum h. 0. 30
 A. et f. 27. a. 20. ubi fuit Jovis
 tunc etc

Die 28. Hor. 4. ante ortum Jovis, h. 15. 28. m.
 f. 27. a. 20. ubi fuit Jovis

post hor. 1. 0. 30

ante ortum h. 0. 30

Die 29. H. 2. 30. ante ortum Jovis, h. 28. h. a. m.
 post hor.

1612
 Decembri 3. H. 1. ante ortum Jovis, f. 27. h. 17. 3/4 m.

Die 3. H. 1. 15. ante ortum Jovis, h. 18. 17. a. m.
 accedebat
 recedebat

H. 0. 30. ante ortum Jovis

Die 5. H. 4. 6. ante ortum Jovis, h. 15. 3/4 m.
 f. 27. a. 20. ubi fuit Jovis

Die 7. Hor. 1. 40. ante ortum Jovis, h. 17. 54. a. m.
 paululo i. a. 20. m.

Post hor. 1
 sic. et 2
 minores q. fere se congerunt ad ortum Jovis, sed deinceps
 nro licet f. h. a. 20. in eade hora, d. ne observare
 et distanti a q. stelle minores paululum
 minime visibilis, q. q. visibilis, q. q. visibilis, q. q. visibilis
 nro a. 20. m.

Martis diameter f. collatione ad Jovis, f. 27. h. 17. 3/4 m.
 in ortum ad ortum Jovis, f. 27. h. 17. 3/4 m.

Die 8. H. 2. 30. post ortum Jovis, que fuit h. 1. 4. 30. m.
 ante ortum Jovis, f. 27. h. 17. 3/4 m.

Die 2. minores sic fere congerunt et in hora f. 27. h. 17. 3/4 m.
 1. 30. m. separantur, sed non videtur. sic aut 2. 30. post
 ortum Jovis, f. 27. h. 17. 3/4 m. ad ortum Jovis, f. 27. h. 17. 3/4 m.
 Hora sic 2. 30. a. 20. m. sic

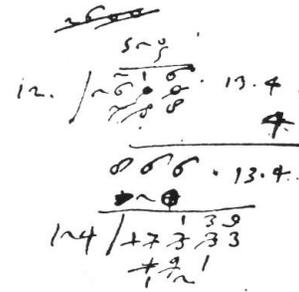
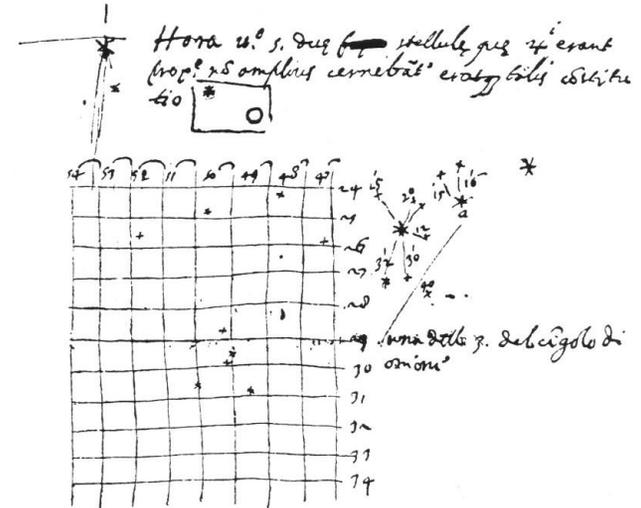
450 Observations Mss. Gal., P.III, T.IV, car.72r
1612

7 Nov Hr 1 before sunrise; this is (?) 6 Nov Hr ... after noon (diagram)
 20 Nov Hr 2 before sunrise or 19 Nov Hr ... after noon (diagram) I was doubtful about the first [prima, feminine: stella] easterly one. (diagram) After an hour such was the constitution. At the same time I saw Mercury, and its disc appeared most like Jupiter or slightly larger; its diameter, then, scarcely equalled a fifth part of the diameter of Venus.
 22 Nov Hr 0.30 before sunrise; that is on 21 Nov Hr ... from noon (diagram)
 25 Nov Hr 2 before sunrise; on 24 Nov Hr 17.25 from noon. (diagram) (diagram) after an hour thus; in which hour Mercury was elevated 0.30 degree; it was Hr 1.15 before sunrise and Hr 18.10 after noon. And after Hr (diagram) 0.30 thus 24 Nov
 27 Nov Hr 2 before sunrise; on 26 Nov Hr ... from noon (diagram) a certain small star A in a similar site appeared. (diagram) before sunrise Hr 0.30 and Jupiter perceptibly approached fixed A.
 28 Nov Hr 4 before sunrise; on 27 Nov Hr 15.28. from noon Venus was then rising. (diagram) (diagram) after Hr 1.30 (diagram) Hr 0.30 before sunrise
 29 Nov Hr 2.30 before sunrise; on 28 Nov Hr [blank] from noon (diagram) (diagram) after an hour

450 Observations Mss. Gal., P.III, T.IV, car.72t
1612

3 Dec Hr 1 before sunrise; on 2 Dec Hr 2 from noon (diagram) doubtful
 5 Dec Hr 1.15' before sunrise on 4 Dec Hr 18.17 from noon (diagram) was receding from Jupiter was nearing (diagram) Hour 0.30 before sunrise
 6 Dec Hr 4.0' before sunrise on 5 Dec Hr 15.54 from noon Venus was rising. (diagram) after Hr 0.30 (diagram) after Hr 1.45 (diagram) first observation and after Hr 3.20 (diagram) from first observation finally Hr 0.30 before sunrise thus was an exact observation (diagram) it was indeed raised a bit towards north
 7 Dec Hr 1.40 before sunrise on 6 Dec Hr 17.54 from noon (diagram) slightly deflecting to the South After Hr 1 (diagram) thus, and the 2 closest to Jupiter were almost touching; however, on contact they did not turn aside, although through Hr 0.20 they were observed in the same condition; and the distance from Jupiter of the smaller one seemed slightly diminished, from which it is concluded that it was in its its mid remotion. The diameter of Mars was determined through collation to the moon since it was in opposition with the sun. Degree 0[°] 0' 12"
 8 Dec Hr 2.30 after the rising of Jupiter, which was Hr 4.30 before sunrise on 7 Dec Hr 15.5 from noon (diagram) The 2 closer to Jupiter were barely touching each other and at approximately Hr 1.30 are hardly perceptibly separated; however, after Hr 2.10 after the first observation they were 0.40' distant from each other; however, the hour 2.50 from the first observation thus: (diagram) slightly to the south

Mss. Gal., P. III, T. III, car. 31r.



una certa preceualis
 extant stellulae 7. in co
 himb. Sijgurabine' quas
 map. a. care di'Kuntia
 no' p'fat minuta 20.

stella a. abiq. uicillo no' uenit, attome
 spicillo Sijlecta afforec. late mag. n. et
 ut in for ip'a aliz 2. 3. et 4. magis
 obliquante

431 Observations Mss. Gal., P.III, T.III, car.32r (1610)

24 Jan Hr 0.50 Such was the configuration. Three stars were visible on the same straight line with (diagram) Jupiter except that the middle one deflected a bit to the south; they were all to the east of Jupiter, The nearest was 2' from Jupiter; the next 30'' from this; the most easterly was 9' from this. The sky was most clear. Hr 6.15 It was so. Now only two stars appeared on an exactly straight line with Jupiter, each to the (diagram) east; the one nearer to Jupiter was 3' from it; the other in truth was about 8' from it.

