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Tycho Brahe's Geniture

Günther Oestmann

Abstract. The paper deals with the astronomical contents of a horoscope for Tycho Brahe cast by himself. Two versions of the horoscope are extant in a manuscript written by Georg Ludwig Frobenius (1566-1645), who was an eminent astronomer and astrologer. Frobenius had stayed for a short time with Tycho on the island of Hven and belonged to the learned circle around Heinrich Rantzau, Danish governor of Schleswig and Holstein. Tycho's geniture can also be found in a collection of nativities compiled by Conrad Cellarius (1574-1636) in Tübingen.

It is known that Tycho Brahe (1546-1601) had inclinations towards astrology, but contrary to his astronomical works and observations, far less research has been done to examine these activities more closely.[1] Casting horoscopes was a common practice among astronomers of the sixteenth-century, and there is good reason to assume that the great Danish astronomer was well aware of his time of birth and knew his horoscope. Indeed, a horoscope of Tycho is extant in two versions calculated by himself. In the course of preliminary researches on Heinrich Rantzau's attitude towards astrology.[2] I was lucky to find this hitherto completely unknown source.

It is the aim of this paper to discuss the astronomical contents and provenance of these genitures, which are part of a small, oblong notebook of twenty-two paper leaves bound in parchment containing several nativities. The manuscript with the inscription *GLFI 1591* is preserved in the university library of Göttingen (Cod. 8° Philos. 50).[3]

The abbreviation stands for *Georg Ludwig Frobenius Iphoviensis*, who was the owner and scribe of the manuscript. Frobenius was born in 1566 in Iphofen, a small town near Würzburg in Franconia, and died 1645 in Hamburg.[4] Between 1586 and 1590 Frobenius studied in Tübingen and Wittenberg and in 1591 he went to Denmark to pursue astronomical studies with Tycho Brahe on the island of Hven. But Tycho offered unreasonable conditions for collaboration, and Frobenius took the opportunity to leave the island after a short time.[5] He was engaged by Tycho's friend Heinrich Rantzau (1526-1598), Danish governor of

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Schleswig and Holstein, as a teacher for his grandson Erich. Frobenius joined Rantzau's learned circle and, together with the Flemish astrologer Adrian Vossenhol (lifetime unknown), the mathematician Thomas Finck (1561-1656) and the historian and poet Peter Lindeberg (1562-1596), became responsible for collecting and editing astrological material for the numerous books which Heinrich Rantzau published under his name.

In 1595 Frobenius married a niece of Detlev Wolders, who was leaseholder of the estate of Wandsbeck near Hamburg owned by Heinrich Rantzau. A year later Frobenius took over Wandsbeck from Wolders, but returning from a voyage in 1597 he found something *'noticeable detrimental to his nourishment'*[6]: Tycho Brahe wished to settle down somewhere after he had fallen out of favour with King Christian IV, and Heinrich Rantzau had decided to offer him the castle of Wandsbeck. Tycho moved there in October 1597 and left for Prague a year later, having been appointed Court Mathematician to Rudolf II.

The castle was demolished in 1773, but the village of Wandsbeck, now completely immersed in the city of Hamburg, became famous, at least among historians of science and connoisseurs of rare books, because of the first printing of Tycho's description of the astronomical instruments (*Astronomiae instauratae mechanica*) which he had employed on the island of Hven.[7]

After Rantzau's death in 1598 Frobenius had to leave Wandsbeck Castle, because the building was intended for Christina von Halle as the widow's dower house, and he settled down in nearby Hamburg as a book printer. In the beginning of the eighteenth-century several manuscripts by Frobenius still could be found in the library of Hamburg Cathedral (Dombibliothek).[8] These included:

1) Sideralis Respublica, sex libris absoluta, [...].

2) Claudii Ptolemaei Magnae Constructionis Mathematicae Libri XIII, Graece, cum nova interpretatione Latina G. L. Frobenii, qui passim etiam necessarias Animadversiones, ex Copernicanis, Tychonicis, et Astronomiae Longomontani Danicae, traditionibus desumptas, [...].

3) Commentarius in Tabulas Prutenicas.

4) Hermes Astronomicus in Tabulas Rudolphinas Caesareas motuum coelestium, quo obscuriora dilucide illustrantur, breviora modice amplificantur, [...].

