

# Venus moon: an astronomical tale of illusions and deceptions

Luisa Lovisetti

Department of Physics “Aldo Pontremoli”, University of Milan, [luisa.lovisetti@unimi.it](mailto:luisa.lovisetti@unimi.it)

*Abstract:* What do a Neapolitan lawyer, a famous Italian astronomer, a Scottish instrument maker, the greatest French writer of adventure novels and a curious Belgian journalist have in common? Perhaps, it may be surprising to discover that they all are main characters of a story concerning the mysterious satellite of Venus. And if the attentive reader must have immediately (and correctly) thought “But Venus has no satellite!”, it will be even more astonishing to realize that, for more than two centuries, some of the most eminent scholars really believed in the existence of such a celestial body. In fact, starting from the seventeenth century, recurrent sightings of a hypothetical satellite occurred, leading several astronomers to go looking for it. Among them, the Italian Giovanni Domenico Cassini (1625-1712), who claimed to have seen something resembling a moon once in 1672, and again in 1686. 2022 is the 350<sup>th</sup> anniversary of his first alleged sighting; this work is thus aimed to trace the most relevant and curious passages of such a long and fascinating astronomical research.

*Keywords:* Venus satellite, illusion, history of astronomy

## 1. Prologue

Non semper ea sunt, quae videntur; decipit frons prima multos; rara mens intelligit, quod interiore condidit cura angulo [Things are not always as they appear, their first appearance deceives many people: the mind hardly ever discovers what is hidden in their innermost part] (Phaedrus c.40, ll. 5-6).

It would be very difficult to find a more suitable incipit for the story we are going to tell in the following pages, and which arises from a mere deception of human mind and eyes.

In fact, this narration is the tale of something that does not exist, and that never did, despite the fact that, for almost 250 years, several scientists - even among the most distinguished and prominent figures of the time - had believed otherwise, chasing and searching for it. Here is, then, the story of a great astronomical illusion, but, at the same time, also of an intriguing and fascinating venture: that is, the history of the alleged moon of (for a comprehensive account, see: Kragh 2008).

## 2. The first observers of the moon

On August 28<sup>th</sup>, at a quarter past four in the morning, while observing Venus through the 34-foot telescope, I saw, at three-fifths of its diameter towards the East, a shapeless light, which seemed to imitate the phase of Venus, whose roundness was diminished on the western side. The diameter of this phenomenon was roughly equal to the fourth part of the diameter of Venus. I observed it attentively for a quarter of an hour, and after having interrupted the observation for four or five minutes, I no longer saw it: but in that moment the daylight was intense (Cassini 1685, p. 45).

These were the notes recorded by the famous Italian astronomer Giovanni Domenico Cassini (1625-1712), in the early morning of August 28<sup>th</sup>, 1686. To be honest, Cassini had already seen something strange around Venus fourteen years before, on the morning of January 25<sup>th</sup>, 1672, when a mysterious dot, very similar to a small celestial body, had appeared in the field of view of his telescope. What object was it? Could it be a sort of satellite?

Cassini was an undisputed authority in the astronomical field. In fact, in 1665, he had discovered the Great Red Spot of Jupiter; in 1672, he had provided a remarkable estimate of the distance between the Sun and the Earth (obtaining an outcome which was only 7% below the current value), by exploiting the Mars parallax; and, in 1683, he had explained the phenomenon of zodiacal light.

In addition to that, Cassini was not stranger to sighting satellites. In fact, he had already discovered four Saturnian moons: Iapetus (in 1671), Rhea (in 1672), and both Tethys and Dione (in 1684). Precisely for this reason, despite having made his sighting public, he was not quite sure that what he had seen was really a satellite, and there was something that made him strongly reluctant to unbalance and to pronounce about the nature of that object.

To tell the truth, Cassini has not even been the first to have observed something resembling a satellite in close proximity to Venus. In fact, in the winter of 1645, another person had already recorded a similar sighting: the Neapolitan astronomer Francesco Fontana (1585-1656). In 1630s Fontana had gained popularity as a manufacturer of Keplerian telescopes which were much more powerful than the Galilean ones, although they turned the image upside down. In 1645, he made several observations of Venus, and, on the evening of November 11<sup>th</sup>, he recorded: "First hour after sunset. I observed the figure of Venus that has changed from previous observations. Similarly, in the middle of his figure, a small dot of a reddish colour appeared, and it is a new discovery, hitherto unknown" (Fontana 1646, p. 94).

