L2/23-207

Unicode request for historical asteroid symbols

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2023 September 18

This request is for astronomical symbols of historical interest for several asteroids.

Charts

Proposed characters are highlighted in blue. Most are placed in a new Miscellaneous Symbols Supplement block. Four are alternatives to existing characters and are placed in the Alchemical Symbols code block, completing it. The designs for Flora, Astraea Form Two and Parthenope Form Two (Lyra) are taken from Denis Moskowitz.

Miscellaneous Symbols Supplement

1CEC0 1CEFF

	1CEC	1CED	1CEE	1CEF
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

	1F70	1F71	1F72	1F73	1F74	1F75	1F76	1F77
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
A								
B								
C								
D								
E								
F								

Characters

Character names are the names of the asteroids, with ‘form two’ added if necessary. The character name for (26) Proserpina needs to be kept distinct from the unrelated U+2BD8 PROSERPINA.

Figure numbers set off in parentheses show divergent glyph forms.

 1CEC0 HEBE. (6) Hebe. Figures 1–3, 6, 12, 19–20, 26–27, 29, 31, 34, 36–39, 42–43, 51, 54.

 1CEC1 IRIS. (7) Iris. Figures 1–3, 7, 13, 26–27, 29, 31, 34, 36–39, 42, 44, 51, 54.

 1CEC2 FLORA. (8) Flora. Figures 1–3, 8, 11, 26–27, (29), (31), (34), 36, (37), 38–39, 42, 45, 51, 54.

 1CEC3 METIS. (9) Metis. Figures 1–3, 9, 13, 26–29, 31, 34, 36–37, 40, 42, 45, 52, 54.

 1CEC4 PARTHENOPE. (11) Parthenope. Figures 1–2, 26–27, 36, (45), 52.

 1CEC5 VICTORIA. (12) Victoria. Figures 1–2, (26), 27, 29, 31, (32), 34, 36–37, 41, 46, (52), (54).

1CEC6 EGERIA. (13) Egeria. Figures 1–2, 26, (36).

1CEC7 IRENE. (14) Irene. Figures 1–2, (26), 30–31, 35–37.

1CEC8 EUNOMIA. (15) Eunomia. Figures 1–2, 26–27, 36, 47.

1CEC9 PSYCHE. (16) Psyche. Figures 1–2, 26, 36.

1CECA THETIS. (17) Thetis. Figures 1–2, 21, 26, 36, 48, (54).

1CECB MELPOMENE. (18) Melpomene. Figures 1–2, 26.

1CECC FORTUNA. (19) Fortuna. Figures 1–2, 26.

1CECD ASTRONOMICAL SYMBOL FOR ASTEROID PROSERPINA. (26) Proserpina. Figures 1–2, 22, 36, 49, 54.

1CECE BELLONA. (28) Bellona. Figures 1–2, 23, 36, 49.

1CECF AMPHITRITE. (29) Amphitrite. Figures 1–2, 36.

1CED0 LEUKOTHEA. (35) Leukothea. Figures 1–2, 24, 36, 50.

1F777 VESTA FORM TWO. (4) Vesta. Figures 3–4, 14–17, 26, (27), (29), (31), (33–34), 36, (37–39), 42, 51, 53.

1F778 ASTRAEA FORM TWO. (5) Astraea. Figures 1–3, 5, 18, 26–27, (29), (31), (35), 36, (37), 38–39, (42), 43, 51, 54.

1F779 HYGIEA FORM TWO. (10) Hygiea. Figures 1–2, 26, (27), (36), (45), (52), (54).

1F77A PARTHENOPE FORM TWO. (11) Parthenope. Figures 29, 34, 36–37.

Properties

None of the characters are intended as emoji.

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1CEC0;HEBE;So;0;ON;;;;;N;;;;;
1CEC1;IRIS;So;0;ON;;;;;N;;;;;
1CEC2;FLORA;So;0;ON;;;;;N;;;;;
1CEC3;METIS;So;0;ON;;;;;N;;;;;
1CEC4;PARTHENOPE;So;0;ON;;;;;N;;;;;
1CEC5;VICTORIA;So;0;ON;;;;;N;;;;;
1CEC6;EGERIA;So;0;ON;;;;;N;;;;;
1CEC7;IRENE;So;0;ON;;;;;N;;;;;
1CEC8;EUNOMIA;So;0;ON;;;;;N;;;;;
1CEC9;PSYCHE;So;0;ON;;;;;N;;;;;
1CECA;THETIS;So;0;ON;;;;;N;;;;;
1CECB;MELPOMENE;So;0;ON;;;;;N;;;;;
1CECC;FORTUNA;So;0;ON;;;;;N;;;;;
1CECD;ASTRONOMICAL SYMBOL FOR ASTEROID PROSERPINA;So;0;ON;;;;;N;;;;;
    → U+2BD8 PROSERPINA
1CECE;BELLONA;So;0;ON;;;;;N;;;;;
1CECF;AMPHITRITE;So;0;ON;;;;;N;;;;;
1CED0;LEUKOTHEA;So;0;ON;;;;;N;;;;;
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1F777;VESTA FORM TWO;So;0;ON;;;;;N;;;;;
→ U+26B6 VESTA
1F778;ASTRAEA FORM TWO;So;0;ON;;;;;N;;;;;
→ U+2BD9 ASTRAEA
1F779;HYGIEA FORM TWO;So;0;ON;;;;;N;;;;;
→ U+2BDA HYGIEA
1F77A;PARTHENOPE FORM TWO;So;0;ON;;;;;N;;;;;
= Lyr*a*
→ U+1CEC4 PARTHENOPE

Background

Giuseppe Piazzi discovered the first asteroid, (1) Ceres, in 1801. It was immediately taken to be the "missing planet" between Mars and Jupiter that had been predicted by Bode's law. This identity was complicated by Heinrich Olbers' discovery of (2) Pallas in nearly the same orbit in 1802, Karl Harding's discovery of (3) Juno in 1804, and Olbers' discovery of (4) Vesta in 1807. These first four asteroids were accepted as planets, and astronomy books of the time listed eleven planets in the Solar system. (Neptune wouldn't be discovered until 1846.) Within a few years of its discovery, each of the asteroids had been given a planetary symbol analogous to those of the classical planets. There was some variation in the appearance of the symbols, largely due to the requirements of typesetting. For example, the symbol for (3) Juno is a scepter and a star. Its realization varied from a simple asterisk and a turned typographic dagger, produced by splicing metal type, to elaborate custom-drawn designs. All four symbols had multiple variants, but in our opinion they do not rise to the level of distinct characters any more than do the diverse variants of the signs of the zodiac.

It took until 1845 for another asteroid to be discovered, when amateur astronomer Karl Hencke found (5) Astraea. In 1847 he found (6) Hebe. From then on the pace of discoveries picked up: by 1851 fifteen asteroids were known. Symbols would eventually be assigned to all of them. Those for Astraea and Hebe were drawn in the discovery reports, but even so multiple variants would appear in publication. Later symbols were mostly assigned by verbal description, sometimes several years after the discovery announcements, and also often show extensive variation.

Because of the delay in assigning symbols, publications were not always complete. For example, Johann Franz Encke did not include symbols for (10) Hygiea (discovered 1849) or (11) Parthenope (discovered 1850) in the 1849 and 1850 editions of his *Berliner Astronomische Jahrbuch*, though he did use symbols for the first nine asteroids in his ephemeris tables. Rather divergent variants appear in tables of symbols from (10) Hygiea onwards, and not all astronomers seem to have been aware of all the symbols. This may be why the British *Nautical Almanac and Astronomical Ephemeris* of 1852 listed fifteen asteroids but provided symbols for only the first nine; by the next year, it had given up listing asteroid ephemeris tables altogether (Hilton, n.d.).

In 1851, Encke replaced the iconic symbols with circled numbers in the *Berliner Astronomische Jahrbuch*, in order of discovery from ① for Astraea, with first four asteroids retained as ordinary planets. In 1852, Benjamin Gould did the same in his *Astronomical Journal*, but started the numbering with ① Ceres, an adjustment that Encke would adopt that same year. Gould complained that the iconic symbols were hard to remember and draw, though John Russell Hind (1852) expressed a contrary opinion. In any case, the numeric symbols quickly became universal in astronomical research (Hilton, n.d.), and they replaced all but the first four asteroid symbols in the 1853 edition of the *Nautical Almanac and Astronomical Ephemeris*.

After (20) Massalia, discovered in 1852, only a few more asteroids were ever assigned iconic symbols. The last holdout appears to have been Robert Luther, who gave symbols to his discoveries as late as 1855, and exceptionally had them drawn in his reports. By 1857, even he had given up the practice (Schmadel 2012).

Because the asteroids had come to dominate planetary tables, data for them began to be tabulated separately, though Ceres through Vesta remained listed among the major planets for another decade in some publications. Gould noted that the circled-number notation distinguished the minor planets from the major planets, reflecting a change in how the Solar System was viewed from a classificatory perspective, though minor planets continued to be seen as a subcategory of planet. Eventually, the circles were dropped in favour of parentheses, which were easier to typeset, especially for large numbers. Current practice is to use either parentheses or, more commonly when combined with the name, a bare number: *e.g.* (1), (1) Ceres, or 1 Ceres (Hilton, n.d.).

Reference works continued showing and explaining the iconic symbols for decades after they stopped appearing in research, though often noting that they were obsolete. None listed all the symbols that had been used, and some diverged from the original discoverer's choices.

In the 1970s, astrologers began to show an interest in asteroids, and adopted the old astronomical symbols for the first four (with a modern variant for Vesta). Since then, a few astrologers have worked with additional asteroids, though usually these had not been assigned symbols. (5) Astraea is one that had, but the astronomical and astrological symbols are unrelated.

We propose for inclusion the 19th-century astronomical symbols for the asteroids, due to their historical interest in a period of changing views on the classification of Solar System bodies, and their continued appearance in references decades after their obsolescence in active usage.

Current Unicode characters

The first four asteroids are included in Unicode: (1) Ceres ⚳ (U+26B3), (2) Pallas ⚴ (U+26B4), (3) Juno ⚵ (U+26B5) and (4) Vesta ⚶ (U+26B6). However, the symbol for (4) Vesta is a distinct modern variant. The original astronomical symbol, chosen by Carl Friedrich Gauss, is a very different design of flames atop a rectangle: 🜨.

A late symbol for (5) Astraea is a pair of balances, ⚖, which exists as U+2696 SCALES. Gould (1852) depicts the symbol for (10) Hygiea as a rod of Asclepius, ⚕, available in Unicode as U+2695 STAFF OF AESCULAPIUS. Brocklesby (1855) depicts the symbol for (20) Massalia as an anchor, ⚓, available in Unicode as U+2693 ANCHOR. The symbol assigned for (37) Fides by its discoverer was a cross, ✝, available in Unicode as U+271D LATIN CROSS. We do not propose duplicates of these late symbols.

The symbol for (6) Hebe is a wine glass, ⚵ or ⚶, but U+1F377 WINE GLASS is an emoji 🍷 and so would not be an adequate substitute. Additionally, the best-attested textual examples of Hebe have a planetary cross at the bottom, like the symbols for (1) Ceres ⚳, (2) Pallas ⚴, and (3) Juno ⚵, but unlike U+1F377.

The symbol for (8) Flora is explained in early sources only as "a flower." However, in later sources it is specifically described as "the rose of England," so we believe that U+2698 FLOWER is not an adequate substitute.

Astrological symbols for (5) Astraea and (10) Hygiea are present in Unicode, but these differ from the astronomical symbols. The astrological symbol for Astraea, at U+2BD9, is a percent sign, % (shift-5 on the keyboard for asteroid 5). The astrological symbol for Hygiea, at U+2BDA, is a caduceus, ☿, a late confusion for the rod of Asclepius. (The caduceus is a symbol of Mercury.) Given that they depict different things, and the precedent of having distinct astronomical and astrological symbols for Uranus and Pluto, it is appropriate to encode separate characters for the historical symbols.

The character U+2BD8 PROSERPINA,]·[, is not intended for the asteroid (26) Proserpina, but for an imaginary trans-Plutonian planet in Russian astrology that has no connection to the asteroid.

Proposed symbols

We request Unicode encoding of the following characters. Paragraphs in italics describe related symbols that we do not believe are needed. The historical account is based on Schmadel (2012).