25 Jan Hr 1.40 It was thus. There were now only 2 easterly stars of which the more easterly was 5 (diagram) 5' distant from the other, the latter indeed according to estimation 6' from Jupiter. Both appeared equal and rather large.

26 Jan Hr 0.40 The position of the stars was of this sort. Now three stars were observed of which 2 (diagram) easterly ones and a third west from Jupiter; the westerly one was 5' from Jupiter; the middle one was, it seemed, 5'20'' from the same. The more easterly one indeed was 6' from this one; they were all on the same straight line with Jupiter, of almost equal magnitude and rather large. Hr 5.20 In truth, the constitution was as above, except that there was emerging near Jupiter from the (diagram) east a fourth small star, smaller than the others, 40'' removed from Jupiter and slightly deflecting from the straight (line) of the other stars towards the north, as the present figure points out.

27 Jan Hr 1 from sunset. Only one small star was visible and it was easterly as in this constitution; it (diagram) was quite small, and was 7S from Jupiter according to estimation. 28 and 29 Jan. The sky was cloudy.

30 Jan Hr 1 Thus were the stars constituted. There was one easterly star distant 2'30'' from Jupiter, (diagram) two in truth westerly of which the one nearer to Jupiter was 3' from it; the other was 1' from this and was smaller than the others, and declined slightly southward from the straight line on which the others along with Jupiter are found.

31 Jan Hr 2 There were two easterly ones. The one close to Jupiter was 2'20'' distant from it; the (diagram) more easterly 30'' from this one. The westerly one was 12' (?) away from Jupiter. They were on a straight line, except that the one closer to Jupiter was elevated slightly to the north. Hr 4 Truly the two easterly ones were closer to each other, to the extent that they were only 20'' distant. In said observations the westerly star was exceedingly small.

OSSERVAZIONI.

449

Mss. Gal., P. III. T. IV, car. 69r.

Mss. Gal., P. III. T. IV, car. 69r.

1612 Martij

D. 2. H. 3. 50 * 6 * *

H. 5. 30. Duo orientales martij eximie fuerit, et q. austrorumpus declinabat ultra nihilat' lateraliter istigere: tunc quos occidentalis sub 2. lat' abbat "

D. 4. H. 0. 30. * 19 40 6 *

H. 6. *

H. 6. 10. * 1. 50 3 30 * 2. 40 3. 30 *

occidentales comiti fuerit ca declinatione in bor. eius quod ad occidentem propinabat.

D. 10. H. 3. * * * * *

passeris signis: et cui declinabat in bor. ubi et hora 4. 30. orientis in line esse ostendebat

D. 12. H. 0. 50 * 3 9 7. 40 *

H. 0. 4. * *

D. 13. H. 0. 4. * * *

H. 4. 20. orientales remanere congebant

H. 0. 5. 40. * 12 10 *

Et orientales rursus separare fuerit, et fore nihil a recta linea deflectebat quoniam. cuius rior in boru, remanere u. e. austeris exiguis declinabat

D. 14. H. 0. 30. * 2. 20 3. 40 15. 30 *

H. 1. 25. * 3 2 1. 10 *

H. 0. 3. * 2. 40 3. 40 *

Duo in unum in parte metus congebant, et post H. 0. 30. epropinque comit' fuerit, et rursus post H. 0. 30. separare fuerit, adeo ut a 10. Statu ad eorum separationem unius horis. spaci' mendavit

D. 15. H. 0. 30 * 4 2. 15 70 *

H. 1. 44. 30 * * * 1. 40. 7. 40 *

1612 Martij

D. 16. H. 0. 30 * 5 * 7 4. 30 *

D. 17. H. 0. 30 * 0. 15 8 *

H. 0. 4. * 7 2. 15 1. 30 4. 30 *

D. 18. H. 0. 30. * 10 3 4. 40 *

H. 0. 5. * *

Chamaei uig. et Ho. 0. rae ulla a 7. 4. d. in unione separata est

D. 19. H. 0. 30. * 4. 30 1. 15 1. 15 *

H. 0. 1. 30. * 3 20 *

D. 20. H. 0. 30 * 9. 30 12. 40 *

H. 2. 30 * 7. 0 *

D. 21. H. 0. 30. * 20. 40. 1. 30 4. 10 1. 20 *

D. 22. H. 0. 30 * 30 2. 10 6 *

D. 26. H. 3. 0. * 1. 2 *

449 Observations Mss. Gal., P.III, T.IV, car.69r
1612 March

2 Mar Hr 3.30 (diagram) to the south Hr 5.30 The two middle easterly ones were conjoined, and because the one turned southward was declining, it seemed to be touching the other laterally; then also the westerly one was hidden behind Jupiter.

4 Mar Hr 0.30 (diagram) to the north Hr 6 (diagram) Hr 6.50 (diagram) The westerly ones were conjoined with a turning away to the north of the one which was advancing to the west.

10 Mar Hr 3 (diagram) They were almost touching each other and (#2) more westerly raised to the north. And Hr 4.30 The westerly were still entirely touching each other. (diagram)

12 Mar Hr 0.50 (diagram) Hr 4 (diagram)

13 Mar Hr 4 (diagram) Hr 4.20 The easterly ones were touching each other. Hr 5.40 (diagram) And the easterly ones were separated again, and were hardly deflected from a straight line; the one nearer to Jupiter now inclined to the north, the more remote truly indeed slightly to the south.

14 Mar Hr 0.30 (diagram) to the north Hr 1.25 (diagram) Hr 3 (diagram) The two closer to Jupiter were touching each other, and after Hr 0.30 were perfectly conjoined; and were again after Hr 0.30 separated, so that from this contact till the utmost separation there elapsed the space of one hour.

15 Mar Hr 0.30 (diagram) Hr 4.30 (diagram)

449 Observations Mss. Gal., P.III, T.IV, car.69t
Mar 1612

16 Mar Hr 0.30 (diagram)

17 Mar Hr 0.30 (diagram) Hr 4 (diagram)

18 Mar Hr 0.30 (diagram) Hr 5 (diagram) I observed until Hr 6; nor was any separated from the conjunction of Jupiter.

19 Mar Hr 0.30 (diagram) Hr 1.30 (diagram)

20 Mar Hr 0.30 (diagram) Hr 2.30 (diagram)

21 Mar Hr 0.30 (diagram) (diagram)

22 Mar Hr 0.30 (diagram)

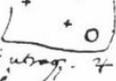
26 Mar Hr 3 (diagram)

OSSERVAZIONI.

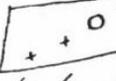
Mss. Gal., P. III, T. III, cap. 32r.

Die 24. Hor. 6. 30. talis fuit configuratio. 

3. stellula edificabat in eadem recta linea
in 7. mi qd media paululu deflectebat ad austrum; erat oes orientales
7. propinqua distabat a 7. i. sequens ab hac 30. ab hac u. orientalis
abest q. erat oes admodu clare, esse n. fuerit. extabat

Horu. 8. 15. ita se habebat  Oes n. in stellu apparebat in
eadem recta ad amissu orientali utraq. 7. propinqua distabat ab eo 3. alio
ut u. ab hac abest 8. prop.

Die 25. Hor. 9. 30. ita se habebat.  erat n. 2. tra stelle orientales
et; prox orientalis ab altera 5. distabat: huc u. a 7. 6.
secundu existimatione: apparebat ambz equaliter, et satis magne?