5) Divinationis Genethliacae compendium, tribus partibus comprehensum, [...].

6) Canon rectarum circulo inscriptarum, quas vulgo chordas sive subtensas vocant, quarum maxima, per centrum transiens, eadem cum circuli diametro 120. partium statuitur, primum a Cl. Ptolemaeo ad semicirculi gradus, et horum semisses, supputatus, ac Graece editus post ad graduum singula minuta extensus, et vulgaribus numerorum notis evulgatus, a G. L. Frobenio, A.C. 1618.

7) Fundamentum ascensionum rectarum et obliquarum, succinctis problematibus earum compositionem et usum explicans, cum tabulis ad eam rem necessariis constructum. Accessit Tabula elevationum polarium.

8) Tabula ascensionum obliquarum, ad elevationem poli grad. 54. min. 8. secund. 10., juxta meridianum Hamburgensem, ex fundamentis Geometricis diligenter A. 1612 supputata.

9) Calculus Eclipseos lunaris quae A. 1612, d. 4 Maji, in meridiano Hamburgensi conspicietur, duplici methodo, primum vulgariter, ex tabulis motuum solis et lunae, a Tych. Braheo restitutorum, deinde Geometrice, ex doctrina triangulorum, secundum hypotheses ab eodem T. Braheo inventas, summa diligentia elaboratus [...].

The aforementioned manuscripts were sold at auction in 1784 and are now lost without trace.[9] But even their titles suggest that Frobenius was an eminent astronomer and astrologer who mastered the higher realms of the art.

Coming back to the horoscope itself, a square scheme with the inscription *Dn. TYCHONIS BRAHAEI Thema genethliacum ab ipsomet correctum, et a filia* [...?] *Margarita, istarum artium studiosa, mihi communicatum* can be found on fol. 1v. Thus the corrected contents of the horoscope were communicated to Frobenius, but it is not really clear by whom: it could be Tycho's daughter Magdalena (b. 1574) – in this case Frobenius did not mention the correct name. If he referred to his sister Margaret (1551-1614), the expression *filia* is somewhat surprising.

There is another scheme on fol. 2r bearing the inscription *nobilis Danus et Illustris Mathematicus nascitur A.C. 1546 Decemb D. 13. H. 22. M. 47. p.m. Elevat. Poli 56 ἑκ τού ἀυτογράφου auctoris* [according to

the author's autograph], and beneath the following addendum by Frobenius: *Correxit Auctor sic: Pone Elevat. poli parum ultra 55°, et locum Martis 11.15 et Ascen. 19 Aquarii tunc omnia convenient* (see fig. 1).

The planetary longitudes in the first horoscope (fol. 1v) for Monday, 13 December, 1546, 22.47 p.m. true solar time are the following:

Horoscope I (original source)

Sun	1;52 Cp
Moon	22;48 Vi
Saturn	28;00 Sa
Jupiter	8;57 Aq
Mars	11;00 Ar
Venus	19;00 Aq
Mercury	3;14 Cp
Nodes	7;00 Sa, 7;00 Ge

Lot of Fortune: 10;08 Sc

House cusps:

X	15;30 Sa
XI	26;30 Sa
XII	12;00 Cp
I	19;12 Aq
II	2;00 Ta
III	2;30 Ge

Horoscope II (original source)

In the second horoscope (fol. 2r) the position of Mars (11;30 Ar), the cusps – and consequently the Lot of Fortune (7;30 Sc) – are different (see fig 2):

X	15;18 Sa
XI	26;00 Sa
XII	10;00 Cp
I	16;33 Aq
II	2;30 Ta
III	2;30 Ge

We may take the assumption that Brahe used Erasmus Reinhold's *Prutenic Tables* (based on the parameters of Copernicus) for calculating

the planetary positions (Frobenius employed these tables for his own horoscope on fol. 4r, too).