On November 15<sup>th</sup>, an hour after the sunset, he saw two reddish stars, while on December 25<sup>th</sup>, he saw only a single small globe at the top of the convex side of Venus. Moreover, on January 22<sup>nd</sup>, 1646, six hours after sunset, he saw a little sphere near the concave surface of the planet (Fontana 1646, pp. 96-100).

### 3. Fancy and reality

Since Venus is placed between the Sun and the Earth, its observations have always been rare, harsh, and insidious to make. Despite instrumental improvements and several attempts undertaken, just few observations had provided useful information concerning that planet before the 17<sup>th</sup> century: therefore, Fontana's observations did not go unnoticed. But while there was no doubt that Fontana was able to make good telescopes, how could people trust the word and the testimony of such a character (in short: a lawyer)? In fact, it should be remembered that Fontana, before being an instrument maker and an astronomer, was, first of all, a law graduate.

Very few astronomers were thus willing to give credit to what Fontana had reported. Among them, however, there were also some authoritative personalities, such as Pierre Gassendi (1592-1655), who mentioned Fontana's sightings in his work *Institutio astronomica* (1647), pointing out that he had never been able to see anything comparable to the objects described by the Neapolitan colleague (Gassendi 1647, p. 162). Also Giovanni Battista Riccioli (1598-1671), in his *Almagestum Novum* (1651), stated that he had never observed any moon with his telescope (Riccioli 1651, p. 451). Believing instead in the flattering fame of the Neapolitan astronomer, the Flemish mathematician André Tacquet (1612-1660) argued that Riccioli and Gassendi had not seen any satellite only because their telescopes were of inferior quality to the one used by Fontana (Tacquet 1669, p. 310).

Anyway, while Fontana's statements could be dubious and unreliable, it was much more difficult to mistrust Cassini. Although he had been very cautious in his statements, never saying with certainty that he had really seen the satellite of Venus, in the 18<sup>th</sup> century it was common practice to regard

announcements of this kind as a new discovery. Therefore, after 1686, numerous scholars set out in search of this alleged satellite. But despite the efforts made, for 54 years, no one was able to see it. Had it been just a dream?

#### 4. Reply from the observatory of London

A first answer came from beyond the Channel, where a young gentleman had a gallant meeting with Venus moon. That lucky observer was James Short (1710-1768), a famous Scottish optician and instrument maker, who, on the morning of November 3<sup>rd</sup>, 1740 (according to the Gregorian calendar), stated that:

Directing a reflecting telescope of 16.5 inches focus (with an apparatus to follow the diurnal motion) towards Venus, I perceived a small star pretty nigh her [...]. Finding Venus very distinct, and consequently the air very clear, I put on a magnifying power of 240 times, and, to my great surprise, found this star put on the same phasis with Venus. I tried another magnifying power of 140 times, and even then found the star under the same phasis. Its diameter seemed about a third, or somewhat less, of the diameter of Venus (Short 1641, p. 646).

The observation made by Short lasted for about an hour, and he did not repeat it. However, his recording was considered one of the most important at the time, since his instruments were reputed excellent and among the best available. Therefore, the second edition of the *Encyclopédie* written by Denis Diderot (1713-1784) and Jean-Baptiste D'Alembert (1717-1783), contained a detailed description of the satellite of Venus, made by Joseph Jérôme Lalande (1732-1807), in which the French astronomer described the observation made by Short as one of the best proofs of the existence of Venus satellite, since it was impossible to think that this astronomer had been misled from optical illusions (Diderot & D'Alembert 1765, p. 35).

Furthermore, Jupiter had several satellites, and so did Saturn: it therefore seemed plausible that Venus could also have at least one moon, and many astronomers were willing to take this hypothesis seriously. Therefore, this satellite had to exist for real...or maybe not?

#### 5. Grave questions

Almost twenty years after the observation made by Short, another astronomer claimed to have seen the satellite of Venus: Andreas Mayer (1716-1782), at that time professor of mathematics, physics and astronomy at the University of Greifswald. Mayer saw such an alleged celestial body on May 20<sup>th</sup>, 1759, and reported his observation in his work *Observationes Veneris Gryphiswaldenses*, published in 1762:

I cannot avoid mentioning the fortuitous observation. On the 20<sup>th</sup>, at sunset, I was looking for a comet with a 30-inches Gregorian telescope, when suddenly I saw [...] a globe, the diameter of which was barely equal to a quarter of the diameter of Venus, and with a minor brightness, above Venus, at a distance of 1.5 diameters. For roughly the half of an hour in which it was observed, its distance did not vary significantly. Whether this is the satellite of Venus or not, I dare not to say so. It was about a quarter to nine in the evening (Mayer 1762, p. 16).