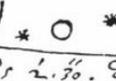
Die 26. Ho. qd eiusmodi fuit stellu ponsus 

spectabat n. 3. stellu quar, 2. orientales
et tertia occidentalis a 7. s. media ab
eodem abest tant 5. 10. orientalis u. ab hac distabat 6. erat in
eadem recta oes cu 7. equalis fere mag. et satis magne?
flora u. 5. no. constitutio erat ut superior, mi qd
prop 7. 4. stellula ex oriente emergebat este:
ni minor a 7. remota 30. ut fuerit figura demonstrat
et paululu a recta reliqua, stellu deflecter versus borea, ut
prox figura demonstrat

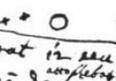
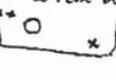
Die 27. unu H. 1. ab occasu, unica tra stellula edificabat 

oer orientalis in pta hae configuratione, erat admodu
exigua, et a 7. distabat 7. in existimationem.

Die 28. et ng. nublosa fuit celu.

Die 30. H. 1. ita edificata erat astra 

erat stella una orientalis a 7. distat 2. 30. Oes u. occidentales
quar, 7. propinqua abest ab eo 3. reliqua ab hac distabat 6.
et erat valigs minor, ac prox a recta linea, in qua reli
que cu 7. referi abis, declinabat i austrum.

Die 31. erat 2. orientales 7.  distabat ab eo
2. 10. ab hac orientalis. 30. occidentalis a 7. abest in pte co.
erat i recta linea, mi qd 7. prop. paululu i borea declinabat
Horu u. 4. Oes orientales propinqua erat se erat adeo ut no. cu distarent
erat i dictis observationibz occidentalis stella exigua recte 

432 Observations Mss. Gal., P.III, T.III, car.32t (1610)

the Sucleae (Hyades) becoming visible (diagram) (diagram) on a straight (line) through Jupiter and its stars at right angles to the south a certain star is distant by about 30' (large boxed diagram) requisite description

1 Feb Hr 2 Such was the constitution. The more easterly star was 6' from Jupiter, the westerly one, (diagram) indeed, 8' to Jupiter. From the east a very small star was near, about 20'' from it.

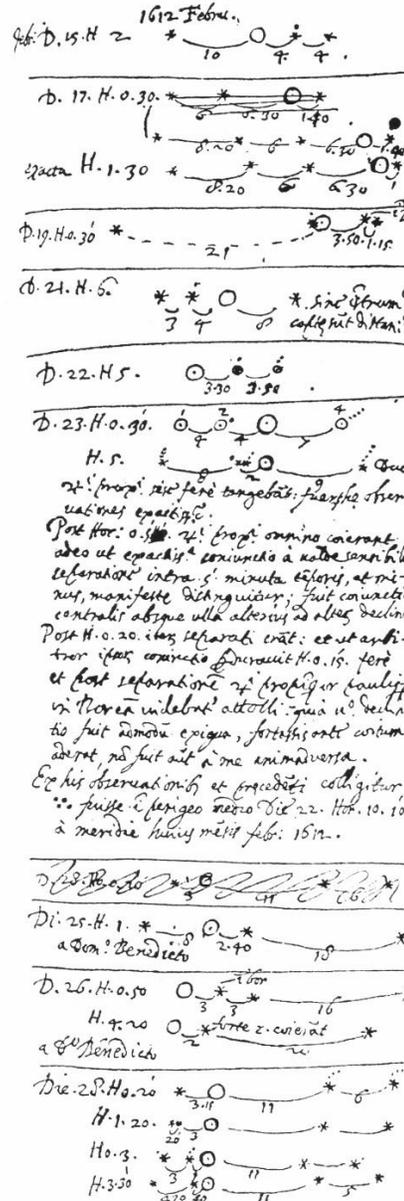
2 Feb Hr 0.40 An easterly one was 6' distant from Jupiter; from the westerly one closer to it 4'; this (diagram) from the more westerly 8'. They were all approximately of the same size. However, at the seventh hour it was thus. Now there were four stars present, 2 easterly, (diagram) 2 westerly. The more easterly one was 4' from the next; this 1'40'' from Jupiter; Jupiter 6' from the next one, and this one from the more westerly 8'. They were all on a most straight line.

3 Feb Hr 7 Thus it was. The easterly one was 1'30'' distant from Jupiter. The nearer westerly one (diagram) was 2' away; from it the other westerly one was 10' distant. They were all exactly on the same straight line, and of about the same size.

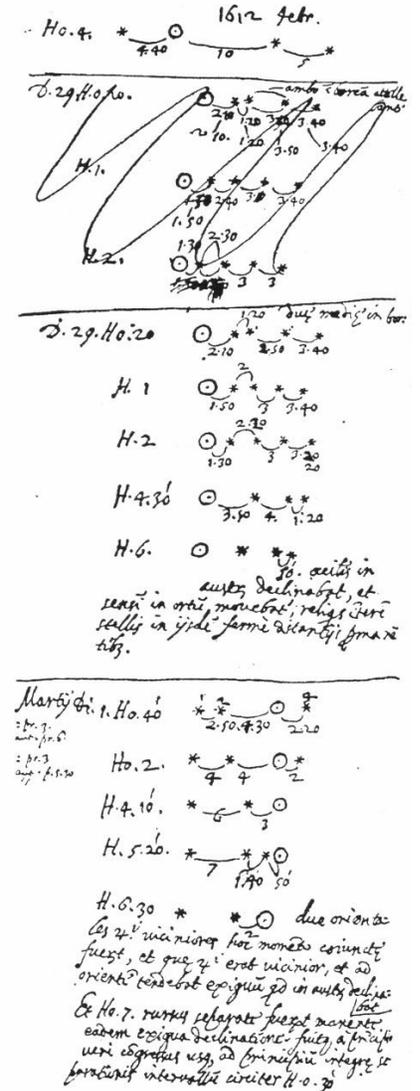
4 Feb Hr 2 There were 2 easterly stars and 2 westerly as in the opposite figure. The more easterly (diagram) one was 3' from the next, this was 0'40'' away from Jupiter; Jupiter from the nearer westerly one 4'; this indeed from the next westerly one 6'. They were all in the same straight line, and of approximately the same size; the one certainly closest to Jupiter appeared to be slightly smaller. Hour 7 They were thus. From the more easterly one to the next 0'30''; from this one to Jupiter 2'; (diagram) from Jupiter to the nearer westerly one 4'; from this to the more westerly one 3'; all equal and on a straight line, always according to the ecliptic.

Mss. Gal., P. III, T. IV, car. 68r.

Mss. Gal., P. III, T. IV, car. 68r.



Post hor. 0.30. ut. Proprii omnino conuerti ad eo ut epachis conuerti a ualde conuerti separati intra 6' minuta eorum, et minus, manifeste distinguuntur; fuit conuerti contrarij absque ulla alterius ad alius declinatio Post H. 0.20. illos separati erat: et ut arbitror ipsos conuerti separati H. 0.15. fere et post separati ut proprii conuerti in linea uidebuntur altissimi uel declinatio fuit demum epigua, fortassis ante cursum adpet, na fuit aut a me animaduertit. Et his obseruationib. et sequenti colligitur fuisse a perigeo medio die 22. Feb. 10. 10. a meridie huius mensis Feb. 1612.