A recalculation[10] (Longitude: 10;00 west of Königsberg in East Prussia, reference meridian of the *Prutenic Tables*) shows that this is the case, indeed. The planetary longitudes according to the *Prutenic Tables* are very close to the manuscript values above:

Sun	1;54 Cp
Moon	22;51 Vi
Saturn	28;04 Sa
Jupiter	8;57 Aq
Mars	11;00 Ar
Venus	18;56 Aq
Mercury	3;20 Cp
Nodes	6;59 Sa, 6;59 Ca

Although he preferred the Prime Vertical system ascribed to Campanus of Novara and an eight-house derivative system,[11] Tycho here obviously used the 'rational method' commonly (although falsely) connected with Johannes Regiomontanus.[12] Circles of position joining in the north and south point of the observer's horizon are laid at distances of 30° through the celestial equator, thus giving unequal sections of the ecliptic. The 'rational method' was widely used by astrologers of the 16th and 17th centuries.

Tycho's birthplace is Knudstrup in Scania, the southern province of Sweden, in 55°58' N.[13] A recalculation according to the house system of Regiomontanus and a latitude of 56° (as stated in the source) yields the following results:

X	15;06 Sa [15;18 Sa]
XI	25;31 Sa [26;00 Sa]
XII	9;44 Cp [10;00 Cp]
I	16;11 Aq [16;33 Aq]
II	2;12 Ta [2;30 Ta]
III	2;06 Ge [2;30 Ge]

The result matches fairly well with the original figures of the second horoscope on fol. 2r (in brackets). The cusps of houses XI and XII seem to have been rounded to the next full degree.

Concerning the houses of the first horoscope on fol. 1v it seems likely that it has been erected for a latitude of 54;56 as calculated according to the distance between ascendant and mid-heaven (obliquity of the ecliptic: 23;30). But the cusps of houses II and III are incorrect (about 1° and 1°30' off). In comparison to the contemporary value for Knudstrup given above the latitude is about one degree too far to the south (54;56 roughly corresponds to the modern latitude of Flensburg in Northern Germany). It can only be speculated why Tycho here used a false latitude. One may tentatively draw the conclusion that Tycho erected the first horoscope presented in Frobenius' manuscript early in his career before taking up astronomical observations systematically. Of course he was well aware of the geographical coordinates of his observatory and the surrounding sites.

Tycho's geniture can also be found in another, slightly later source. In 1602 Conrad Cellarius (1574-1636), who had studied under Michael Mästlin (1550-1631) and later became Professor of Natural Philosophy and head (*Ephorus*) of the Theological College (Stift) in Tübingen,[14] compiled a collection of horoscopes which most likely served as an empirical aid for astrological predictions (*Opus Genethliacum Figurarum DCCCXXXV. Quod est speculum varii hominum ortus, ordinis, fortunae, et mortis* [...]; Stuttgart, Württembergische Landesbibliothek: Cod. math. 4°, 22). (Nothing is known about the personal relations between Frobenius and Cellarius.) On fol. 58r (107r) he included a circular diagram of Brahe's horoscope with the remark *Hoc thema ipse Tycho Brahe erexit*. Time and planetary positions – with a slightly different longitude for Mars (11;35 Ar) – are identical (see fig 3). Cellarius explicitly mentions that the horoscope has been erected for a latitude of 55°.

The house cusps are the following:

X	15;30 Sa
XI	26;00 Sa
XII	11;00 Cp
I	19;12 Aq
II	2;00 Ta
III	2;00 Ge

Fig. 1. Tycho's Geniture, Frobenius version 1

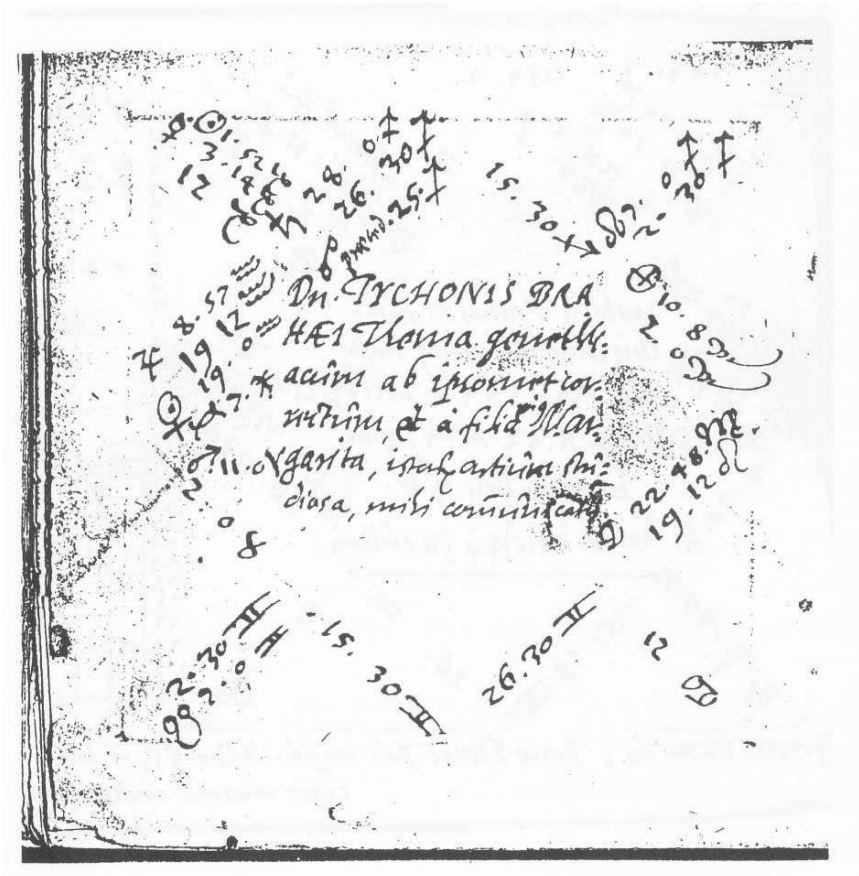


Fig. 2. Tycho's Geniture, Frobenius version 2

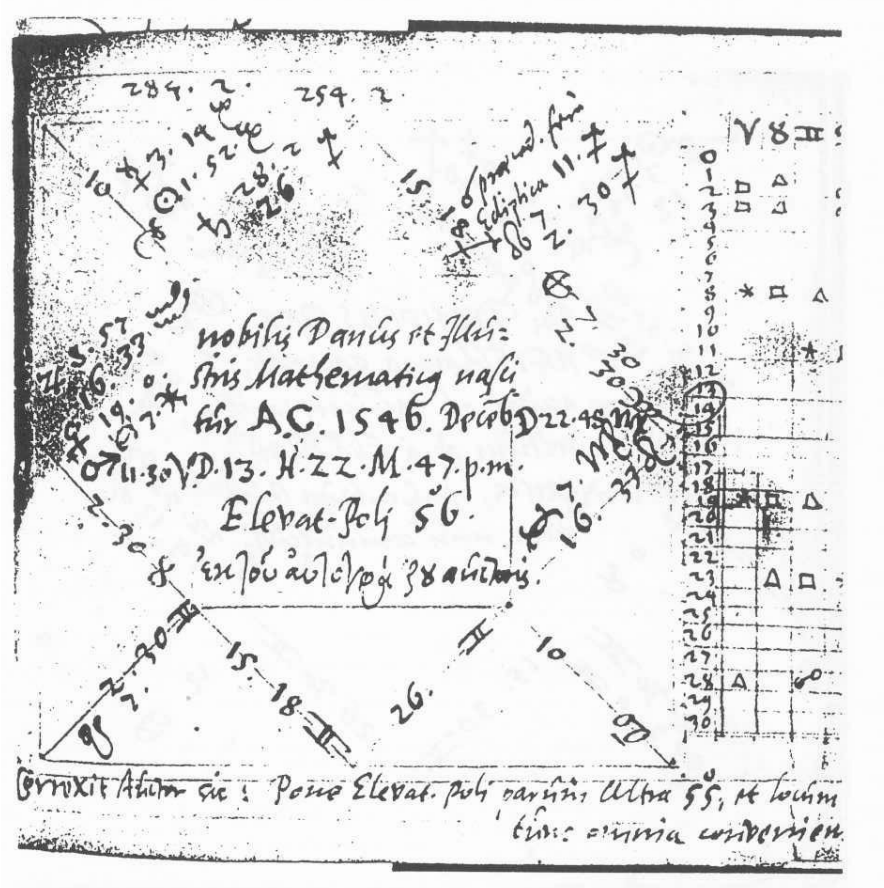
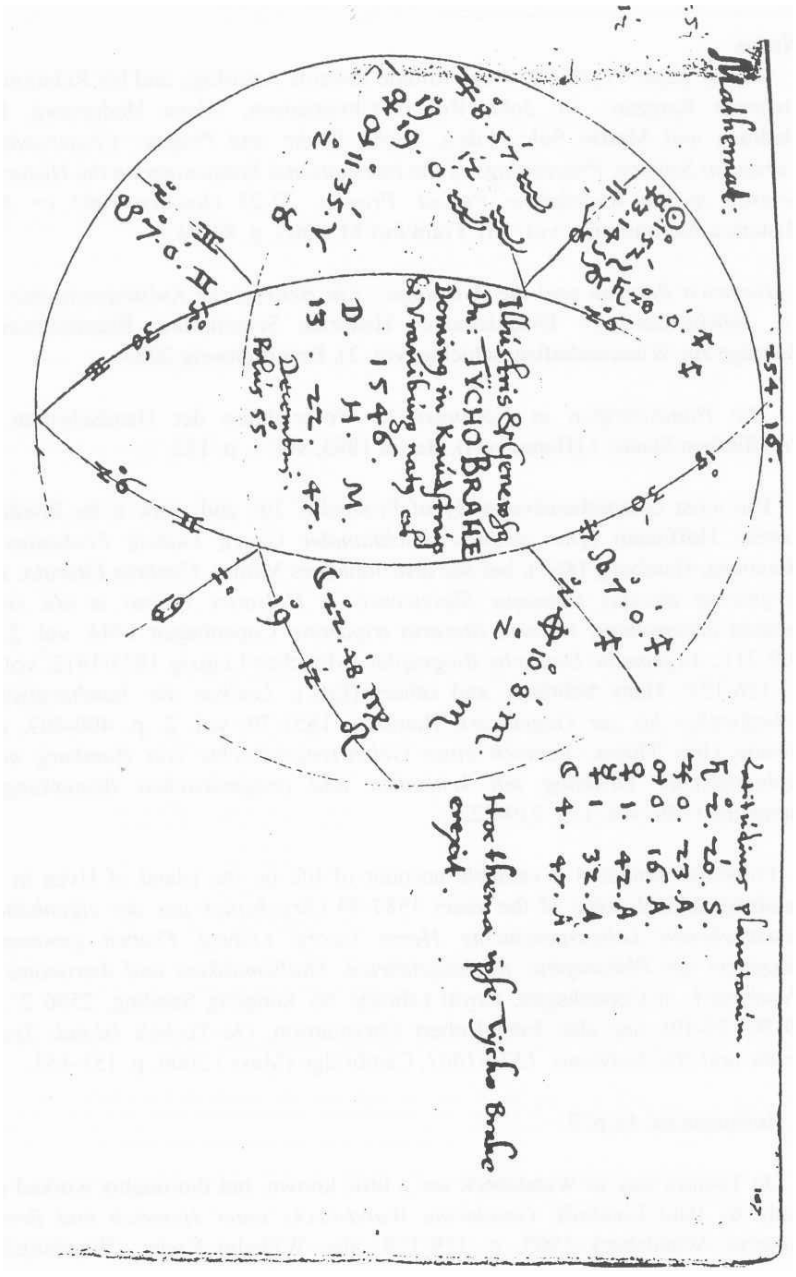


Fig. 3. Tycho's Geniture, Cellarius



Notes

1. See my paper 'Tycho Brahe's Attitude towards Astrology and his Relations to Heinrich Rantzau', in: John Robert Christianson, Alena Hadravová, Petr Hadrava und Martin Solc (Eds.), *Tycho Brahe and Prague: Crossroads of European Science, Proceedings of the International Symposium on the History of Science in the Rudolphine Period, Prague, 22-25 October 2001* (= Acta Historica Astronomiae, vol. 16), Frankfurt/M. 2003, p. 84-94.

2. *Heinrich Rantzau und die Astrologie: Ein Beitrag zur Kulturgeschichte des 16. Jahrhunderts* (= Disquisitiones Historiae Scientiarum: Braunschweiger Beiträge zur Wissenschaftsgeschichte, vol. 2), Braunschweig 2003.

3. *Die Handschriften in Göttingen* (= Verzeichniss der Handschriften im Preußischen Staate, I [Hannover]), Berlin 1893, vol. 1, p. 152.