Unfortunately, Mayer's observation reached little notoriety, as well as those conducted in early 1761 by Father Louis Lagrange (1711-1783), a Jesuit from Marseille (not to be confused with the much more famous homonymous mathematician). Lagrange made his observations between February 10<sup>th</sup> and 12<sup>th</sup>, using a 6-foot-long refracting telescope with a magnifying power of 800 times, bought by Esprit Pezenas (1692-1776), a Jesuit astronomer, mathematician and hydrographer from Marseille, who was the

director of the Marseille Observatory. Lagrange claimed to have seen a small celestial object near Venus three times; however, he did not see any phases (unlike previous observers). Moreover, he stated that the small body seemed to move on a path perpendicular to the ecliptic: this strange orbit appeared so unusual that he did not publish any reports of the discovery, probably because he did not really believe in the actual existence of a satellite; nevertheless, his observations were later mentioned in the *Encyclopédie* (Diderot & D'Alembert 1765, p. 35).

The sightings reported by Fontana, Cassini and Short thus seemed to be confirmed by two additional and different astronomers. However, after further observations made in 1761, Short took a step back, by stating that he did not believe in the existence of a hypothetical satellite of Venus and that he wanted to retract his allegations of 1740. What had happened in 1761, which had led Short to such a great uncertainty?

## 6. Struggle against the impossible

Venus may have a Satellite or Moon, although it be undiscovered by us: which will not appear very wonderful, if we consider how inconveniently we are situated for seeing it. For its enlightened side can never be fully turned towards us but when Venus is beyond the Sun; and then she herself appears little bigger than an ordinary Star. When she is between us and the Sun, her Full Moon has its dark side towards us; and then we can no more see it than we can see our own Moon at the time of Change. When Venus is at her greatest Elongation, we can have but one half of the enlightened side of her Full Moon towards us; and then it may be too far distant to be seen by us. But if she has a Moon, it may certainly be seen with her upon the Sun, in the year 1761: for even if it should be in conjunction or opposition at that time, we can hardly imagine that it moves so slow as to be hid all the six hours that Venus will appear on the Sun (Ferguson 1756, p. 15).

That was what James Ferguson wrote in 1756, in his treatise *Astronomy Explained Upon Sir Isaac Newton's Principles*. In fact, the scientific community was reasonably convinced that the definitive answer could arrive on June 6<sup>th</sup>, 1761, and June 3<sup>rd</sup>-4<sup>th</sup>, 1769, with the two transits of Venus across the Sun. The phenomenon would be the subject of numerous observations (Lovisetti 2022), since it would provide the extraordinary opportunity to finally determine the Earth-Sun distance with an uncertainty of less than 1%, at least according to the calculations made by Edmond Halley (1656-1742), in 1716 (Halley 1716, p. 461). With so many astronomers and scholars observing Venus, the presence of a possible satellite would certainly not escape; in fact, between 1761 and 1769, 28 sightings were recorded (19 in 1761; 9 between 1762 and 1768; and unexpectedly none in 1769).

Among them, besides those of Lagrange, we remember the observations conducted by Jacques Leibar Montaigne (b.1716). Montaigne made several observations in May 1761, convinced by Armand Henri Baudouin de Guémadeuc (1734-1817), an Alsatian controversial character, who had a 25-foot telescope in the marine observatory of the Thermes de Cluny, Paris.

On May 3<sup>rd</sup>, at about half past nine in the evening, about 2' far from Venus, a small and feeble crescent appeared, located in the same manner as Venus. The diameter of this little crescent was about one-fourth of the planet's one, and the line drawn from the centre of Venus to that of the satellite made an angle of about 20° with the vertical of that planet and below it, towards the noon. The next day, on May 4<sup>th</sup>, at the same time, our observer still saw the same phenomenon, but a little more distant of about 30" or 1', and in the northern part with respect to the vertical of Venus, with which he formed an angle of about 10°. On May 5<sup>th</sup> and 6<sup>th</sup>, no observations could be made, because of a thick fog which kept the atmosphere up to the height of Venus, whose disk could be barely observed. Fortune returned on May 7<sup>th</sup>, and they saw again the satellite still at a distance between 25' and 26' from the centre of Venus, but above it towards the north, in a plane which passed by the

planet, the satellite made an angle of  $45^\circ$  with the vertical of Venus. The following days the satellite was not seen until the 11<sup>th</sup> of the same month, when it still appeared around nine o'clock, still at about the same distance from Venus, and still making an angle of  $45^\circ$  with the vertical, but in the southern part (Diderot & D'Alembert 1765, p. 35).