Post hor. 0.30. ut. Proprii omnino conuerti ad eo ut epachis conuerti a ualde conuerti separati intra 6' minuta eorum, et minus, manifeste distinguuntur; fuit conuerti contrarij absque ulla alterius ad alius declinatio Post H. 0.20. illos separati erat: et ut arbitror ipsos conuerti separati H. 0.15. fere et post separati ut proprii conuerti in linea uidebuntur altissimi uel declinatio fuit demum epigua, fortassis ante cursum adpet, na fuit aut a me animaduertit. Et his obseruationib. et sequenti colligitur fuisse a perigeo medio die 22. Feb. 10. 10. a meridie huius mensis Feb. 1612.

*die 27. H. 0.30. * * * due orionae*

*die 27. H. 0.30. * * * due orionae*

*die 27. H. 0.30. * * * due orionae*

448 Observations Mss. Gal., P.III, T.IV, car.68t
1612 Feb

- 15 Feb Hr 2 (diagram)
- 17 Feb Hr 0.30 (diagram) exact Hr 1.30 (diagram)
- 19 Feb Hr 0.30 (diagram)
- 21 Feb Hr 6 (diagram) The distances were taken without the instrument.
- 22 Feb Hr 5 (diagram)
- 23 Feb Hr 0.30 (diagram) Hr 5 (diagram) The two closest to Jupiter were almost touching each other; these observations were most exact. After Hr 0.5 the ones closest to Jupiter had come wholly together to the extent that within 5 minutes of time, or less, a most exact conjunction is manifestly distinguished from a most perceptible separation; it was a central conjunction without any turning away of one from the other. After Hr 0.20 they were again separate, and, as I judge, their conjunction will have lasted nearly 0.15 hour; and after the separation, the one nearer to Jupiter seemed to be raised a bit to the north, because truly its turning away was quite slight; perhaps it was present before the coming together; however, it was not noticed by me. From these observations and from the preceding one it is gathered that (#2) was in middle perigee from day 22 of this month of Feb at Hr 10.10 from noon.
- 25 Feb Hr 1 (diagram) to the north from Don Benedetto
- 26 Feb Hr 0.50 (diagram) Hr 4.20 (diagram) perhaps 2 had come together from Don Benedetto
- 28 Feb Hr 0.20 (diagram) Hr 1.20 (diagram) Hr 3 (diagram)

448 Observations Mss. Gal., P.III, T.IV, car.68t
1612 Feb

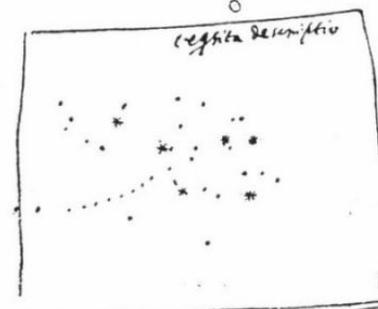
- Hr 4. (diagram)
- 29 Feb Hr 0.20. (diagram) both were raised to the north Hr 1. (diagram) Hr 2. (diagram)
- Hr 4.30S (diagram) Hr 6. (diagram) the westerly one was declining to the south and was moving perceptibly to the east, the other stars remaining at nearly the same distances.
- 1 Mar Hr .40S (diagram) Hr 2. (diagram) Hr 4.10S (diagram) Hr 5.20S (diagram) Hr 6.30 (diagram) The two easterly ones closer to Jupiter at this moment were conjoined, and the one which was closest to Jupiter was tending slightly to the east because it was declining to the south. And Hr 7. They were again separate, the same slight turning away remaining; and there was from the beginning of the true coming together until the beginning of the complete separation an interval of about Hr 0.30

Mss. Gal., P. III, T. III, car. 32t.

Summily apparetur



et et stellarum mag ad rectam angulos versus austrum dicitur stella quod dicitur 30. fere.



Die 2. Februarij Hr. 2. talis fuit dispositio. stella a 4. abest 6. occidentali u. d. 7. prop. erat stellula danda exigua dicitur ab eo. 16. prop. una orientalis distabat a 7. 6. 7. ab occidentali u. d. 4. hac ab occidentali 6. erat 16. fere magnis. Horante 7. ita se habebat

Die 3. fuit talis Hr. 0.40. 7. ab occidentali u. d. 4. hac ab occidentali 6. erat 16. fere magnis. Horante 7. ita se habebat

Die 4. Hr. 2. ita se habebat orient. 7. ab occidentali u. d. 4. hac ab occidentali 6. erat 16. fere magnis. Horante 7. ita se habebat

Die 5. Hr. 2. stella 2. orientalis erat, at 2. occid. 16. fere magnis. Horante 7. ita se habebat

Die 6. Hr. 2. stella 2. orientalis erat, at 2. occid. 16. fere magnis. Horante 7. ita se habebat

Die 7. Hr. 2. stella 2. orientalis erat, at 2. occid. 16. fere magnis. Horante 7. ita se habebat

447 Observations Mss. Gal., P.III, T.IV, car.67t
1612

5 Feb Hr 3.50 (diagram) was raised to the north.

6 Feb Hr 4 (diagram) to the north

7 Feb Hr 1.30 (diagram) As it happened, there was a third easterly one next to Jupiter.

Hr 3.40 (diagram) Hr 5.10 (diagram) I received these observations from Don Benedetto.

11 Feb Hr 1.40 (diagram)

12 Feb Hr 0.50 (diagram) raised to the north through the instrument and by reason of the season(?) time(?) weather(?) (temporis). Hr 2 (diagram) Hr 3.30 (diagram) Hr 5.30 (diagram) all exact

13 Feb Hr 0.30 (diagram) exact to the south Hr 1.40 (diagram) Hr 3 (diagram) this one rather to the north Hr 4 (diagram) Hr 5 (diagram)

14 Feb Hr 1.30 (diagram) to the south Hr 3 (diagram) Hr 5 (diagram)

447 Observations Mss. Gal., P.III, T.IV, car.67r
1612

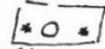
10 Feb Hr 1.50 (diagram) Hr 4 (diagram) Don Benedetto Hr 6 (diagram)

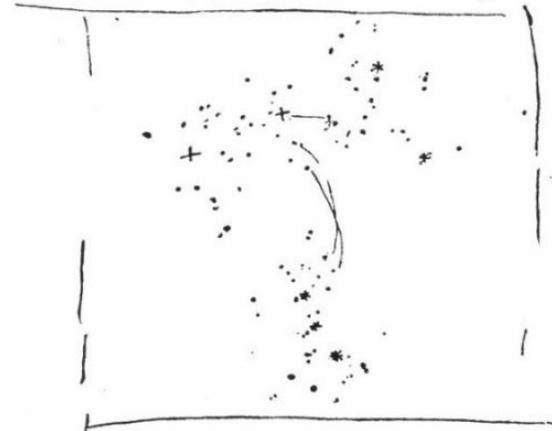
12 Feb Hr 11 (diagram) The ones closest to Jupiter seemed stationary; the more westerly one truly was distant from the one closest to itself by hardly 1 semidiameter. Don Benedetto

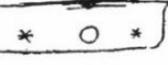
OSSERVAZIONI.

433

Mss. Gal., P. III, T. III, car. 33r.