(4) Vesta 🜧. Discovered by H. W. Olbers (1807). Gauss' original astronomical symbol for (4) Vesta depicted Vesta's hearth as flames atop a rectangle. The flames were often typeset with an Aries symbol (von Zach 1807). Sometimes the hearth is depicted in more elaborate forms, especially after asteroid symbols began to fall out of use; one of these () is the ancestor of the modern symbol ().

(5) Astraea 🜨. Discovered by K. L. Hencke (1845). The symbol chosen by the discoverer was an inverted anchor (*ein umgekehrter Anker*, Deutsche Akademie der Wissenschaften zu Berlin, 1845).

> *Later reference works often substitute a pair of balances (U+2696), a more traditional icon of Astraea as the goddess of justice, and suggest that the inverted anchor was a typographic substitute. This variant postdates the abandonment of asteroid symbols by astronomers.*

(6) Hebe ⚵. Discovered by K. L. Hencke (1847). Gauss named this minor planet at the request of its discoverer, and chose a wine glass (*Weinglas*) to be its symbol (Steger 1847), befitting Hebe as cup-bearer to the gods before her replacement by Ganymede. It sometimes has a planetary cross at bottom (⚵) and sometimes does not (⚳).

(7) Iris 🌈. Discovered by J. R. Hind (1847). The original report writes: "The symbol adopted for this planet is a semicircle to represent the rainbow, with an interior star and a base line for the horizon" (Royal Astronomical Society, 1847). Later the rainbow was sometimes represented with multiple nested arcs, 🌈, but the almanacs we consulted follow the original description.

(8) Flora ⚘. Discovered by J. R. Hind (1847). The original report describes the symbol as "a flower" (Royal Astronomical Society, 1847). Later writers call it specifically the Rose of England (Schmadel, 2012); some give it a more detailed design. It often has a planetary cross at bottom.

(9) Metis. Discovered by A. Graham (1848) at the private observatory of Mr. Cooper, to whom two names were suggested: Thetis with a wave (dolphin) symbol—see (17)—and Metis with an eye symbol. Graham chose the latter, with "an eye and a star" for its symbol (Graham 1848).

(10) Hygiea ⚕. Discovered by A. de Gasparis (1849). This planet was named by M. Capocci, director of the Naples observatory. De Gasparis appears not to have announced a symbol immediately with the name. He announced it the next year (1850) as "a serpent (like a Greek ζ) crowned with a star" (de Gasparis 1850). Perhaps because of the delay in the announcement, this is the first symbol that does not appear in the 1850 BAJ and the 1852 *Nautical Almanac and Astronomical Ephemeris*, though both include asteroids discovered after (10) Hygiea. Some later reference books skip over it as well.

> *In Gould (1852), the symbol is illustrated instead as a rod of Asclepius (⚕, a serpent coiled around a staff), which exists at U+2695. Webster's 1864 dictionary gives an apparently unique conflation, a rod of Asclepius with a star, but describes it as "a star and a serpent", so the rod of Asclepius appears to be a typographic substitute for the intended symbol.*

(11) Parthenope ⚶. Discovered by A. de Gasparis (1850) in Naples. Named by J. Herschel, as Parthenope was the name of an ancient Greek settlement at the site of modern Naples. De Gasparis announced the symbol together with that of Hygiea, as "a fish crowned with a star" (de Gasparis 1850). Later writers of reference books sometimes give a lyre, ♋, as an alternative symbol, associating it with Parthenope as one of the sirens. Hind (1852) shows a Pisces symbol under a star, which we interpret as a typographic variant of the fish-and-star symbol. We propose both the fish-and-star and the lyre symbols due to their use by multiple sources.

(12) Victoria ⚷. Discovered by J. R. Hind (1850), who described the symbol as "a star and laurel branch, emblematic of the Goddess of Victory" (Hind 1850). There are several glyph variants of this symbol, but it is usually stated that they represent the intended meaning. For example, the two-branch wreath (a sign of victory) above a star in Figure 46. In Webster's 1864 dictionary the laurel wreath has become a simple arc, with the star at center: ⊛, which could be confused with (29)

Amphitrite. Because of the name's coincidence with the then-reigning Queen of England, there was some controversy over the name, and Gould adopted the name *Clio* (the muse of history) instead, an alternative that had been proposed by Hind. Eventually it was agreed that the mythological condition was satisfied by *Victoria* and the name was adopted, though a few reference works would continue to use *Clio* for some time. Curiously, the laurel symbol was used regardless of the name.

(13) Egeria ⚵**.** Discovery by A. de Gasparis (1850). The discovery was announced together with the symbols for (10) Hygiea and (11) Parthenope. Named by Le Verrier (discoverer of Neptune). The next year, de Gasparis announced the symbol as a buckler (*un bouclier*, Académie des Sciences, 1851), though the announcement apparently had not reached Gould in 1852. It sometimes has the shape of a circular buckler with a boss (⚵). Although there is no mention of a star, one is included in the sources where we find this symbol: Hind (1852) and Webster's 1864 dictionary. The latter explains it as "a star and a plate."

(14) Irene ⚶**.** Discovered by J. R. Hind (1851) and named by J. Herschel. Hind describes the symbol as "a dove carrying an olive-branch with a star on the head" (Hind 1851). This rather complicated symbol appears to have been abbreviated by its discoverer to an olive branch and a star in 1852; some later authors abbreviate it to a dove with an olive branch without the star.

> *Webster's 1864 dictionary shows both this symbol and a second one that does not appear to be otherwise attested: "an olive branch, a flag of truce, and a star". We do not propose the latter as we could not attest to it beyond this mention.*

(15) Eunomia ⚷**.** Discovered by A. de Gasparis (1851), who described the symbol as a star over a heart (*un cœur surmonté d'une étoile*, de Gasparis 1851).

(16) Psyche ⚸**.** Discovered by A. de Gasparis (1852), who described the symbol as a star over a butterfly's wing (*une aile de papillon surmontée d'une étoile*, Sonntag 1852). The butterfly is a Greek symbol for *ψυχή* (*psychê*), the soul. The wing may be simplified to a semicircle, ⚸, thus differing from ⚘ IRIS only in the placement of the star; there's a possibility that the simplified variant influenced the design of the logo for NASA's upcoming *Psyche* mission.

Logo of the NASA *Psyche* mission

(17) Thetis ⚹**.** Discovered by R. Luther (1852) and named by F. W. Argelander. The symbol depicts a dolphin (*Delphin*), sacred to Thetis. In the drawing a star appears *under* the dolphin (Luther 1852). The undulating form of the dolphin is typical of Roman mosaics.

Tunisian mosaic of Galatea riding a dolphin, Sousse Arch. Museum.
© Ad Meskens, Wikimedia Commons

(18) Melpomene ✷**.** Discovered by J. R. Hind (1852) and named by G. B. Airy. The symbol is attested in Hind's 1852 *An Astronomical Vocabulary*, in which he argues in favour of iconic symbols over numerical symbols. Melpomene was not assigned a symbol in the discovery report. It does not appear that the symbol was ever explained: it is a dagger over a star, the dagger being a symbol of Melpomene as the muse of tragedy.

(19) Fortuna ⯁. Discovered by J. R. Hind (1852) and named by him. The symbol is attested in Hind (1852). Fortuna was not assigned a symbol in the discovery report. It does not appear that the symbol, a star over Fortune's wheel, was ever explained.

> *Brocklesby (1855) gives a different symbol for Fortuna, which appears to possibly be a set of scales that is graphically distinct from the scales used for (5) Astraea. See Figure 29. We do not propose this form partly because it is not clear what was intended.*

> ***(20) Massalia.*** *Discovered independently a day apart by A. de Gasparis and J. Chacornac; announced in de Gasparis (1852). Named by B. Valz on behalf of Chacornac; Valz explicitly proposed the circled number 20 rather than an iconic symbol (Valz 1852). However, Brocklesby (1855) gives a simple anchor (U+2693 ⚓) as the symbol, possibly to represent the port of Marseilles (the asteroid's namesake).*

(26) Proserpina ⯐. Discovered by R. Luther (1853) and named by A. von Humboldt. The symbol is described and drawn in the discovery report as a star inside a pomegranate (*eines Granatapfels mit einem Stern im Innern*, Luther 1853). In Webster's 1864 dictionary this symbol is erroneously assigned to (32) Pomona.

(28) Bellona ⚔. Discovered by R. Luther (1853) and named by J. F. Encke. The symbol is described and drawn in the discovery report as Bellona's scourge and lance (*die Geissel und den Spiess*, Encke 1854).

(29) Amphitrite ⯓. Discovered by A. Marth (1853), and independently the next day by N. R. Pogson, and independently the day after that by J. Chacornac. Named by G. Bishop. The symbol was described as "a shell" (*eine Muschel*) in the discovery report (Marth 1854). The form in Webster's 1864 dictionary is a simple crescent, with the star that is common to most asteroid symbols.

(35) Leukothea ⚘. Discovered by R. Luther (1855) and named by G. Rümker and C. A. F. Peters. The symbol is described and drawn in the discovery report as "a lighthouse in ancient form" (*einen Leuchtturm in antiker Form*, Rümker 1855).

> ***(37) Fides.*** *Discovered by R. Luther (1855) and named by the Düsseldorf city council. The symbol is described as "a cross" (eines Kreuzes) in the discovery report (Luther 1856). We do not propose this as it can be encoded as U+271D ✝.*

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Figures

The following figures illustrate the extent of usage of these symbols in historical astronomical research papers, almanacs, and reference works, along with the range of variation in form.

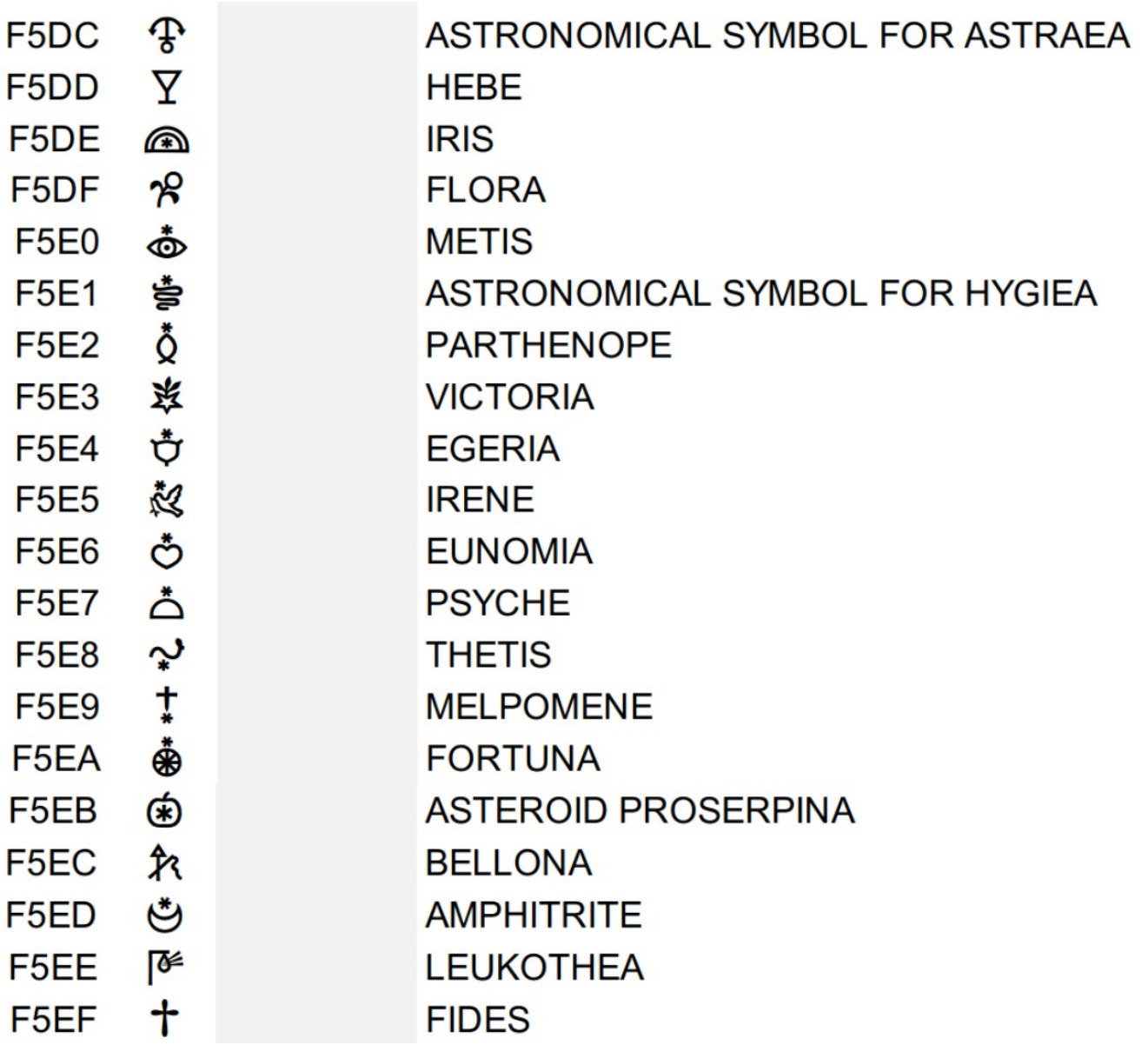


Figure 1. The Nishiki-Teki PUA code points assigned to historical asteroid symbols. The form of (10) Hygiea, , is busier than the historical verbal description would suggest.