All the observations were communicated by Baudouin, who read two memoirs during a meeting of the French Academy of Sciences, of May 20<sup>th</sup>, 1761, in which he tried to deduce the elements of the orbit of that satellite, estimating that it had to be almost as far from Venus as the Moon is from the Earth (Baudouin 1761, p. 22). Baudouin was convinced about the great relevance of those observations, which confirmed the ones made by Cassini: he subsequently published a treatise, *Mémoire sur la découverte du Satellite de Venus* (1761), in which he reported all his deductions. Montaigne's 9-foot telescope was strangely not equipped with a filar micrometer, and all the distances were thus assessed only by estimate; however, his observation was considered quite reliable, at least by Lalande. But when Baudouin repeated the observation on June 6<sup>th</sup>, together with Charles Messier (1730-1817), no traces of that satellite could be seen (Lalande 1761, p. 84).

Moreover, few years later, in Auxerre, another astronomer claimed to have seen something that could be a satellite, in three different occasions:

On March 15<sup>th</sup>, 28<sup>th</sup> and 29<sup>th</sup>, 1764, around half past seven in the evening, M. de Montbarron, councilor at the Présidial [court of justice] in Auxerre, repeated his observations with his [Gregorian] telescope of 32 inches, he changed the small mirror, changed the eyepieces, kept Venus out of range of his instrument while observing his satellite, showed it to numerous people for hours, did not neglect anything that could increase the certainty of the appearance of this star (Diderot & D'Alembert 1765, p. 35).

More details were provided by Messier in a letter of June 16<sup>th</sup>, 1764 (Hell 1765, pp. 26-27), sent to the Hungarian astronomer and Jesuit father Maximilian Hell (1720-1792). According to that letter, on March 15<sup>th</sup>, while observing Venus at seven o'clock in the evening, Montbarron saw a small star, on the dark side of Venus. On the 28<sup>th</sup> of the same month, at half past seven in the evening, he sighted the same small star near Venus, similar to the previous one, which made with the vertical an angle of  $15^\circ$  on the western side. And also on the following day, on March 29<sup>th</sup>, although Venus was surrounded by some sparse clouds, he was able to observe the same star once again. After the third and last sighting, although Montbarron often looked with the same telescope for that mysterious celestial body resembling a star, he could never see it again. In addition to that, Montbarron admitted that he could not distinguish any phase in this star, in any of his three observations.

No biographical details are known regarding the figure of the French councillor, and we are not even given to know how Messier became aware of Montbarron's observations. Moreover, it is interesting to note that, contrary to previous observations, no information was provided about the magnifying power of Montbarron's telescope, nor about the star's angular distance from Venus, or even about its diameter. Therefore, his observations revealed not to be particularly useful to sustain the hypothesis of a real satellite. Instead, according to Hell (Hell 1765, p. 27), those observations proved that the mysterious object was not a fixed star, since fixed stars are more scintillating and less delimited than the object observed. Actually, it must be said that the fact that the small body seen by Montbarron did not twinkle, could not prove that it was not a star, but it simply suggests that the atmosphere was (presumably) less turbulent on those evenings.

## 7. The consequences of a deviation

After 1769, despite the sightings, astronomers were therefore still generally sceptical about the real existence of a satellite.

A strong thrust came from Hell, who, in his treatise *De satellite Veneris* (1765), stated that all the sightings that had occurred up to then were nothing more than optical illusions, caused by the planet Venus itself. According to Hell, the image of Venus was so bright that it was reflected by the eye, and then re-entered the telescope, and created a smaller secondary image: the very one that various astronomers had mistakenly taken for an alleged satellite.