Die 5. alia fuit nubilosa
Die 6. talis fuit constitutio H. 2.  2. in stelle aderat. orientales
ut una a 7. distans, 2. occidentalis altera a 7. remota 3. erat in ea
de recta in 7.
Die 7. due stelle aderat orientales a 7. ita distans 
in intersticia inter 7. et 7. erat ambo. 1. erat in eade recta



Die 8. erat 3. stelle orientales oes,
ut in figura opposita 7. prop.
erat exigua distans ab ea 1. 20.
media ab hac distabat 4. et erat satis magna, orientalis admodum exigua
distabat ab hac. 20. distans fuerat h. 4. ab occidu; amplex erat nungd 7.
prop. una bn. an 2. essent stellule uidebat. n. interdu hinc alia adue
uerus ortu mix. immodum exigua et ab illa distat 20. oes in eade recta
in extensione ubi bn. distans erat.
Hora u. 7. stella 7. prop. illi fere tangebant, distabat. n. 10. tantu.
reliquae u. 1. magis a 7. aderat, erat. n. media a 7. distat 6. tande
Hora 4. omnin 7. erat iuncta adu et amplius no. conuebat
Die 9. H. o. 30. aderat 2. stelle orientales, et una occidentalis ita
orientalis exigua a 7. distabat 7. media minor
erat et a 7. remota 7. 7. ab occidentali que parua
erat 4.
Die 10. stellule due admodum exiguae conuebat orientales ab. 
remotion distabat a 7. 10. uicinius u. 6. 20. erat in eade recta
Hora aut 4. stella 7. prop. amplius no. apparebat, ues ut opinor. sub 7. latitabat
altera u. 1. hinc remota erat ut mix. arm. fuerat f. aer. irregulari aut, et a 7. erat magis
aliqua uidebat. n. distans in

434 Observations Mss. Gal., P.III, T.III, car.33t (1610)

11 Feb Hr 1 There were two stars present from the east and from the west. The westerly one was (diagram) distant 4S from Jupiter. The nearer easterly one was equally 4S; the more easterly was 8S distant from this. They were all quite clear and on a straight line to a hair. But at Hr 3 a fourth star was seen near to Jupiter as the other diagram makes clear; it was smaller (diagram) than the others and 0.30 from Jupiter and from a straight line of the aforementioned it deflected slightly to the north. They were all most bright and astonishingly conspicuous. At Hr 5.30 truly the easterly star near to Jupiter already occupied to a hair the middle place between (diagram) Jupiter and the following star and they were all of the same magnitude and on the same straight line exactly in this way: 12 Feb Hr 0.40 from sunset. Four stars were present, 2 from the east and 2 from the west. The more (diagram) remote easterly one was 10S from Jupiter; the more remote westerly one truly 8S and these were conspicuous enough. The remaining two were very close to Jupiter and were very small especially the easterly one which was from Jupiter distant 0S40 the westerly one truly was 1S away. Hr 4. The small star near to Jupiter from the east no longer appeared. 13 Feb Hr 0.30 Four stars were present, one from the east, conspicuous enough, distant from Jupiter (diagram) 2S the other truly more easterly less apparent one distant from the previous one 4S; from the west 2, of which the more westerly was distant from Jupiter 4S and was conspicuous enough; a little small star came between this one and Jupiter and near to the more westerly star; it was indeed no more than 0.30 from the former; they were all on the same straight line to a tee according to the longitude of the ecliptic. 15 Feb Hr 1 (since on the 14th the sky was obstructed by clouds) such was the position. There were (diagram) 3 easterly stars, none westerly. The one close to Jupiter was 0.50' away, the following was was 0'20" away from this; from this one truly the easternmost was 2' distant and was larger than the remaining ones; indeed those closer to Jupiter were rather small. But at approximately Hr 5, of the stars near to Jupiter only one was discerned and the distance of this one was 0.30'; the distance truly of the easternmost was indeed 4'. Hr 6 however, besides the two constituted from the east, as was just mentioned, a little star, astonishingly small, was discerned distant from Jupiter 2'.

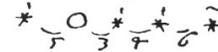
16 Feb Hr 6. They stood in such constitution: an easterly one was 7' from Jupiter; Jupiter from the (diagram) following westerly one 5'; this one from the more westerly one 3'; they were all of almost the same magnitude and conspicuous enough, and on the same straight line exactly according to the line of the zodiac.

446

OSSERVAZIONI.

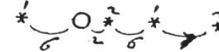
Mss. Gal., P. III, T. IV, car. 66r.

Die. 20. Febr. 20. 36is H. 7. 30.



Die. 30. Ho. 6. * * * * O. certin à 7.
 paululi attillat in linea: de ea to: dubius
 fu.

Die. 7. Febr. Ho. 7. 30.



D. 6. H. 9. * * * * O. 1.40

D. 10. H. 6. 30. * * * * O. 3 5

D. 11. H. 6. * * * * O. 8 9

D. 18. H. 6. 20 * * * * O. 4 2 5

D. 29. H. 5. 20. * * * * O. 6 3 5 3

D. 10. January 1612 * * * * O. 1 3 3 30

D. 11. H. 5. * * * * O. 4 1 2 2

D. 19. H. 3. * * * * O. 4 15 7.30

H. 5. * * * * O. 4 1

H. 5. 30 * * * * O. 4

D. 21. H. 2. 20. * * * * O. 2 2 2

H. 4 * * * * O. 3 2 6

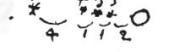
D. 21. H. 2. 20. * * * * O. 2 2 2

H. 4 * * * * O. 3 2 6

Discerner 2p ad semidiamet. sui orbis ut
 1. ad 275. m. p. velut sic spectat; p. p. in lineis
 p. h. long. multiplicat in 20. ad 1. est una
 m. diametri 2p ad 275. m. p. orbis ut. 1. ad
 5500

Mss. Gal., P. III, T. V, car. 76r.

Die. 30. 36is H. 6.



detortio à 7. q. fac =
 h. h. 2. bonis attillat =
 bon. dubius fu

Mss. Gal., P. III, T. IV, car. 67r.

D. 22. H. 2. * * * * O. 3 6 4

H. 6. * * * * O. 1.20 1.40 0 4

D. 28. H. 2. * * * * O. 2 2 3

H. 5. * * * * O. 3 2 20

D. 29. H. 3. * * * * O. 2 30 3 6

D. 30. H. 2. * * * * O. 4 9 3 7

D. 31. H. 3. * * * * O. 10 2 4

H. 5. * * * * O. 10 2 2 2 1. 40

In hac 2. observatione primus usus sum
 p. r. ad intervallum exacte augetur et las
 ac distantiis orientalis prop. accipi,
 n. n. fuit instrument. ad huc exactis. parat
 tum

D. 1. Febr. H. 2. * * * * O. 20 2 30 30

Hor. 5. * * * * O. 20 3 6

Huius secundae observationis distinctio observata
 fuit instrumenti: sed de hanc factis distat
 Nota quod n. in instr. quo dicitur caput notetur
 linea que illi ceat in ang. quo dicitur elidit
 sic sicut parallelis Equatori & loco 7. q. motu
 2. in hac linea cognoscet huius distantiis. Plan.
 ferat & Planis elidit parallelis.

446 Observations Mss. Gal., P.III, T.IV, car.66t
1611

- 20 Nov Hr 7 (diagram)
- 30 Nov Hr 6 (diagram) Concerning the third, which was raised slightly to the north, I was doubtful.
- 4 Dec Hr 7.30 (diagram)
- 6 Dec Hr 9 (diagram)
- 10 Dec Hr 7 (diagram)
- 11 Dec Hr 6 (diagram)
- 18 Dec Hr 20 (diagram)
- 29 Dec Hr 20 (diagram)

1612
 10 Jan Hr 4 (diagram) Hr 5 (diagram) The westerly one closest to Jupiter was raised to the north and was separated from the one closest to itself.
 19 Jan Hr 3 (diagram) Hr 5 (diagram) Hr 5.30 (diagram)
 21 Jan Hr 2.20 (diagram) Hr 4 (diagram) The diameter of Jupiter to the semidiameter of its orbit is as 1 to 275 when it is viewed through the telescope; but if the telescope multiplies the lines in the ratio of 20 to 1 it will be the true ratio of the diameter of Jupiter to the semidiameter of its orbit as 1 to 5500.