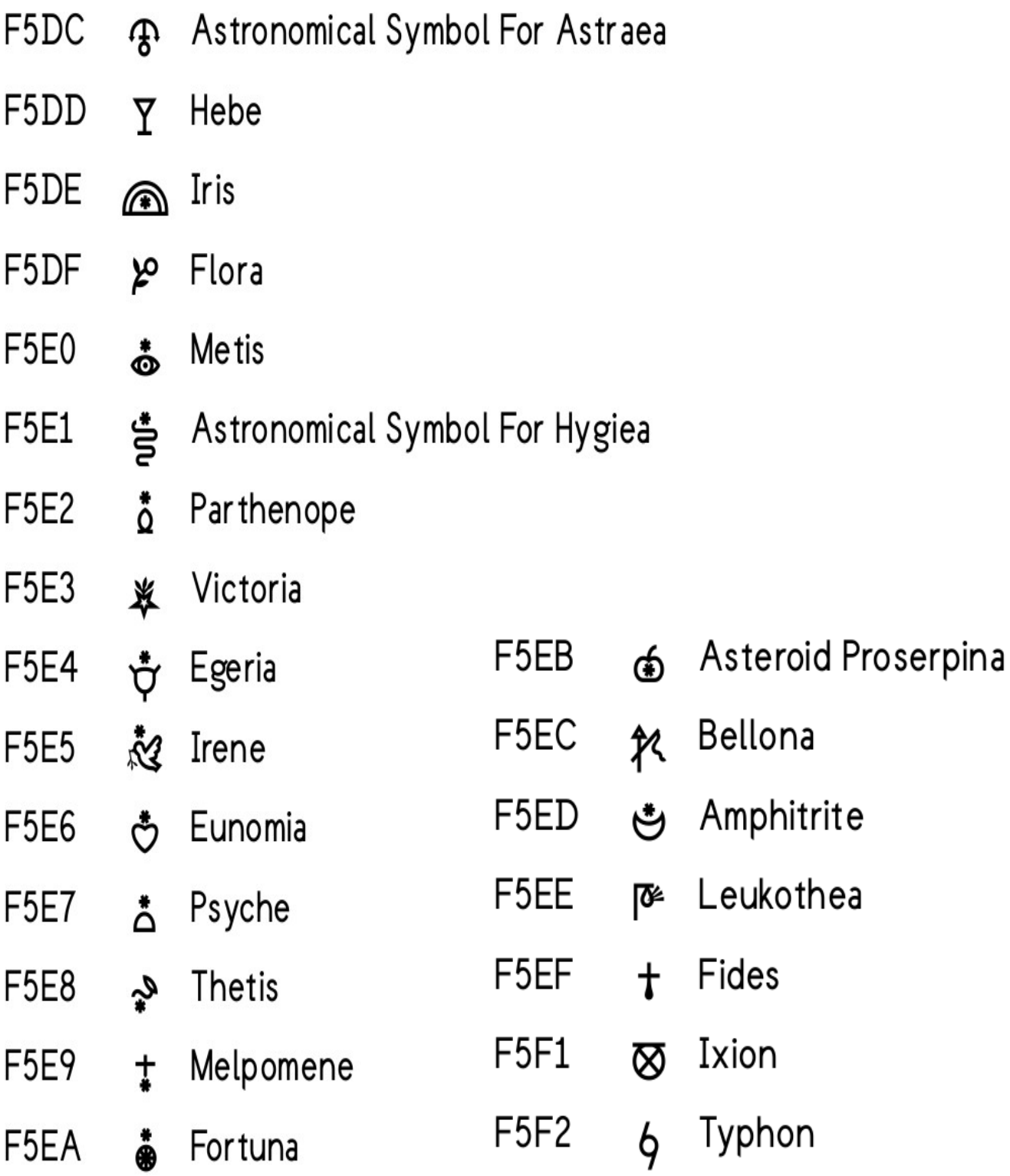
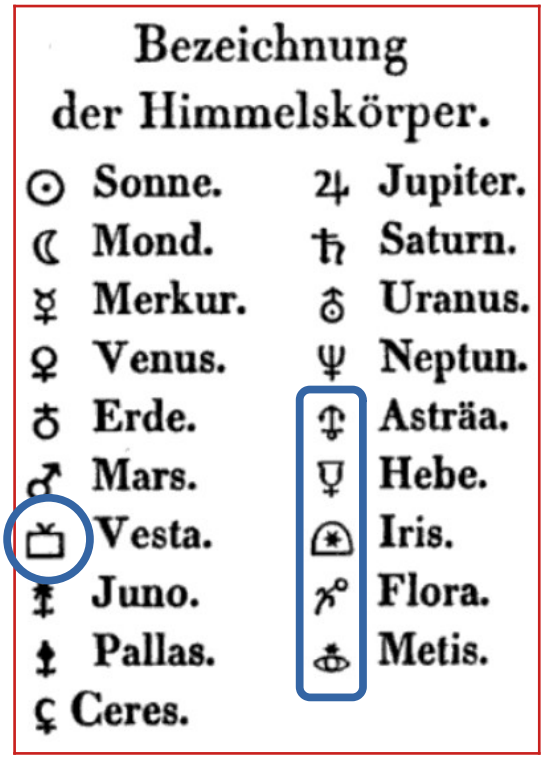


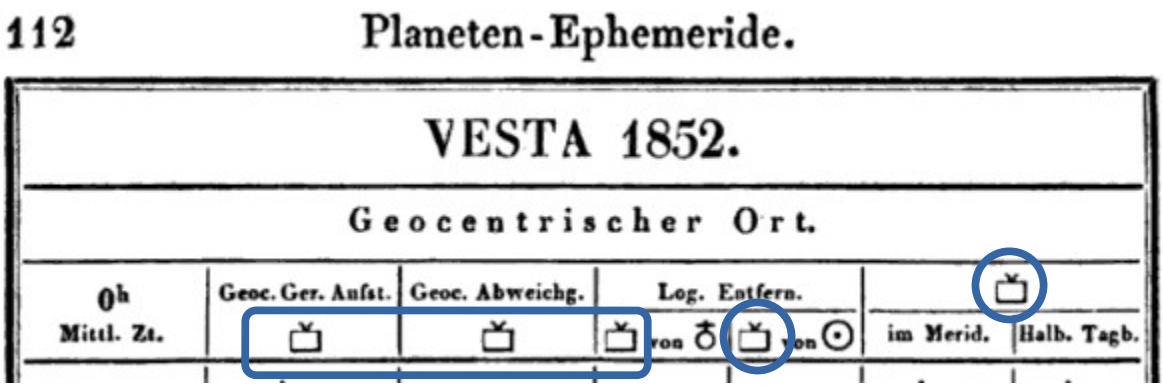
Figure 2. Historical asteroid symbols included in the PUA of the font *Catrinity*, assigned to their Nishiki-Teki points. The form of (17) Thetis is not accurate. Ixion and Typhon are 21st-century discoveries and are not included in this proposal.



Bezeichnung
der Himmelskörper.

☉ Sonne.
☾ Mond.
☿ Merkur.
♀ Venus.
♁ Erde.
♂ Mars.
⚶ Vesta.
⚵ Juno.
⚴ Pallas.
⚳ Ceres.
♃ Jupiter.
♄ Saturn.
♅ Uranus.
♆ Neptun.
⚸ Asträa.
⚺ Hebe.
⚷ Iris.
⚘ Flora.
⚎ Metis.

Figure 3. *Berliner Astronomisches Jahrbuch* 1850 (edition for 1853). The symbols for (4) Vesta through (9) Metis are circled.



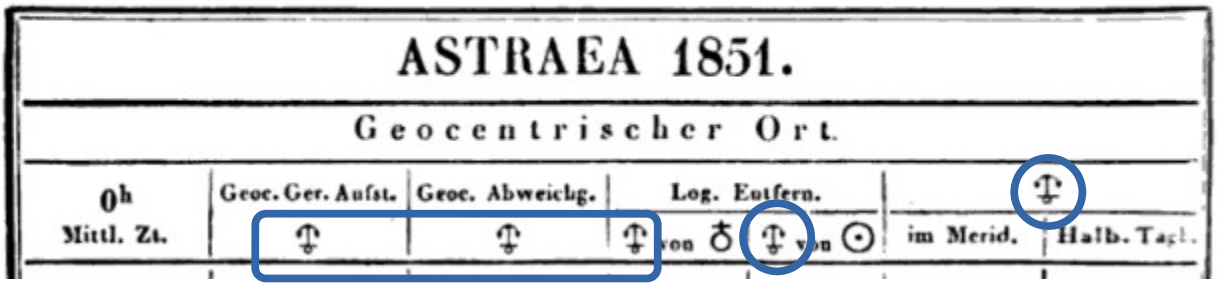
112 Planeten-Ephemeride.

VESTA 1852.

Geocentrischer Ort.

0h Mittl. Zt.	Geoc. Ger. Aufst.	Geoc. Abweichg.	Log. Entfern. von ♁	Log. Entfern. von ☉	im Merid.	Halb. Tagb.

Figure 4. In-text usage of the symbol ⚶ for (4) Vesta in column-headers from the *Berliner Astronomisches Jahrbuch* 1849 (edition for 1852). The symbol is also used this way in the next edition.

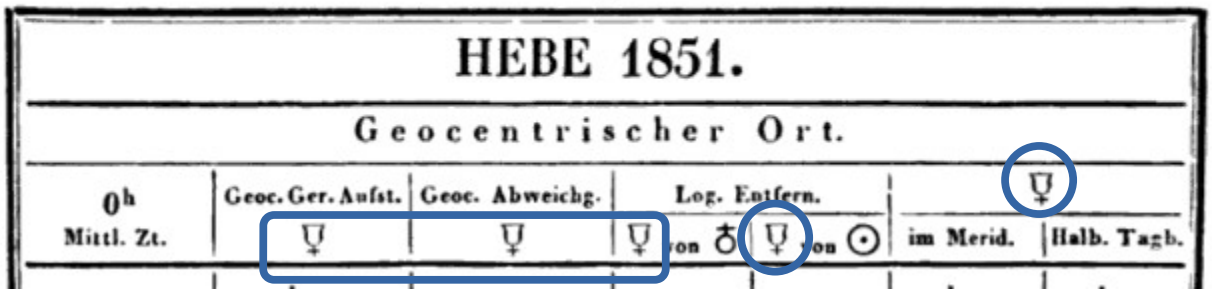


ASTRAEA 1851.

Geocentrischer Ort.

0h Mittl. Zt.	Geoc. Ger. Aufst.	Geoc. Abweichg.	Log. Entfern. von ☿	Log. Entfern. von ☉	im Merid.	Halb. Tagb.
	♎	♎	♎	♎		

Figure 5. Ibid., ♎ for (5) Astraea.

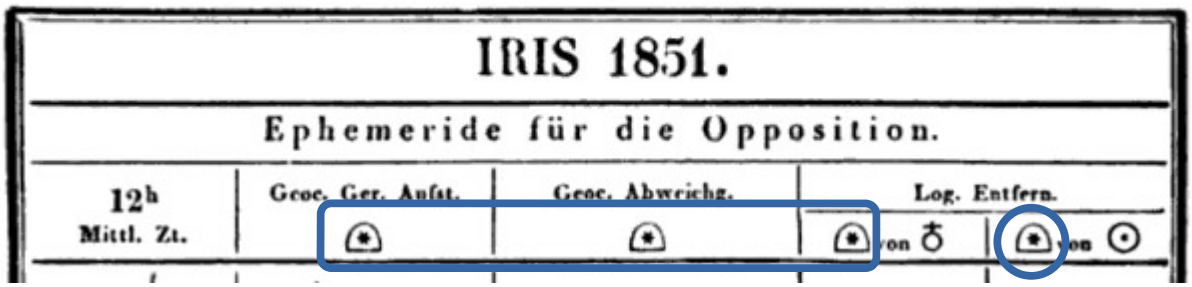


HEBE 1851.