In fact, in 1757 and 1758, Hell had seen an indefinite object near the planet, while making some observations with both a refractor and a reflecting telescope. By slowly moving the eye towards the eyepiece, he had noted that the object followed the same phase as the planet; but by moving perpendicular to the telescope axis, however, was only the image (and not the planet) which had moved in the same way. This theory thus explained the different positions of the alleged satellite, and also the fact that it presented the same phase of the planet (like a real satellite): it was simply a shrunken image of it. For this reason, and for the fact that he had noted the same effect also with Mars and Jupiter, he concluded that he had been deceived by some optical illusions through the telescopes (Hell 1765, pp. 29-32 and p. 63). Moreover, according to Hell,

Why should it appear only to M. Montaigne in Limoges in 1761, and to M. Roedkiaer in Copenhagen in 1764, and the same year to M. Montbarron in Auxerre, and not to others? How is it [possible] that in the same year of 1764, during all the months of March, April, May and June, I saw him very often, perhaps in the same days in which M. Messier in Paris looked for him in vain, while they saw him in Copenhagen and Auxerre, but could none of them see it again in the same places? Why, then, did it appear to me as often as I wanted, and not to others? It was because I had clear skies while the others had clouds for all the time? To what cause can they attribute the fact that all these times I saw it through two Gregorian telescopes, but never through the two much better Newtonian telescopes, although I tried it often by myself and asked others to try it? (Hell 1765, p. 89).

Basing on all those proofs, that object could not therefore be something real, but simply a reflected image, and the question seemed definitively closed. At the time, however, the news was greeted with a hint of regret, and it was said that: "It is a pity that this moon of Venus has vanished, since our imaginative minds had already given him the epigrammatic name of Cupid." (Krünitz 1769, p. 118).

The mysterious satellite of Venus thus slowly lost its charm, and astronomers became unconcerned about its eventual existence. However, between 1870 and 1885, thanks to the subsequent pair of Venus transits (expected for 1874 and 1882), and to the discovery of the two satellites of Mars - namely, Phobos and Deimos, sighted in 1877, by Asaph Hall (1829-1907) - the problem came back into vogue.

## 8. How a Belgian manages an affair

Among the scientists convinced that Venus had a satellite, there was the Belgian journalist Jean-Charles Houzeau (1820-1888). Houzeau started his astronomical career by being a young volunteer at the service of the Royal Observatory of Belgium (while working as a journalist) and, in 1882, he led a Belgian expedition to San Antonio (Texas), to observe the transit of Venus with a special heliometer specifically designed by him.

In the first instance, to justify the scarce sightings, Houzeau assumed that the satellite had existed in the past, but that it had later disappeared, having been disintegrated. However, this hypothesis was not convincing, not even for Houzeau himself, and the Belgian astronomer quickly decided not to pursue this idea.

Relying on some of the data collected by previous astronomers (incidentally, only 7 out of 36: Fontana's observation of November 15<sup>th</sup>, both Cassini's ones, that of Short, that of Montaigne, and Montbarron's sightings of March 4<sup>th</sup> and 28<sup>th</sup>) (Houzeau 1884, p.284), he then suggested that the sighted object was a small planet, which he called Neith, the name of the Egyptian creator of the universe. In fact, this celestial body had a regular period and was cyclically in conjunction with Venus.

The orbit of Neith is under the direct influence of that of Venus, which is remarkably close. Considering the orbit of Venus as the demarcation of the equator of a central body, the meniscus of which would be left on this orbit, Neith would represent a satellite, circulating at a short distance, and the attraction of the meniscus would maintain the body in the plane aforesaid. [...] If we could move the Moon a little away from the Earth, and place it at a given moment at opposition, it would cease to circulate around our globe, and would make its revolution like us around the Sun. Who can affirm that a case of this kind did not arise for Venus, and that Neith is not comparable to what I will call a pseudo-satellite, placed beyond the sphere of attraction of Venus? (Houzeau 1884, p. 289).

However, one last confirmation was missing: a new sighting. Fortunately - or unfortunately, depending on the point of view - on February 3<sup>rd</sup>, 1884, in the Brussels observatory (Thirion 1885, p. 46), a bright dot was sighted very close to Venus by Belgian astronomer Charles Émile Stuyvaert (1851-1908), and again on February 12<sup>th</sup>, by his colleague Louis Niesten (1844-1920).

For Houzeau those were the unequivocal confirmations of his hypothesis and of the real existence of such a mysterious object, but the scientific community soon crushed his enthusiasm, classifying Houzeau's hypotheses as mere speculations, without any scientific basis. Neith was nothing more than an optical illusion, and the case, this time for real, was definitively closed.

## 9. The romance of the moon

As we all know, in fact, Venus has no satellite and, therefore, all the sightings that have occurred in the history of astronomy have proved wrong.