443 Observations Mss. Gal., P.III, T.IV, car.76r
1611

[repeat of 30 Nov observation]

446 Observations Mss. Gal., P.III, T.IV, car.67r
1612

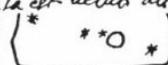
- 22 Jan Hr 2 (diagram) Hr 6 (diagram)
- 28 Jan Hr 2 (diagram) Hr 5 (diagram)
- 29 Jan Hr 3 (diagram)
- 30 Jan Hr 2 (diagram)
- 31 Jan Hr 3 (diagram) Hr 5 (diagram) In this second observation I first used the instrument for taking intervals exactly, and I took the distance of the more easterly one accurately; the instrument was not as yet most exactly prepared.
- 1 Feb Hr 2 (diagram) Hr 5 (diagram) The distances of this second observation were observed through the instrument, but as to the hour it is not sure. Note that if in the instrument with which the distances are obtained there be noted a line which divides it according to the angle by which a line of the ecliptic divides a parallel of the equator in the place/locus of Jupiter, through the movement of Jupiter on this line it may be known if the Medicean planets travel on parallel planes of the ecliptic.

434 OSSERVAZIONI.

Mss. Gal., P. III, T. III, car. 33r.

Fig. 11. H. 1. adiat ab oriente stella 2.  * O *

et 1. ab occasu. occidentalis distabat a 7. 4. orientis prop^a pariter q' orientalis, ab ha distabat 3. erat satis significans et in eade recta ad angu^m

Set hora 5. stella quarta 7. prop^a proxima una est velut altera figura declarat, erat reliq^{ue} minor, et  * O *

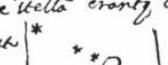
a recta illor^{um} linea modicum qd^{am} versus borea deflectebat; splendidiusq^{ue} erat omnes et mirè immodum significans. Hora u^o 5. 30. in stella orientalis 7. prop^a median^{em} ad angu^m obarebat locu^m inter 7. et sequente stella^m erantq^{ue} ois eiusde magnis et in eade recta ex parte hac  * O *

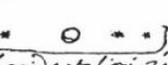
Fig. 12. H. 0. 10. ab occasu quatuor aderant stelle 2. ex occa^{su} 2. ex occasu. orientalis remotior distabat a 7. u^o occidentalis vero remotior 3. et he^c satis erant significans. Reliqua 2. erat minor^{is} et erant admodu^m exigua^m prope^{re} orientalis, que a 7. distabat. 0. 40. occidentalis vero aberat 1.

Hora 4. stella que 7. ex oriente erat proxima amplius ad ap^{er} forebat  * O *

Fig. 17. H. 0. 30. tres aderant stelle, ex oriente una altera^m orientalis satis significans distans a 7. 2. ab occidente u^o a^m inimi remota 2. quare occidentalis a 7. distabat 4. erantq^{ue} inter hac et 7. mediabant stellula exigua et occidentalis stelle proxima, ab illa can^{is} ad plus aberat 0. 30. eratq^{ue} in eade recta ad amissi^m in Silybia longitudine.

Fig. 15. H. 1. (na 14. (clm nubibus fuit obscuru^m)) tali erat positio 3. erat orientalis stelle, nulla occidentalis, 7. prop^a aberat 0. 50. sequere^m distabat ab hoc 0. 20. ab hoc u^o orientalis elyabat^{ur} 2. eratq^{ue} reliquis maior: 7. emⁱⁿ minor^{is} erat admodu^m exigua.

Set Hora prop^a 5. ex stelle 7. proximi una lateri cerebat^{ur}, altera sub^{er}erat: erantq^{ue} huiusmodi stelle a^m orientalis vero 0. 30. gatio^m erat adueta, fuit can^{is} 4. Hora aut^{em} 6. (inter duas et modo distans) est distans ab occa^{su}, cerebat^{ur} ab occa^{su} stellula mirè immodu^m exigua a 7. distans 2.

Fig. 16. H. 6. in tali distatione steterunt: orientalis  * O *

14 a 7. aberat 7. 4 a sequente occidentalis 3. hec ab occidentalis 3. erant omnes eiusde^m fere magnitudinis et satis significans, et in eade recta linea ex parte eundem^{em} totius ductu^m.

436 Observations Mss. Gal., P.III, T.III, car.34t (1610)

(note in Italian) But these people make the world in their fashion and I in its own. I have not put in the hills and the valleys, and other stars in the heavens if first I have not seen them, but you indeed have made Jupiter incorruptible without seeing it such.

2 Apr Such was the constitution; three easterly ones and one westerly. The westerly one was 3' away (diagram) from Jupiter. The easterly one closest to Jupiter was 1' away from it; the following one was 2' away from this; the more easterly one was 8' away from this. They were all in a straight line to a hair and were all conspicuous.

In Firenzuola 3 Apr Hr 0.40 Three planets were visible, one to the east, two indeed to the west. The easterly one was (diagram) 9' distant from Jupiter. The closer westerly one was 1' from Jupiter; the remaining more westerly one was 3' from the other. It was brighter than the others.

Florence 5 Apr Hr 1 Only one easterly planet was present 2'30'' distant from Jupiter and was rather conspicuous. (diagram)

In San Romano 6 Apr Hr 2 Only one easterly one was present 5' distant from Jupiter and it was rather conspicuous. It (diagram) was not, as I conjecture, the same as the preceding, but another conjoined with Jupiter on a previous night; Venus then indeed appeared. Now it was under Jupiter.

9 Apr Hr 1 Four planets have been seen in this configuration: namely 2 easterly ones of which the closer (diagram) to Jupiter was 2' away from it, the other likewise 2' away from this (aforementioned planet). At the same time there were two westerly ones of which the closer was 1'30'' distant from Jupiter; the other was 8' distant from Jupiter. They were in the same straight line to a hair, and rather conspicuous.

10 Apr Hr 0.30 Thus was the constitution: namely three easterly planets of which the closest to Jupiter (diagram) was 1' 30'' distant from it; the following was 5' away from Jupiter; the remaining one was indeed 5' from this.

11 Apr Hr 1 3 stars were present all to the west. The closest to Jupiter was 2' distant; the following one (diagram) was 3' away from this and the most westerly indeed was 4' distant from this.

13 Apr Hr 0.30 Only a pair of stars was sighted, one to the east distant 4' from Jupiter, one to the west (diagram) indeed 6'.

14 Apr Hr 1.30 Four planets were sighted; 2 to the east, likewise 2 to the west. The easterly one closer (diagram) to Jupiter was 1' away, the other easterly one was 6' distant from Jupiter. The closer westerly one was 0'40'' away, the other one 4'.

15 Apr Only 2 appeared, one easterly, the other westerly. (diagram)

16 Apr Three were seen, all easterly. The closest to Jupiter was 2' away; the following one 2'; the (diagram) easternmost 4' from this.

17 Apr 3 stars were present, one to the east 9' distant from Jupiter; 2 to the west of which the closer to (diagram) Jupiter was 2' distant, the more westerly was 4' distant from this.