Geocentrischer Ort.

0h Mittl. Zt.	Geoc. Ger. Aufst.	Geoc. Abweichg.	Log. Entfern. von ☿	Log. Entfern. von ☉	im Merid.	Halb. Tagb.
	♀	♀	♀	♀		

Figure 6. Ibid., ♀ for (6) Hebe.

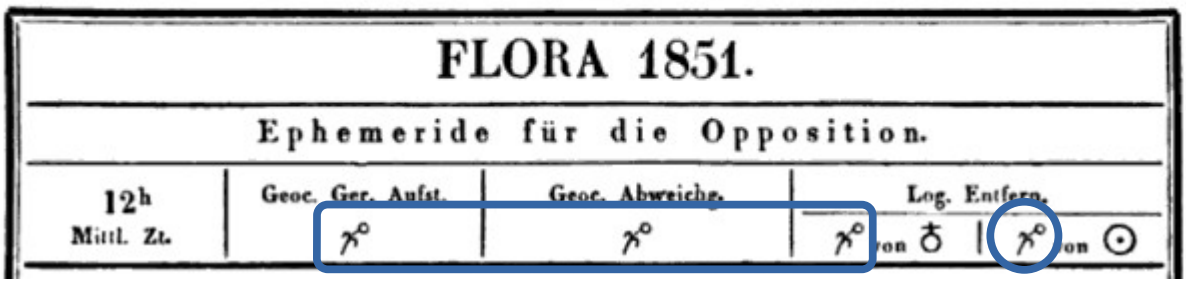


IRIS 1851.

Ephemeride für die Opposition.

12h Mittl. Zt.	Geoc. Ger. Aufst.	Geoc. Abweichg.	Log. Entfern. von ☿	Log. Entfern. von ☉
	⊛	⊛	⊛	⊛

Figure 7. Ibid., ⊛ for (7) Iris.

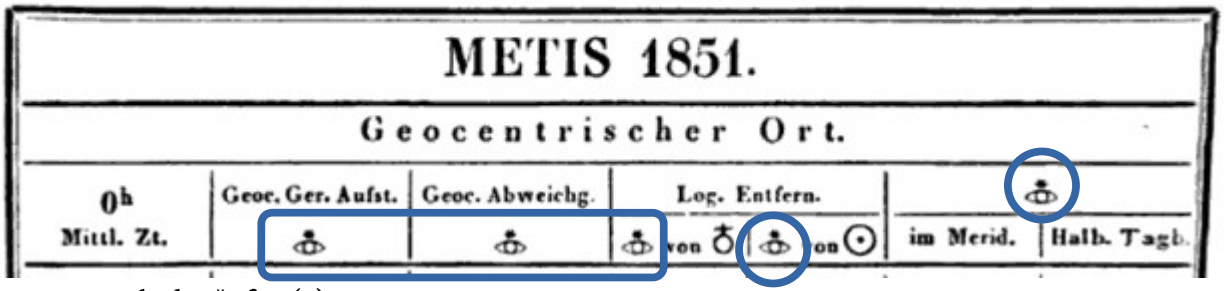


FLORA 1851.

Ephemeride für die Opposition.

12h Mittl. Zt.	Geoc. Ger. Aufst.	Geoc. Abweichg.	Log. Entfern. von ☿	Log. Entfern. von ☉
	⚘	⚘	⚘	⚘

Figure 8. Ibid., ⚘ for (8) Flora.

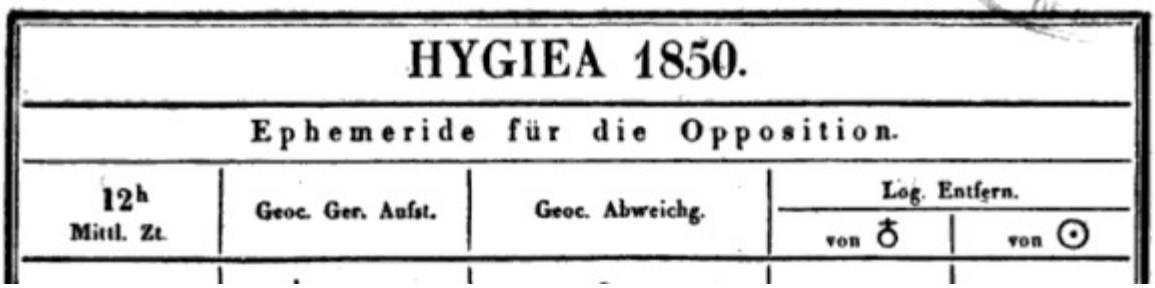


METIS 1851.

Geocentrischer Ort.

0h Mittl. Zt.	Geoc. Ger. Aufst.	Geoc. Abweichg.	Log. Entfern. von ♁	Log. Entfern. von ☉	im Merid.	Halb. Tagb.

Figure 9. Ibid., ✳ for (9) Metis.



HYGIEA 1850.

Ephemeride für die Opposition.

12h Mittl. Zt.	Geoc. Ger. Aufst.	Geoc. Abweichg.	Log. Entfern. von ♁	Log. Entfern. von ☉

Figure 10. Ibid., for (10) Hygiea. The data is presented without a symbol. The same is true in the next edition for (11) Parthenope.

II. Eunomia.

Epoch, 1852, July 13·0 Mean Time at Berlin.

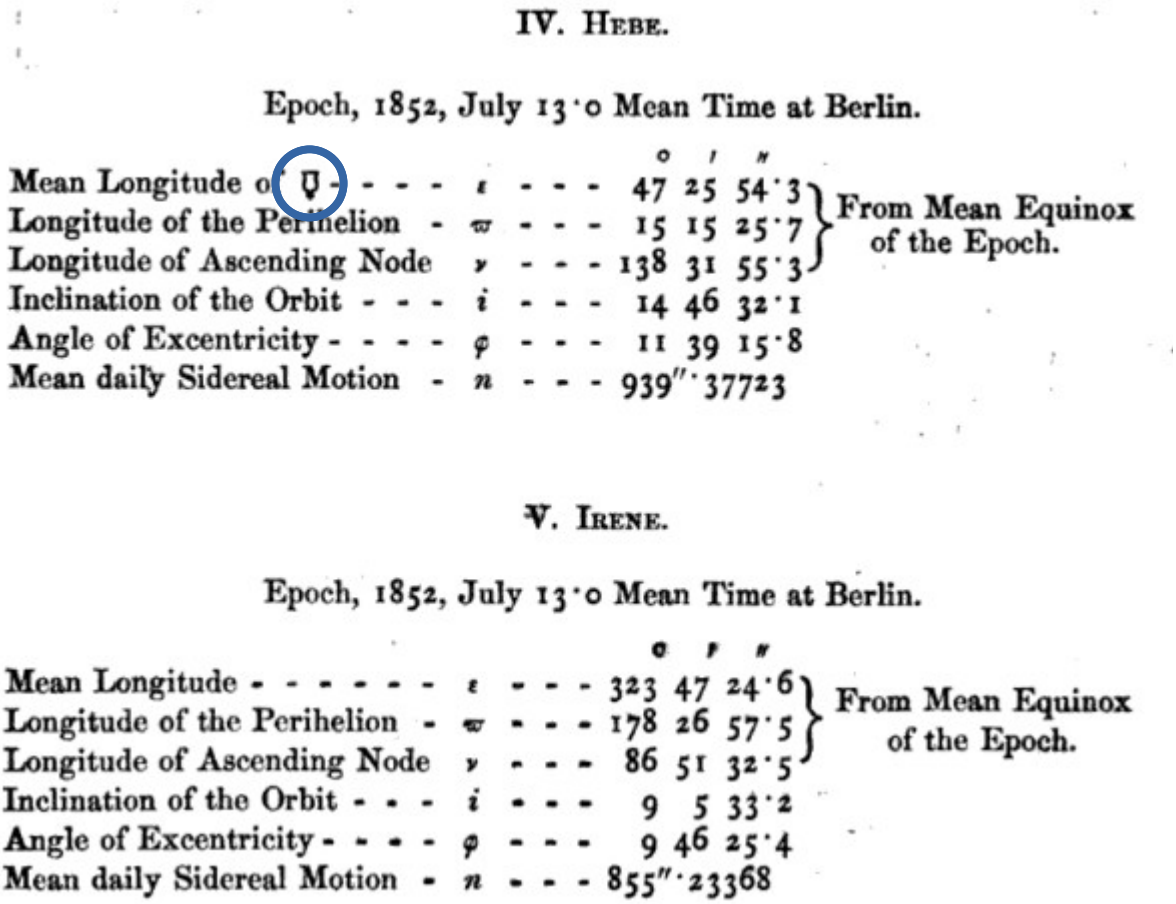
		°	′	″	
Mean Longitude	ε	26	52	33·4	From Mean Equinox of the Epoch.
Longitude of the Perihelion	ϖ	27	34	16·7	
Longitude of Ascending Node	☊	293	53	56·2	
Inclination of the Orbit	i	11	43	39·9	
Angle of Excentricity	φ	10	52	7·0	
Mean daily Sidereal Motion	n	823″·33685			

III. Flora.

Epoch, 1852, March 24·0 Mean Time at Berlin.

		°	′	″	
Mean Longitude of ♩	ε	174	45	31·8	From Mean Equinox of the Epoch.
Longitude of the Perihelion	ϖ	32	49	44·7	
Longitude of Ascending Node	☊	110	20	52·5	
Inclination of the Orbit	i	5	53	3·2	
Angle of Excentricity	φ	9	1	15·8	
Mean daily Sidereal Motion	n	1086″·07895			

Figure 11. *The Nautical Almanac and Astronomical Ephemeris for the Year 1855* (1852). Excerpt from pp. 625-7. Symbol ♩ for (8) Flora. This appendix gives data for Neptune and the asteroids (6) Hebe, (7) Iris, (8) Flora and (9) Metis with their symbols. Data is also presented for (11) Parthenope, (12) Victoria, (13) Egeria, (14) Irene and (15) Eunomia, but no symbols are provided.



IV. Hebe.

Epoch, 1852, July 13·0 Mean Time at Berlin.

		°	′	″	
Mean Longitude of ♀	ε	47	25	54·3	From Mean Equinox of the Epoch.
Longitude of the Perihelion	ϖ	15	15	25·7	
Longitude of Ascending Node	ν	138	31	55·3	
Inclination of the Orbit	i	14	46	32·1	
Angle of Excentricity	φ	11	39	15·8	
Mean daily Sidereal Motion	n	939″·37723			

V. Irene.

Epoch, 1852, July 13·0 Mean Time at Berlin.

		°	′	″	
Mean Longitude	ε	323	47	24·6	From Mean Equinox of the Epoch.
Longitude of the Perihelion	ϖ	178	26	57·5	
Longitude of Ascending Node	ν	86	51	32·5	
Inclination of the Orbit	i	9	5	33·2	
Angle of Excentricity	φ	9	46	25·4	
Mean daily Sidereal Motion	n	855″·23368			

Figure 12. Ibid., ♀ for (6) Hebe.

VI. Iris.

Epoch, 1852, June 8·0 Mean Time at Berlin.

Mean Longitude of ☉	ϵ	°	′	″	85	44 36·1
Longitude of the Perihelion	ϖ				41	20 21·5
Longitude of Ascending Node	γ				259	44 5·2
Inclination of the Orbit	i				5	28 15·6
Angle of Excentricity	φ				13	26 8·0
Mean daily Sidereal Motion	n				963″·13955	

} From Mean Equinox of the Epoch.