Even the French novelist Jules Verne (1828-1905) was convinced that Venus had no satellites, as he stated in *Hector Servadac*, written in 1877 (thus before the speculations advanced by Houzeau). In Verne's book, a comet (called Gallia), after a collision with the Earth, took away a piece of its surface, carrying 36 people on board. Gallia crossed the solar system in a 2-year voyage along an elliptical orbit that made it first approaching the Sun, beyond the orbit of Venus, and then moving away beyond the orbit of Jupiter. During the approach of Gallia to Venus, Verne wrote:

At least - said Captain Servadac - this approximation will have, if nothing else, served to demonstrate that the planet Venus has no satellites! Indeed, Domenico Cassini, Short, Montaigne de Limoges, Montbarron and some other astronomers truly believed to the existence of this satellite (Verne 1877, p. 58).

So, what have all those astronomers seen? A comet perhaps? A small nova? Or have they been just misled by mere optical illusions, as suggested by Hell? We will never know for sure. As often happens, there are questions that can never be answered with certainty. In all those situations, then, not being able to obtain a scientific explanation of what happened, will be our fantasy and our imagination that will lead us - in the footsteps of Verne - towards extraordinary voyages.

## Bibliography

- Baudouin de Guémadeu, A. H. (1761). *Mémoire sur la découverte du Satellite de Venus & sur les nouvelles observations qui viennent d'être faites à ce sujet*. Paris: Desaint & Saillant.
- Cassini, G.D. (1685). *Découverte de la lumière céleste qui paroist dans le zodiaque*. Paris: Sebastien Mabre-Cramoisy.
- Diderot, D. & D'Alembert, J. B. (1765). *Encyclopédie ou dictionnaire raisonné des sciences, des arts et des métiers. Tome XVII*. Paris: Briasson.
- Ferguson, J. (1756). *Astronomy explained upon Sir Isaac Newton's Principles, and made easy to those who have not studied Mathematics*. London: J. Johnson.
- Fontana, F. (1646). *Novae caelestium, terrestriumque rerum observationes [...]*. Naples: Giacomo Gaffaro.
- Gassendi, P. (1647). *Institutio astronomica [...]*. Paris: Ludovicum de Hevqueville.
- Halley, E. (1716). "Methodus singularis qua solis parallaxis sive distantia à Terra ope Veneris intra Solem conspiciendoe [...]", *Philosophical Transactions of the Royal Society*, 29 (348), pp. 454-464.
- Hell, M. (1765). *De satellite Veneris*. Vienna: Johann Thomas Trattner.
- Houzeau, J. C. (1884). "Le satellite problematique de Venus", *Ciel et Terre: Revue Populaire D'Astronomie*, 5, pp. 283-289.
- Kragh, H. (2008). *The Moon that wasn't. The saga of Venus' spurious satellite*. Basel: Birkhäuser.
- Krünitz, J. G. (1769). "Verzeichniß der vornehmsten Schriften von der Venus und dem Merkur, und dem Durchgange dieser Planeten durch die Sonnenscheibe", *Neues Hamburgisches Magazin*, 15, pp. 114-118.
- Lalande, J. J. (1761). "Observation du passage de Vénus sur le disque du Soleil", *Histoire de l'Académie Royale des Sciences*. Paris: Imprimerie Royale, pp. 81-86.
- Lovisetti, L. (2022). "E pluribus unum: The first international scientific collaboration". *Il Nuovo Cimento C*, 45 (6). doi: 10.1393/ncc/i2022-22225-2.
- Mayer, A. (1762). *Observationes Veneris Gryphiswaldenses [...]*. Greifswald: F. Rose.
- Phaedrus, G. J. (c. 40). *Fabulae, II. Poeta. Liber IV*, ll. 5-6.
- Riccioli, G.B. (1651). *Almagestum novum astronomiam veterem novamque complectens [...]*. Bologna: Vittorio Benacci.
- Short, J. (1641). "An observation on the planet Venus, with regard to her having a satellite", *Philosophical Transactions of the Royal Society*, 41 (459), pp. 646-647.
- Tacquet, A. (1669). *Opera mathematica*. Antwerp: Jacob van Meurs.
- Thirion, S.J. (1885). "Le satellite de Venus", *Revue des questions scientifiques*, 17, pp. 44-62.
- Verne, J. (1877). *Hector Servadac: voyages et aventures à travers le monde solaire*. Paris: Pierre-Jules Hetzel.