4. The most comprehensive study of Frobenius' life and work is by Friedrich Lorenz Hoffmann (*Der gelehrte Buchhändler Georg Ludwig Frobenius in Hamburg*, Hamburg 1867), but see also Johannes Moller, *Cimbria Literata, sive scriptorum ducatus utriusque Slesvicensis et Holsatici, quibus et alii vicini quidam accensentur, historia literaria tripartita*, Copenhagen 1744, vol. 2, p. 209-211; *Allgemeine Deutsche Biographie*, München/Leipzig 1875/1912, vol. 8, p. 126-127; Hans Schröder and others (Eds.), *Lexikon der hamburgischen Schriftsteller bis zur Gegenwart*, Hamburg 1851/79, vol. 2, p. 400-403, and Johann Otto Thiess, *Versuch einer Gelehrtengeschichte von Hamburg nach alphabetischer Ordnung mit kritischen und pragmatischen Bemerkungen*, Hamburg 1780, vol. 1, p. 219-222.

5. Frobenius rendered a valuable account of life on the island of Hven in his autobiographical notes of the years 1587-99 (*Bruchstück aus der eigenhändig geschriebenen Lebensgeschichte Herrn Georg Ludwig Froben gewesenen Magisters der Philosophie, Rechtsgelehrten, Mathematikers und Astronoms zu Hamburg* [...]; Copenhagen, Royal Library: Ny kongelig Samling, 2596 2°, p. 29-30, 33-40); see also John Robert Christianson, *On Tycho's Island: Tycho Brahe and His Assistants, 1570-1601*, Cambridge (Mass.) 2000, p. 151-153.

6. Hoffmann (n. 4), p. 7.

7. On Tycho's stay in Wandsbeck see a little known, but thoroughly worked out study by Paul Eickhoff, *Geschichte Wandsbecks unter Heinrich und Breido Rantzau*, Wandsbeck 1905, p. 119-138; also Wilhelm Krebs, 'Wandsbecker

Erinnerungen an Tycho Brahe', *Das Weltall: Illustrierte Zeitschrift für Astronomie und verwandte Gebiete*, 4, 1903/04, p. 414-417. For the extant copies of the scarce first edition of Brahe's *Astronomiae instauratae mechanica* see B. Hasselberg, 'Einige Bemerkungen über Tycho Brahes Astronomiae instauratae Mechanica. Wandesburgi 1598', *Vierteljahrsschrift der Astronomischen Gesellschaft*, 39, 1904, p. 180-187.

8. The list of titles was first published by Moller (n. 4), p. 211, and can also be found in Thiess (n. 4), p. 221-222, and Hoffmann (n. 4), p. 35-38.

9. There is one notable exception: the first-mentioned manuscript (*Sideralis respublica*, but consisting of eight books) is preserved in the university library of Göttingen (Cod. 8° Philos. 49; see *Die Handschriften in Göttingen* (n. 3), vol. 1, p. 151-152).

10. I have used a very convenient computer program especially created for the needs of historians by Peter Schiller (*Geschichte der Himmelskunde* [CD-ROM with booklet], Wilnsdorf 2001) and wish to thank him for valuable suggestions and corrections.

11. Oestmann (n. 1), p. 87, 89.

12. It was already known in the Maghrib in the eleventh-century (E. S. Kennedy, 'The Astrological Houses as Defined by Medieval Islamic Astronomers', in: Josep Casulleras und Julio Samsó (Eds.), *From Baghdad to Barcelona: Studies in the Islamic Exact Sciences in Honour of Prof. Juan Vernet*, Barcelona 1996, vol. 2, p. 543).

13. Tycho Brahe, *Opera omnia*, ed. John Louis Emil Dreyer, Copenhagen 1913/29, vol. 5, p. 312 (*Longitudines et latitudines insigniorum in Europa locorum a Tychone Brahe partim propria observatione, partim intineraria distantia et correctis mappis emendata*; taken from Christian Severinus Longomontanus, *Astronomia Danica*, Amsterdam 1622).

14. Heribert Hummel, 'Conradus Cellarius Haegeus: Leben und Werk des Dichterfürsten und Professors aus Göppingen', in: *Alt-Württemberg: Beilage zur Südwestdeutschen Illustrierten Wochenzeitung*, 8, 1962, Nr. 1.

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