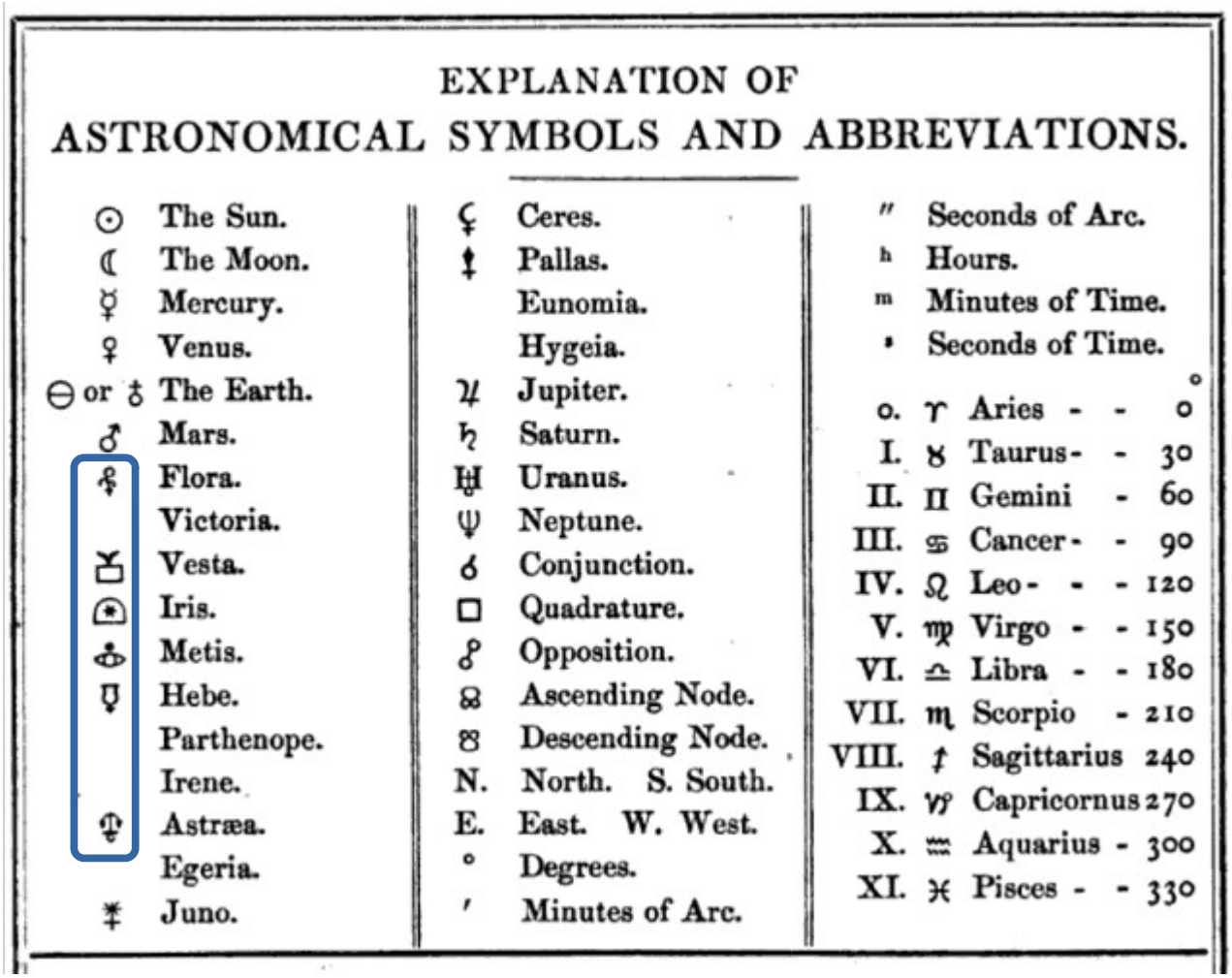
VII. Metis.

Epoch, 1852, June 4·0 Mean Time at Berlin.

Mean Longitude of ☉	ϵ	°	′	″	255	12 56·6
Longitude of the Perihelion	ϖ				71	33 10·9
Longitude of Ascending Node	γ				68	28 57·7
Inclination of the Orbit	i				5	35 54·7
Angle of Excentricity	φ				7	3 18·0
Mean daily Sidereal Motion	n				962″·18010	

} From Mean Equinox of the Epoch.

Figure 13. Ibid., ☉ for (7) Iris and ☉ for (9) Metis.



EXPLANATION OF
ASTRONOMICAL SYMBOLS AND ABBREVIATIONS.

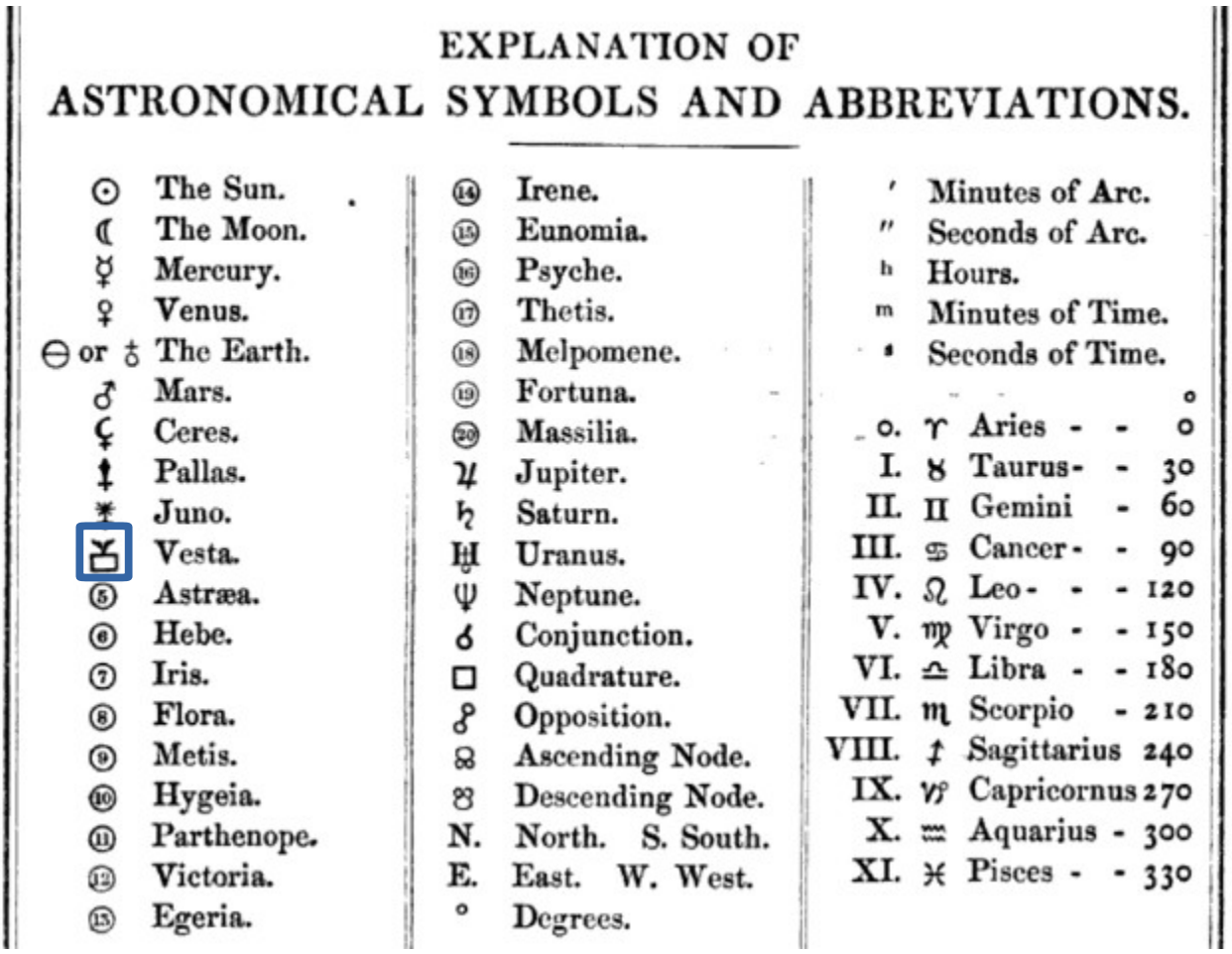
☉ The Sun.
☾ The Moon.
☿ Mercury.
♀ Venus.
⊖ or ♁ The Earth.
♂ Mars.
⚘ Flora.
Victoria.
⚶ Vesta.
Iris.
Metis.
⚳ Hebe.
Parthenope.
Irene.
⚵ Astræa.
Egeria.
⚴ Juno.

⚳ Ceres.
⚴ Pallas.
Eunomia.
Hygeia.
♃ Jupiter.
♄ Saturn.
♅ Uranus.
♆ Neptune.
☌ Conjunction.
□ Quadrature.
☍ Opposition.
☊ Ascending Node.
☋ Descending Node.
N. North. S. South.
E. East. W. West.
° Degrees.
′ Minutes of Arc.

″ Seconds of Arc.
h Hours.
m Minutes of Time.
s Seconds of Time.

			°
o.	♈	Aries - -	0
I.	♉	Taurus- -	30
II.	♊	Gemini -	60
III.	♋	Cancer- -	90
IV.	♌	Leo- - -	120
V.	♍	Virgo - -	150
VI.	♎	Libra - -	180
VII.	♏	Scorpio -	210
VIII.	♐	Sagittarius	240
IX.	♑	Capricornus	270
X.	♒	Aquarius -	300
XI.	♓	Pisces - -	330

Figure 14. *The Nautical Almanac and Astronomical Ephemeris for the Year 1855* (1852). Excerpt from p. xiv. The asteroids are listed up to (15) Eunomia, but symbols are only given up to (9) Metis. The requested symbols from (4) Vesta to (9) Metis are circled.



EXPLANATION OF
ASTRONOMICAL SYMBOLS AND ABBREVIATIONS.

☉	The Sun.	⑭	Irene.	′	Minutes of Arc.
☾	The Moon.	⑮	Eunomia.	″	Seconds of Arc.
☿	Mercury.	⑯	Psyche.	h	Hours.
♀	Venus.	⑰	Thetis.	m	Minutes of Time.
⊖ or ♁	The Earth.	⑱	Melpomene.	s	Seconds of Time.
♂	Mars.	⑲	Fortuna.		°
⚳	Ceres.	⑳	Massilia.	0. ♈	Aries - - 0
⚴	Pallas.	♃	Jupiter.	I. ♉	Taurus- - 30
⚵	Juno.	♄	Saturn.	II. ♊	Gemini - 60
⚶	Vesta.	♅	Uranus.	III. ♋	Cancer- - 90
⑤	Astræa.	♆	Neptune.	IV. ♌	Leo- - - 120
⑥	Hebe.	☌	Conjunction.	V. ♍	Virgo - - 150
⑦	Iris.	□	Quadrature.	VI. ♎	Libra - - 180
⑧	Flora.	☍	Opposition.	VII. ♏	Scorpio - 210
⑨	Metis.	☊	Ascending Node.	VIII. ♐	Sagittarius 240
⑩	Hygeia.	☋	Descending Node.	IX. ♑	Capricornus 270
⑪	Parthenope.	N.	North. S. South.	X. ♒	Aquarius - 300
⑫	Victoria.	E.	East. W. West.	XI. ♓	Pisces - - 330
⑬	Egeria.	°	Degrees.		

Figure 15. *The Nautical Almanac and Astronomical Ephemeris for the Year 1856* (1853). Excerpt from p. xii. In this equivalent table from the next year's edition, all the symbols have been replaced by circled numbers, except for (1) Ceres through (4) Vesta (which still keeps Gauss' form ⚶, circled). The asteroids are now also listed by discovery order, rather than by distance from the Sun.

„ſte um alle dieſe kleinen Planeten erworben hat,
„ihm Namen und Zeichen zu beſtimmen. Dr. *Gauſs*
„hat meine Bitte erfüllt; *Sie legen mir*, antworte-
„te er, *die Ehre, bey Ihrem Planeten Pathenſtelle*
„*zu vertreten, ſo dringend an's Herz, daſs ich*
„*mich derſelben nicht entziehen kann, ſo wenig ich*
„*auch Anſpruch darauf habe. Es ſey alſo darum;*
„*ich weiſs dem Planeten keinen ſchönern Namen zu*
„*geben, als den der Göttin, die die Völker der al-*
„*ten Zeit zur Schutzgöttin der reinen Sitten, der*
„*mackelloſen Tugend und des häuslichen Glückes*
„*machten. Finden Sie alſo meine Wahl nicht un-*
„*ſchicklich, ſo heiſse Ihr Töchterchen: Veſta!*
„Ich finde dieſen Namen ſehr glücklich gewählt.
„Als Zeichen hat Herr Dr. *Gauſs* die ſymboliſche
„Vorſtellung des auf dem Altare der Göttin bren-
„nenden heiligen Feuers ⚶ beſtimmt, und auch
„dieſs ſcheint mir in aller Abſicht ſeinem End-
„zweck zu entſprechen.“

Figure 16. *Monatliche Correspondenz zur Beförderung der Erd- und Himmels-Kunde*. Franz Xaver von Zach. Volume 15, p. 507 (1807) Displays Gauss' original form ⚶ for (4) Vesta.