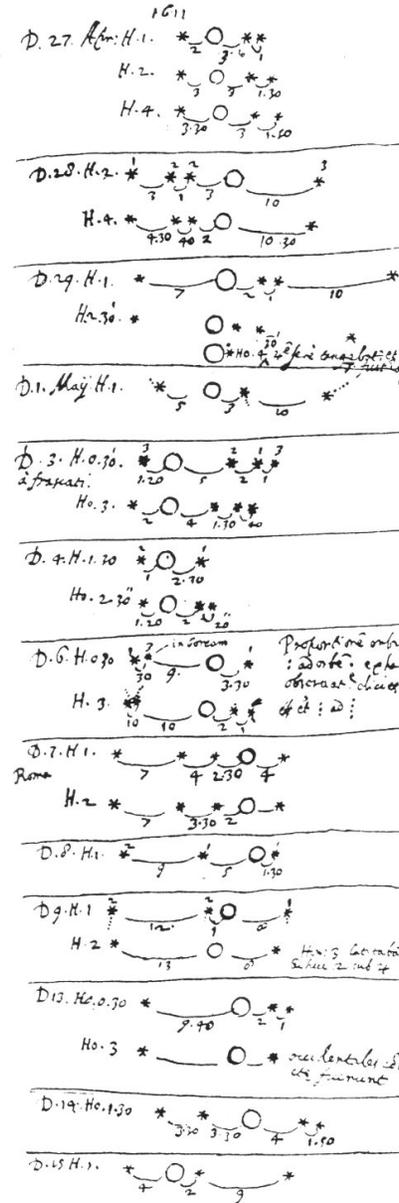
18 Apr Hr 0.20 Four planets were seen. The easterly one more removed from Jupiter was 12' from it, (diagram) the closer 1'. The closer westerly one was 3' away; the more westerly one was indeed likewise 3' from this. And they were in the same straight line to a hair.

At the Villa del Cappone (2 diagrams) 24 Apr (diagram)

25 Apr (diagram)

26 Apr (diagram)

Mss. Gal., P. III, T. IV, car. 71r.



Mss. Gal., P. III, T. III, car. 36r.



442 Observations Mss. Gal., P.III, T.IV, car.78r
1611

17 Mar Hr 0.30 (diagram) Hr 3 (diagram) Hr 5 (diagram)

18 Mar Hr 0.30 (diagram) Hr 4 (diagram) after half an hour the middle easterly planets were conjoined according to longitude and the smaller one elevated to the north touched the other as closely as possible.

20 Mar Hr 2 (diagram) the two closer to Jupiter are conjoined. Hr 3.40 (diagram) but since after a half an hour the two stars closer to Jupiter became more removed (they were distant now 30), it is evident that in the first observation they were conjoined and that both had had their movement towards the west; one may infer this from the slowness of their separation. (#3) was in perigee at Hr 15.40.

21 Mar Hr 1 (diagram) Hr 3 (diagram) Hr 4.20 (diagram)

22 Mar Hr 2 (diagram) 2nd from Jupiter was in augmentation hour fourth Hr 5 (diagram) 3rd from Jupiter in augmentation Hr 5 closest to Jupiter in perigee Hr 6 3/4 (in Italian) They follow the observations going back two diagrams.

442 Observations Mss. Gal., P.III, T.IV, car.75t
1611

23 Mar Hr 1.30 (diagram) at San Cassiano (due east of Massa, in province of Lucca)
Hr 2.30 (diagram) Hr 3.20 (diagram)

24 Mar Hr 2 (diagram) in Siena. doubtful

25 Mar Hr 0.40 (diagram) San Quirico

26 Mar Hr 0.40 (diagram) Aquapendente Hr 3 (diagram)

27 Mar Hr 0.30 (diagram) Viterbo The more easterly was approaching the following one; now at Hr 2 it was only 1 minute away; however at Hr 3 they were almost touching each other; the distance of the closer one did not appear changed, from which it may be conjectured that it was in its middle longitude and that it is the one which describes the smallest circle, truly the more easterly one which traces the second circle from Jupiter; Hr 4 they were all entirely joined, and the distance of these from Jupiter seemed slightly changed.

28 Mar Hr 0.30 (diagram) Monterosi Hr 3 (diagram) Hr 4.30 (diagram) Those close to Jupiter were separated; the third from Jupiter was slightly larger than the others.

29 Mar Hr 2 (diagram) Rome Hr 3 (diagram) Hr 3.40 (diagram) Hr 4.40 (diagram)

30 Mar Hr 1 (diagram) Hr 2.30 (diagram) Hr 3.30. The closest to Jupiter was joined with it.

31 Mar Hr 1 (diagram) Until Hr 4 there was no perceptible change. 1 Apr Hr 1.20 (diagram) Hr 3 (diagram)

439 Observations Mss. Gal., P.IV, T.VI, car.73t
1610

25 Jul At earliest morning namely on Sunday the feast of Saint James, at Padua, I first observed an easterly matutinal Jupiter near which three Medicean planets, all easterly, stood from it into this order: (diagram)

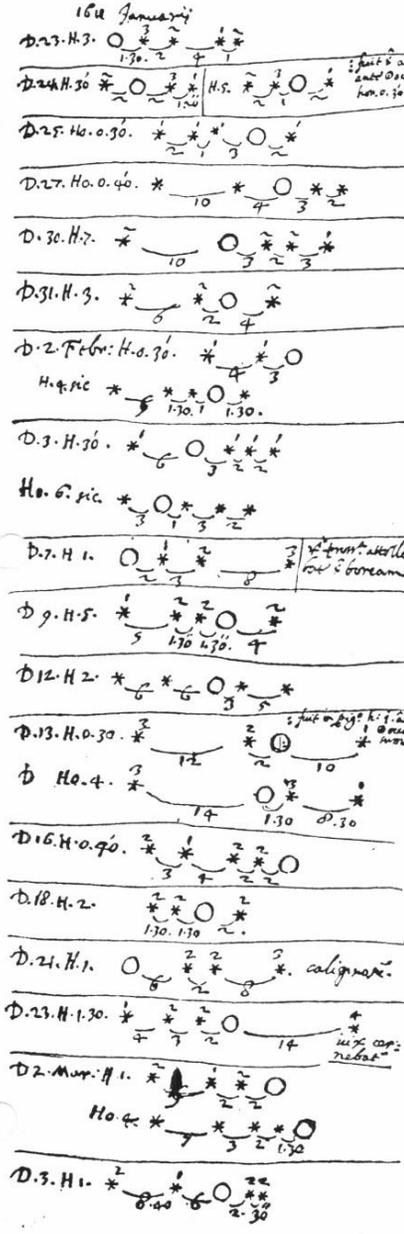
- 29 Jul thus: (diagram)
- 5 Aug (diagram) The middle easterly one was raised slightly to the north.
- 8 Aug (diagram)
- 15 Aug (diagram) The nearest to Jupiter was elevated towards the north.
- 17 Aug (diagram)
- 24 Aug (diagram) The middle one was elevated sharply to the north.
- 25 Aug (diagram)
- 20 Aug (diagram)
- 21 Aug (diagram)
- 22 Aug (diagram)
- 31 Aug (diagram)
- 7 Sep (diagram)
- 25 Oct (diagram)
- 4 Nov (diagram)
- 5 Nov (diagram)
- 14 Nov Hr of night 7 (diagram)
- 15 Nov Hr 5 (diagram) The air around Jupiter was foggy, out of which an easterly star was scarcely conspicuous.
- 18 Nov Hr 5 (diagram)
- 19 Nov (diagram)
- 20 Nov Hr 5 (diagram) A westerly one was elevated to the north, and at Hr 7 the westerly ones were almost touching.
- 21 Nov (diagram)