75c. Il *Sole* dunque è nel centro dell' universal tendenza o gravitazione (185) di tutti i corpi appartenenti al Sistema, non escludendone le Comete (611). Dei *Pianeti* gli uni girano intorno a lui immediatamente e diconsi perciò *primarj*; gli altri chiamati *Satelliti* o *secondarj* girano intorno ai primi, tratti con essi e colle proprie orbite intorno al Sole. Il loro ordine, i loro nomi e i loro segni sono i seguenti: il *Sole* ☉, *Mercurio* ☿, *Venere* ♀, la *Terra* ♁, *Marte* ♂, Vesta ⚶, Giunone ⚵, Cerere ⚳, Pallade ⚴, *Giove* ♃, *Saturno* ♄, *Urano* ♅. L' ultimo di questi è detto anche *Herschel* dal nome del famoso Astronomo che lo scoprì nel 1781. Gli altri quattro, che sono tra ♂ e ♃ (ove appunto una certa legge di progressione aveva fatto assai prima creder necessario un qualche Pianeta intermedio) furono scoperti più re-

Figure 17. Stanislao Canovai, Gaetano de Ricco: *Elementi di fisica matematica* (1810), Vol. 2, p. 149. Lists the symbols for the first four asteroids. Note the elaborate forms for the Sun (red), (3) Juno (red) and (4) Vesta (⚶, blue), illustrating the variation found in the symbols.

angegebenen Orte gestanden haben sollte. Die rückläufige Bewegung, bei einer Culminationszeit um 11ʰ Nachts, stimmte der Gröfse nach mit der rückläufigen Bewegung der kleinen Planeten überein, so dafs, da der Stern sich durch keine Art von Nebel von den andern unterschied, die Wahrscheinlichkeit, dafs es ein neuer Planet, der zwölfte unseres Sonnensystems, sei, und zwar in der Gegend der kleinen Planeten, sehr nahe lag.

Diese Wahrscheinlichkeit wurde durch die späteren Beobachtungen, sowohl hier als in Altona, Hamburg, Pulkowa, Greenwich, wohin die Nachricht sogleich mitgetheilt ward, zur Gewifsheit. Der Planet hat mit Einwilligung des Entdeckers den Namen Astraea erhalten, und sein Zeichen wird nach dem Wunsche des Hr. Hencke ein umgekehrter Anker ♁ sein.

Sobald drei hiesige Beobachtungen mit dreizehntägiger Zwischenzeit, Dcbr. 14, Dcbr. 21, Dcbr. 27 erhalten waren, wobei die Sternpositionen möglichst nahe berichtigt waren, wurde der Versuch einer Bahnbestimmung nach Gaufs Theoria motus gemacht. Die gefundene Bahn bestätigte alle früheren Vermuthungen, und da sie noch bis jetzt (Jan. 6.) so wenig von den letzten Beobachtungen abweicht, dafs man nach ihr den Planeten mit Sicherheit auffinden kann, so möge sie hier aufgeführt werden, zugleich mit den bisher bekanntgewordenen Beobachtungen, und ihrer Vergleichung mit den Elementen. Bei der

Figure 18. *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* (1845), p. 406. The announcement of the inverted-anchor symbol ♁ for (5) Astraea.

miker gezeichnete Berliner Sterncharte auf jener Stelle keine Sterne nach. Somit hatte also Hencke einen Planeten entdeckt, von dem sich sehr bald zeigte, daß er zu der Classe der zwischen Mars und Jupiter befindlichen Planeten gehöre. Hofrath Gauß gab auf Hencke's Ansuchen diesem neuen Planetoiden den Namen Hebe mit dem Zeichen ♀ (ein Weinglas). Die Hebe ward nun sehr bald in Berlin, Hamburg, Altona, Göttingen, Greenwich u. s. w. aufgefunden und beobachtet; ihre elliptische Bahn fand die Berechner Neumann, Galle, d'Arrest, Encke, Hind, Quirling, Niebour und Gould. Doch sind die Resultate derselben noch nicht sehr übereinstimmend; im Durchschnitt kann man für die Hebe einstweilen setzen:

Halbe große Bahnaxe oder mittlere Entfernung von der Sonne	2,437 = 50364992 geogr. Meilen.
Excentricität der Bahn	0,206 = 10375188 " "
Neigung der Bahn	14° 47′ 12″.

Figure 19. *Ergänzung-Conversationslexicon* (1847), p. 442. Announcement of the wineglass symbol ♀ for (6) Hebe.

III. Anzeigen.

Meteor. Am Bodensee lösste sich den 15. August Abends 7^h 22^m in der Richtung nach Südost ein Meteor, Funkensprühend gleich einer Rakete mit einem kurzen, aber dicken Schweife im Zenith ab, und flog in einem östlichen Bogen, sich anscheinend ausbrennend, ehe es den Bodensee erreicht hatte; es leuchtete mit einem dem Vollmonde gleichen Glanze. Nach der Appenzeller Zeitung wäre das, in ganz Süddeutschland wahrgenommene, Meteor in Teufen ebenfalls beobachtet worden.

Zweiter Planet von Henke. Derselbe ist vom Hofrath Gauss *Hebe* benannt und mit dem Zeichen ersehen worden. Dieser Name Hebe scheint jetzt ziemlich allgemein (statt *Iris*, s. No. 32. S. 250.) angenommen zu sein, und soll nun deshalb künftig auch von uns, statt früher Iris, gebraucht werden.

Beförderung. Dr. Brunnow in Berlin ist zum Astronomen an der Benzenberg'schen Sternwarte (Charlottenruhe) zu Bilk bei Düsseldorf ernannt worden.

Ernennung. Die astronomische Gesellschaft zu Leipzig hat den Herrn Professor *F. Kaiser*, Director der Sternwarte zu Leiden, zu ihrem Ehrenmitgliede ernannt.

Figure 20. *Wöchentliche Unterhaltungen für Dilettanten und Freunde der Astronomie, Geographie und Witterungskunde* (1847), p. 315. Another announcement of the wineglass symbol for (6) Hebe.

Beobachtungen der Thetis auf der Bilker Sternwarte, von Herrn Director *Luther*.

Hiermit übersende ich Ihnen einige Bilker Beobachtungen des diesjährigen April-Planeten.

		M. Zt. Bilk.	R. A.	Decl.	Anzahl der Durchg.
1852	April 17	$10^h37'\ 39''2$	$180°38'\ 23''9$	$+8°49'\ 2''4$	2
	20	10 26 28,0	180 12 38,4	8 57 12,0	14
	21	10 0 42,9	180 4 58,7	8 59 27,1	10
	22	10 21 49,4	179 57 19,9	9 1 32,1	13
	23	9 17 40,4	179 50 37,6	9 3 16,0	4
	24	11 4 13,6	179 43 18,0	9 4 55,7	10
	25	9 53 23,0	179 37 20,5	9 6 10,1	6
	Mai 5	9 53 26,9	178 56 41,9	9 6 29,2	7
	7	9 16 25,6	178 53 34,5	+9 3 49,7	3

Die scheinbaren Oerter des bei diesen Beobachtungen angewandten Vergleichsterns *a* (9) wurden nach Bessel Zone 232 und 237 mittelst des Berliner Jahrbuchs so berechnet:

	0^h m. Zt. Berlin.	Sch. R. A.	Sch. Decl.
1852	April 10,0	$180°33'\ 21''3$	$+9°0'\ 12''1$
	20,0	20,9	12,7
	30,0	20,2	13,5

Herr Director *Argelander* in Bonn, welcher der hiesigen Sternwarte schon seit längerer Zeit seinen Schutz und Beistand zu Theil werden lässt, hat die Entdeckung des April-Planeten zuerst constatirt und mir bei dieser Gelegenheit dafür den Namen Thetis und das Zeichen vorgeschlagen, wodurch der der silberflüssigen Göttinn geheiligte Delphin angedeutet wird. Indem ich mich hiermit einverstanden erkläre, ersuche ich die sämmtlichen Herren Astronomen, diesen Namen und dieses Zeichen annehmen und beibehalten zu wollen.

Bilk 1852. Mai 4.

R. Luther.

Figure 21. *Beobachtung der Thetis auf der Bilker Sternwarte*, R. Luther. Astronomische Nachrichten, Vol. 34, pp. 243-4. The announcement of the dolphin symbol ♌ for (17) Thetis.

Beobachtungen des neuesten Planeten auf der Bilker Sternwarte.

	M. Zt. Bilk.	Sch. Oerter des Planeten.		Vergl.	Sch. Oerter der Vergl.-Sterne.			Grösse.
1853 Mai 14	10h 17m 49s,1	206° 3′ 26″,0	−9° 57′ 32″,4	9	206° 16′ 52″,2	−9° 57′ 21″,9	B. Z. 243	7.8
14	11 33 42,6	206 2 51,5	57 25,2	10	52,2	21,9		
15	10 48 26,4	205 53 37,2	55 48,7	13	52,2	21,9		
16	10 51 17,4	205 44 23,7	54 14,0	15	52,2	21,9		
24	10 29 33,4	204 43 29,5	46 19,5	9	205 48 50,7	−9 46 36,6	B. Z. 243	9
25	10 26 34,9	204 37 32,9	−9 45 51,8	8	50,7	36,5		

Die Taufe des Planeten ist durch Sr. Excellenz den wirklichen Geheimen Rath Freiherrn *Alexander v. Humboldt* gütigst vollzogen worden. Demgemäss beehre ich mich, den Herren Astronomen ergebenst anzuzeigen, dass der Planet den Namen Proserpina und das Zeichen eines Granatapfels mit einem Stern im Innern ⊛ erhalten hat.

Bilk, im Mai 1853. *R. Luther.*

Figure 22. *Beobachtung des neuesten Planeten auf der Bilker Sternwarte*, R. Luther. Astronomische Nachrichten, Vol. 36, pp. 349-50. The announcement of the pomegranate symbol ⊛ for (26) Proserpina.

Beobachtung der Bellona, nebst Nachrichten über die Bilker Sternwarte.

Ich beehre mich, Ihnen ergebenst zu melden, dass Herr Prof. *Encke* in Berlin für meinen dritten Planeten den Namen Bellona und das Zeichen  gewählt hat, welches Zeichen die Geissel und den Spiess der kriegerischen Schwester des Mars vorstellen soll. Hinsichtlich der Nummerfolge würde Bellona der 28ste der kleinen Planeten sein, da die *Marth*sche Entdeckung eines anderen neuen Planeten einige Stunden später fällt.

Ausserdem wurden im verflossenen Herbst und Winter eine der 4 Mauern des Thurms, die nur auf einem morschen Balken ruhte, und die ganz unbrauchbar gewordene Rundbahn der Drehkuppel durch eine solidere auf einem Bogen ruhende Mauer und eine solide Eisenbahn ersetzt. Das Curatorium der Sternwarte gewann nach sorgfältig eingezogenen Erkundigungen über die bei anderen Drehkuppeln gemachten Erfahrungen die Ueberzeugung, dass für die hiesige Sternwarte das Princip der Kugeln, das sich unter Anderem in Cambridge und Senftenberg sehr bewährt hat, jedenfalls beizubehalten

Figure 23. *Beobachtung der Bellona, nebst Nachrichten über die Bilker Sternwarte*, R. Luther. Astronomische Nachrichten, Vol. 38, pp. 143-4. The announcement of the scourge-and-lance symbol ⚵ for (28) Bellona.

Name und Zeichen des von Herrn *R. Luther* zu Bilk am 19. April entdeckten Planeten.

Herr *Luther* hat Herrn Director *Rümker* und mich aufgefordert für seinen zuletzt entdeckten Planeten Namen und Zeichen zu bestimmen. Wir haben den Namen Leucothea, der Beschützerin der Seefahrer, und als Zeichen  einen Leuchtthurm in antiker Form, gewählt.

P.

Figure 24. *Name und Zeichen des von Herrn* R. Luther *zu Bilk am 19. April entdeckten Planeten*. Astronomische Nachrichten, Vol. 40, pp. 373-4. The announcement of the antique lighthouse symbol ⚶ for (35) Leukothea.

Schreiben des Herrn Dr. *R. Luther*, Directors der Sternwarte zu Bilk, an den Herausgeber.

Hiemit habe ich die Ehre, Ihnen anzuzeigen, dass der Düsseldorfer Gemeinderath in seiner gestrigen Sitzung, aus einer vom Curatorium der Sternwarte zu diesem Zweck entworfenen Liste, für meinen neuesten Planeten den Namen Fides und das Zeichen eines Kreuzes († gewählt hat.

Meine erste Beobachtung der Fides ist

1855	mittl. Z. Bilk	RA. †	Decl. †	Anzahl d. Vgl.
Octb. 6	8h 44′ 14″4	2° 12′ 21″4	+ 0° 49′ 18″2	10

Scheinb. Ort des Vergleichsterns nach *Piazzi*

2 35 53,2 + 0 53 16,4

Bilk bei Düsseldorf, 1855 Octb. 11. *R. Luther.*

Figure 25. *Schreiben des Herrn Dr.* R. Luther, *Directors der Sternwarte zu Bilk, an den Herausgeber*. Astronomische Nachrichten, Vol. 42, pp. 107-8. The announcement of the cross symbol † for (37) Fides.

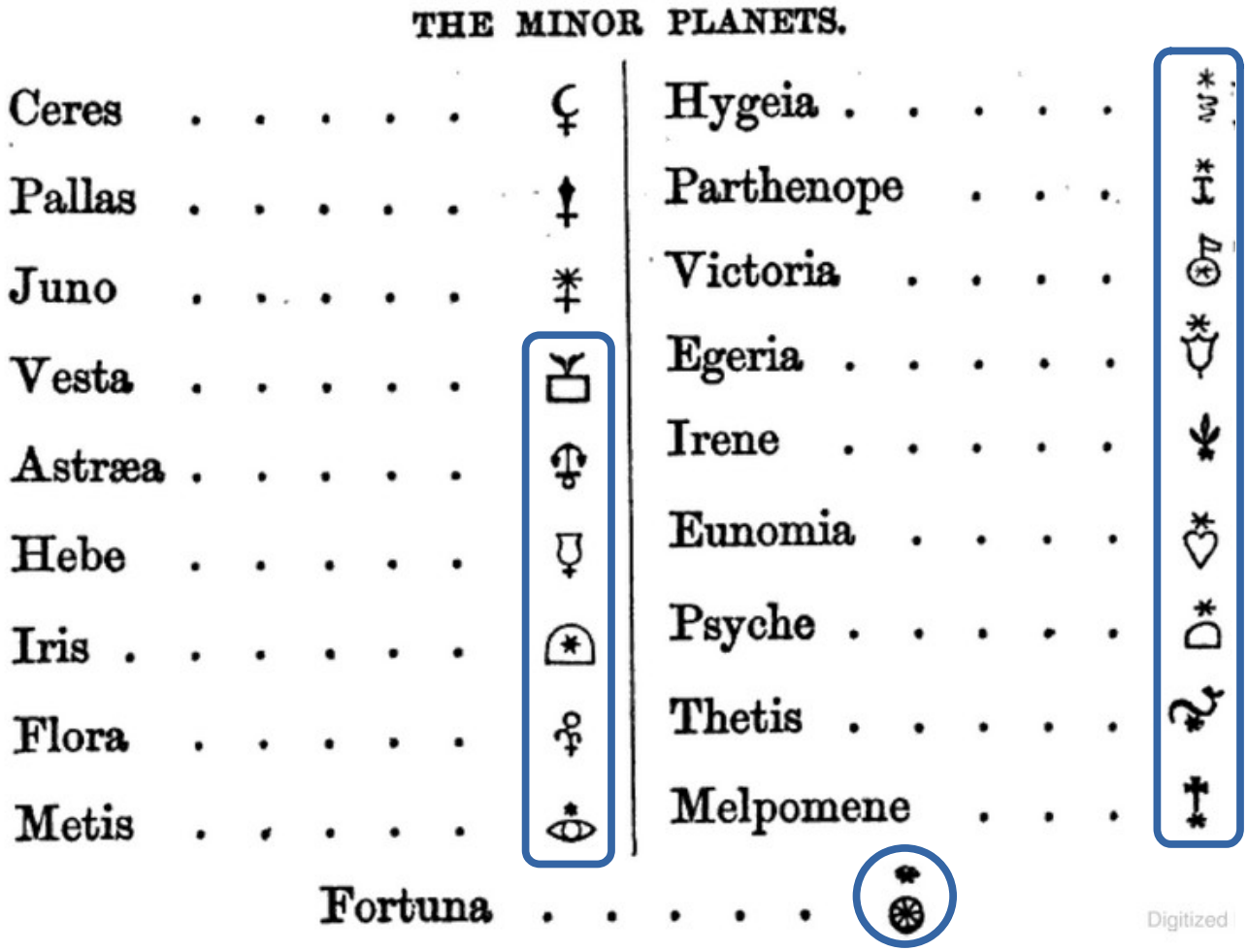


Figure 26. Hind, J. R., *An Astronomical Vocabulary* (1852), p. v. The proposed symbols, from (4) Vesta to (19) Fortuna. Note that (10) Hygiea appears to be a zeta-shaped snake and star, ☿*, per de Gasparis' original description. (11) Parthenope uses a Pisces symbol for the fish. (12) Victoria might be a laurel wreath with a star, but the symbol at the top is unclear – perhaps a flag of victory? (14) Irene is an olive branch and star, dropping the dove and thus resembling (12) Victoria in other sources.

ON THE SYMBOLIC NOTATION OF THE ASTEROIDS,

By THE EDITOR.

As the number of the known asteroids increases, the disadvantages of a symbolic notation analogous to that hitherto in use increase much more rapidly even than the difficulty of selecting appropriate names from the classic mythology. Not only are many of the symbols proposed inefficient in suggesting the name of which they are intended to be an abbreviation; but some of them require for their delineation more artistic accomplishment than an astronomer is necessarily or generally endowed with. The symbol proposed for *Irene* (*A. J.*, II. 23), for example, has not only never appeared, but I am not aware that it has ever been actually drawn. To remedy this evil, and not to lose the unquestionable advantage connected with a system of symbols easily remembered and readily drawn, — it has been agreed upon by several astronomers in Germany, France, England, and America, to propose for adoption a more simple system for the group in question, — consisting of a circle containing the number of the asteroid in the chronological order of its discovery. This number will speedily become mnemonically associated with the asteroid itself; we thus have a symbol ready for every asteroid hereafter to be discovered, and this remarkable group are distinguished from the larger planets in the character of their notation. As this notation will hereafter be adopted in the *Astronomical Journal*, a table may at first not be unserviceable for reference.

Planet.	New Symbol.	Date of Discovery.	Old Symbol.
Ceres,	①	1801, January 1,	⚳
Pallas,	②	1802, March 28,	⚴
Juno,	③	1804, September 1,	⚵
Vesta,	④	1807, March 29,	⚶
Astræa,	⑤	1845, December 8,	⚷
Hebe,	⑥	1847, July 1,	⚸
Iris,	⑦	" August 13,	⚹
Flora,	⑧	" October 18,	⚺
Metis,	⑨	1848, April 25,	⚻
Hygea,	⑩	1849, April 12,	⚼
Parthenope,	⑪	1850, May 13,	⚽
Clio,	⑫	" September 13,	⚾
Egeria,	⑬	" November 2,	
Irene,	⑭	1851, May 20,	
Eunomia,	⑮	" July 29,	⚿

Figure 27. B. A. Gould, On the Symbolic Notation of the Asteroids (1852). The Astronomical Journal, Vol. 2, No. 34, p. 80. Note the more elaborate variants of the symbols of (3) Juno, (4) Vesta, (6) Hebe, and (7) Iris. Contrary to the announcement by the discoverer, the symbol pictured for (10) Hygiea is the rod of Asclepius, ⚕ , rather than a star atop a snake. This is a common typographic substitution. Symbols for (13) Egeria and (14) Irene are not shown.

METIS ☿

514. On the 25th of April, 1848, Mr. Graham, of Markree Castle in Ireland, detected a star of the *tenth* magnitude in a position where none had been noticed before. On the following evening it had *changed its position* so decidedly as to establish at once its nature as a planet. It received the name of *Metis*, and a *star with an eye* constitutes its sign.

515. Metis shines with a fainter light than Flora and Iris, and requires a good telescope to see her well. The *magnitude* of this asteroid has not yet been determined. It *revolves* about the sun in 1,347 days, at the *mean distance* of 227,387,000 miles, its orbit having an *inclination* to the plane of the ecliptic of 5° 35′ 55″.

HYGEIA. ⑩

516. Scarcely a year elapsed after the discovery of Metis before another member was added to this numerous cluster of planets, for on the 12th of April, 1849,

Figure 28. John Brocklesby, *Elements of Astronomy* (1855), p. 230. Note the transition from the

iconic (9) Metis symbol ⟁ to the numerical (10) Hygiea symbol.

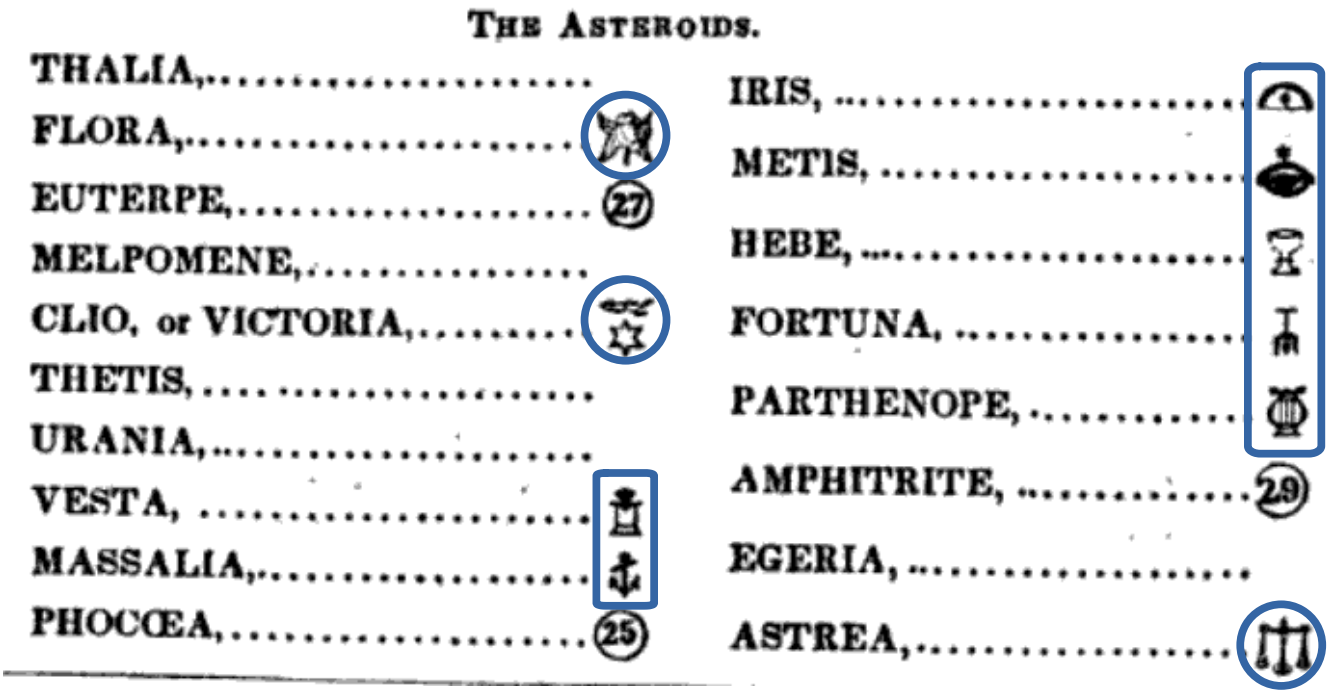
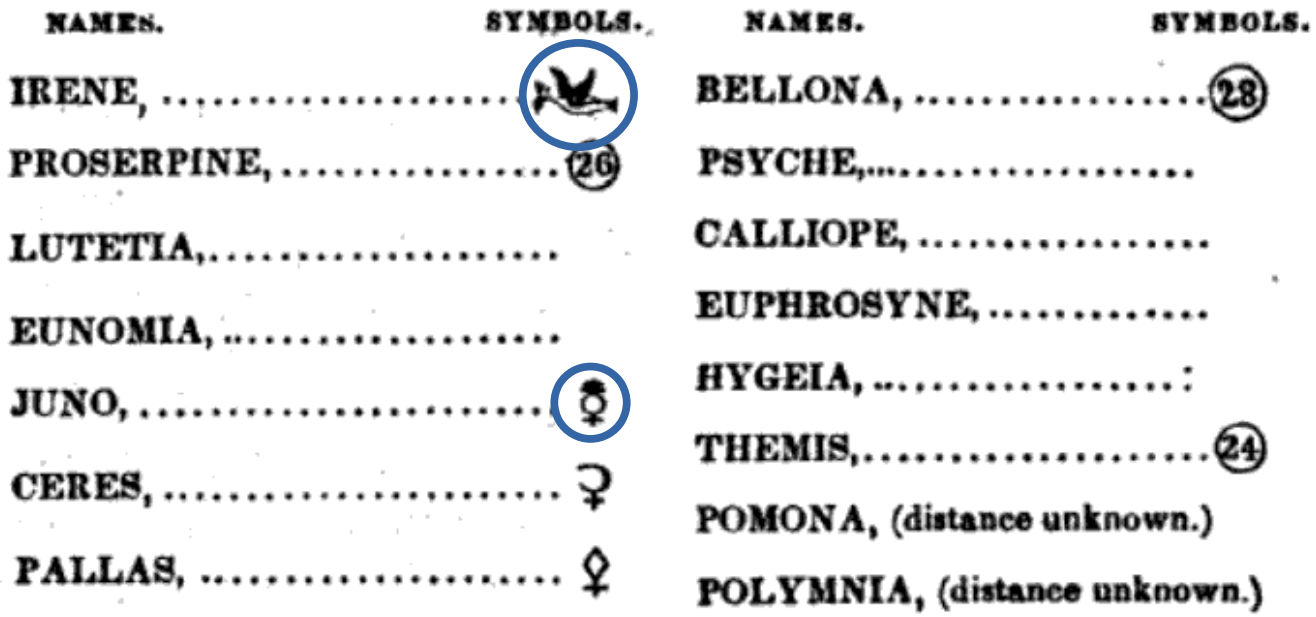