439 Observations Mss. Gal., P.III, T.IV, car.74r
(1610)

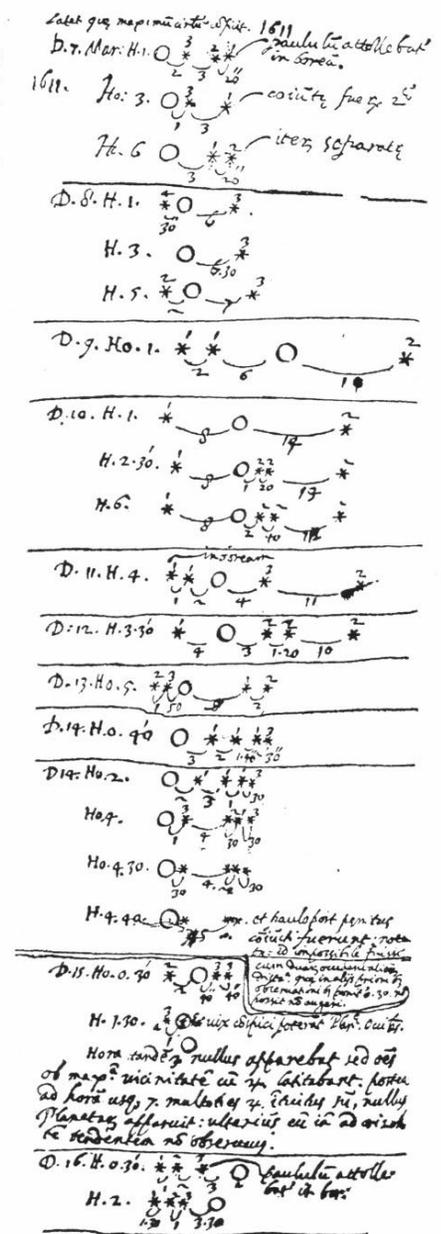
- 30 Nov (diagram) The easterly one nearest to Jupiter was elevated slightly to the north and after 1/3 hour was conjoined with the one closest to itself.
- 2 Dec Hr 3 (diagram) Hr 5 The one closest to Jupiter was conjoined with it. The air was most clear.
- 3 Dec Hr 5 (diagram)
- 4 Dec Hr 5 (diagram)
- 6 Dec Hr 5 (diagram)
- 7 Dec Hr 5 (diagram) Hr 7 (diagram) The extreme easterly one was raised slightly to the north.
- 9 Dec Hr 5 (diagram)
- 10 Dec Hr 4 (diagram)
- 12 Dec Hr 3 (diagram)
- 13 Dec Hr 3.30 (diagram) The second one from Jupiter was elevated to the north. Hr 4 the ones closer to Jupiter were conjoined. Hr 5 (diagram) The middle one was seen to decline to the south.
- 14 Dec Hr 3.30 (diagram)
- 19 Dec Hr 3 30 (diagram) (in Italian) It continues three diagrams later.

OSSERVAZIONI.

Mss. Gal., P. III, T. IV, car. 77r.



Mss. Gal., P. III, T. IV, car. 77r.



441 Observations Mss. Gal., P.III, T.IV, car.77r
1611 January

- 23 Jan Hr 3 (diagram)
- 24 Jan Hr 30Š (diagram) | Hr 5 (diagram) was in augmentation before sunrise Hr 0.30.
- 25 Jan Hr 0.30Š (diagram)
- 27 Jan Hr 0.40Š (diagram)
- 30 Jan Hr 7 (diagram)
- 31 Jan Hr 3 (diagram)
- 2 Feb Hr 0.30 (diagram)
- 3 Feb Hr 30 (diagram) Hr 6 thus: (diagram)
- 7 Feb Hr 1 (diagram) The closest to Jupiter was raised to the north.
- 9 Feb Hr 5 (diagram)
- 12 Feb Hr 2 (diagram)
- 13 Feb Hr 0.30 (diagram) : was in perigee Hr 1 before sunrise. Hr 4 (diagram)
- 16 Feb Hr 0.40 (diagram)
- 18 Feb Hr 2 (diagram)
- 21 Feb Hr 1 (diagram) foggy
- 23 Feb Hr 1.30 (diagram) was scarcely discerned
- 2 Mar Hr 1 (diagram) Hr 4 (diagram)
- 3 Mar Hr 1 (diagram)

441 Observations Mss. Gal., P.III, T.IV, car.77t
1611

The one which makes the greatest circle is hidden

- 7 Mar Hr 1 (diagram) was raised slightly to the north. 1611 Hr 3 (diagram) two were conjoined Hr 6 (diagram) separate again
- 8 Mar Hr 1 (diagram) Hr 3. (diagram) Hr 5 (diagram)
- 9 Mar Hr 1 (diagram) Hr 1.30. (diagram)
- 10 Mar Hr 1 (diagram) Hr 2.30Š (diagram) Hr 6 (diagram)
- 11 Mar (diagram) to the north Hr 4. (diagram)
- 12 Mar Hr 3.30Š (diagram)
- 13 Mar Hr 5. (diagram)
- 14 Mar Hr 0.40Š (diagram)
- 14 Mar Hr 2 (diagram) Hr 4. (diagram) Hr 4.30. (diagram) Hr 4.40. (diagram) and shortly afterwards they were deeply conjoined; noted: this was impossible since the distance of the two westerly most which is posited at 0.30 in prior observations cannot not be increased
- 15 Mar Hr 0.30Š (diagram)
- 15 Mar Hr 1.30Š (diagram) The westerly planets could hardly be discerned. Hr finally 3. None (nullus, masculine, therefore planeta) appeared but all because of the the greatest proximity with Jupiter were hidden; afterwards until Hr 7 I observed attentively many times; no planet appeared; previously already I did not observe it tending to the horizon.
- 16 Mar Hr 0.30Š (diagram) it was raised a bit to the north. Hr 2 (diagram).

Mss. Gal., P. III, T. IV, car. 73r.

1610

Die 25. Julij Summa mans. Effecto tempore di:
in Jacob Die Geminas Polarij primam
Observari in orientali matutina cui ad:
stant tres Planete, Mercurius orientales ois
ab ipso in huc ordine

Die. 29. Aug. sic

Die. 5. Aug. media
occidentalis paululae effectus ubi:

Die. 8.

Die. 11.

Die. 17.

Die. 20.

Die. 21.

Die. 22.

Die. 24.

Die. 25.

Die. 31.

Die. 7. Septemb.

Die. 25. Octob.

Die. 4. Novemb.

Die. 5.

Die. 14. H. noct. 7.

Die. 15. H. 5.

Die. 18. H. 5.

Die. 19.

20. H. 5.

Die. 21.

Mss. Gal., P. III, T. IV, car. 74r.

Die. 30. * - * - * - * Orientalis
et proxima paulula in Bor. assebat, et cu hui
prox. # post hor. 1/2 coniectus fuit.

Die. 2. Decemb. H. 7.

H. 5. 7. prox. cu eo unum est. clor. aer.

Die. 3. H. 5.

Die. 4. H. 5.

Die. 6. H. 5.

Die. 7. H. 5.

H. 7. * - * - * - * O. eximus orion:
culis paulula in Bor. effectus?

Die. 9. H. 5.

Die. 10. H. 4.

Die. 12. H. 8.

Die. 17. H. 7. 10.

H. 7. minima q. coniect. fuit.

H. 5. * - * - * - * O. minus in debet in:
auct. declinare

Die. 14. H. 5. 10.

Die. 19. H. 7. 20.