Figure 29. John Brocklesby, *Elements of Astronomy* (1855), pp. 14. A table in this work listing the symbols of the planets. A pair of balances is used as the symbol for (5) Astraea. Note the more elaborate forms for (4) Vesta, (6) Hebe, (7) Iris, and (8) Flora. (11) Parthenope takes the lyre symbol ♍. (19) Fortuna is given a symbol for Lady Luck that may be a variation on (5) Astraea's balance symbol, and (20) Massalia is a simple anchor, ⚓, presumably as a symbol of Marseille's port. (This is covered by U+2693). In the accompanying text those two are referred to by circled numbers only.



NAMES.	SYMBOLS.	NAMES.	SYMBOLS.
IRENE,		BELLONA,	(28)
PROSERPINE,	(26)	PSYCHE,	
LUTETIA,		CALLIOPE,	
EUNOMIA,		EUPHROSYNE,	
JUNO,	♀	HYGEIA,	
CERES,	☿	THEMIS,	(24)
PALLAS,	♀	POMONA, (distance unknown.)	
		POLYMNIA, (distance unknown.)	

Figure 30. John Brocklesby, *Elements of Astronomy* (1855), p. 15. (14) Irene appears in a simplified form containing only the dove and the olive branch (dropping the star of ☆), making it the common peace symbol, although the textual description on p. 233 still calls it "a *dove* with an *olive branch* and a *star* on its head". Note the more elaborate form, ⚸ , for (3) Juno. The missing circled numbers appear in the accompanying text.

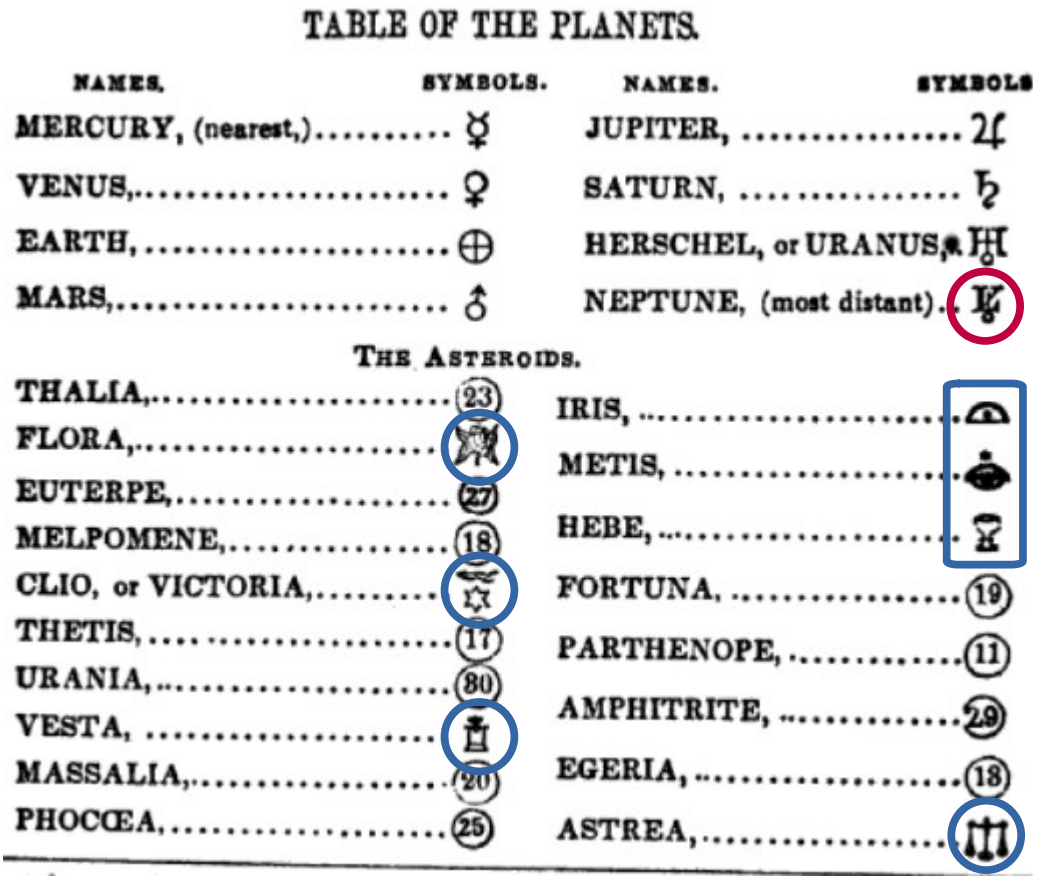
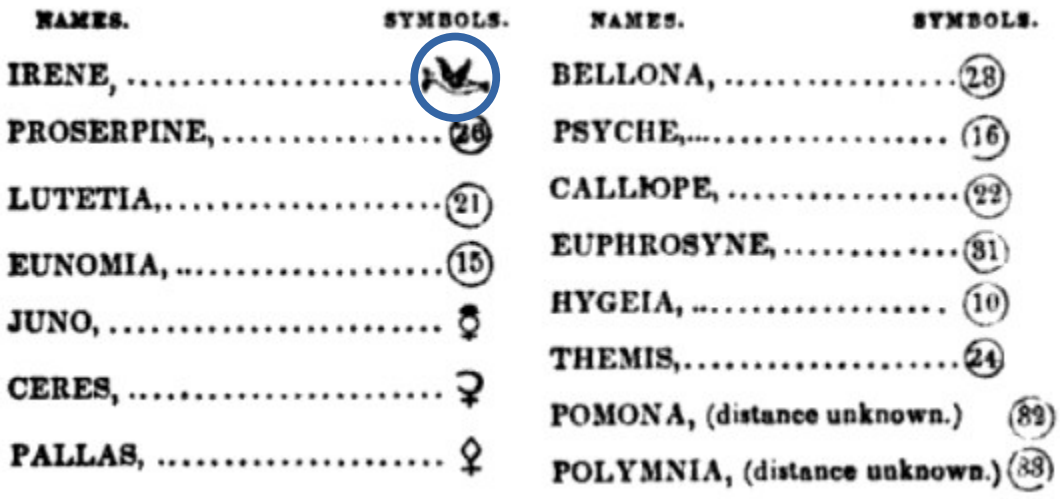


TABLE OF THE PLANETS.

NAMES.	SYMBOLS.	NAMES.	SYMBOLS.
MERCURY, (nearest,)	☿	JUPITER,	♃
VENUS,	♀	SATURN,	♄
EARTH,	⊕	HERSCHEL, or URANUS,	♅
MARS,	♂	NEPTUNE, (most distant)	♆

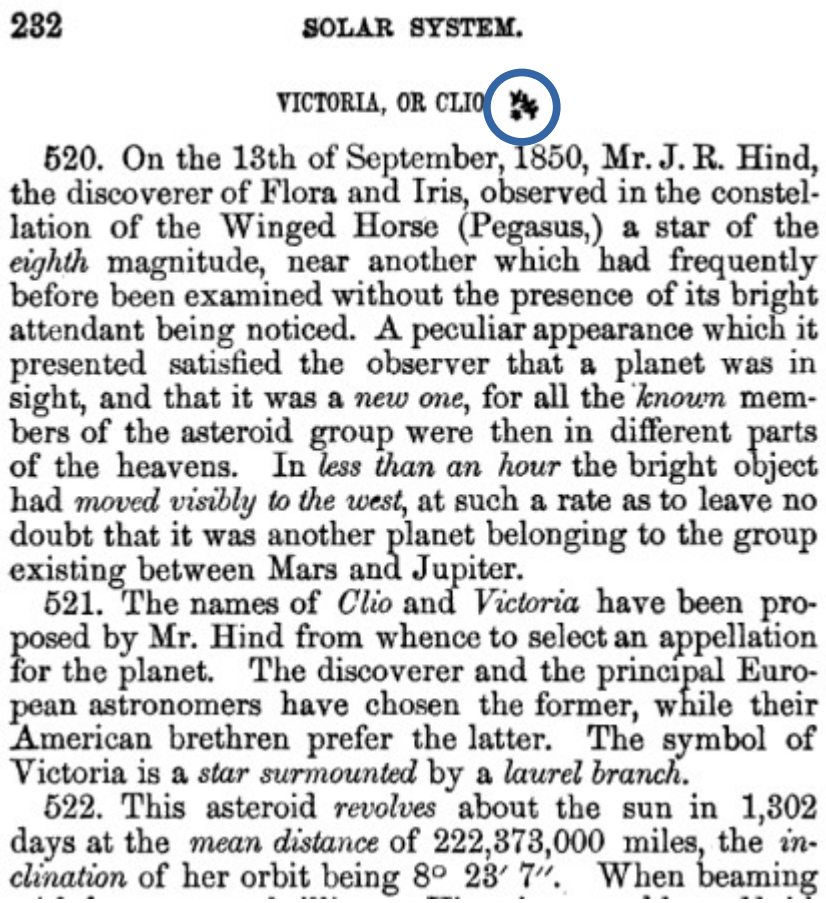
THE ASTEROIDS.

THALIA,	(23)	IRIS,	
FLORA,		METIS,	
EUTERPE,	(27)	HEBE,	
MELPOMENE,	(18)		
CLIO, or VICTORIA,		FORTUNA,	(19)
THETIS,	(17)	PARTHENOPE,	(11)
URANIA,	(30)	AMPHITRITE,	(29)
VESTA,		EGERIA,	(18)
MASSALIA,	(20)	ASTREA,	
PHOCŒA,	(25)		



NAMES.	SYMBOLS.	NAMES.	SYMBOLS.
IRENE,		BELLONA,	(28)
PROSERPINE,	(26)	PSYCHE,	(16)
LUTETIA,	(21)	CALLIOPE,	(22)
EUNOMIA,	(15)	EUPHROSYNE,	(31)
JUNO,	⚵	HYGEIA,	(10)
CERES,	⚳	THEMIS,	(24)
PALLAS,	⚴	POMONA, (distance unknown.)	(32)
		POLYMNIA, (distance unknown.)	(33)

Figure 31. John Brocklesby, *Elements of Astronomy* (1857), pp. 14-15. Here the missing numbers from the 1855 edition are restored, and the symbols for (19) Fortuna and (20) Massalia replaced by circled numbers. Note also the very rare L-V digraph for Neptune (red), supported by Unicode at U+2BC9.



232 SOLAR SYSTEM.

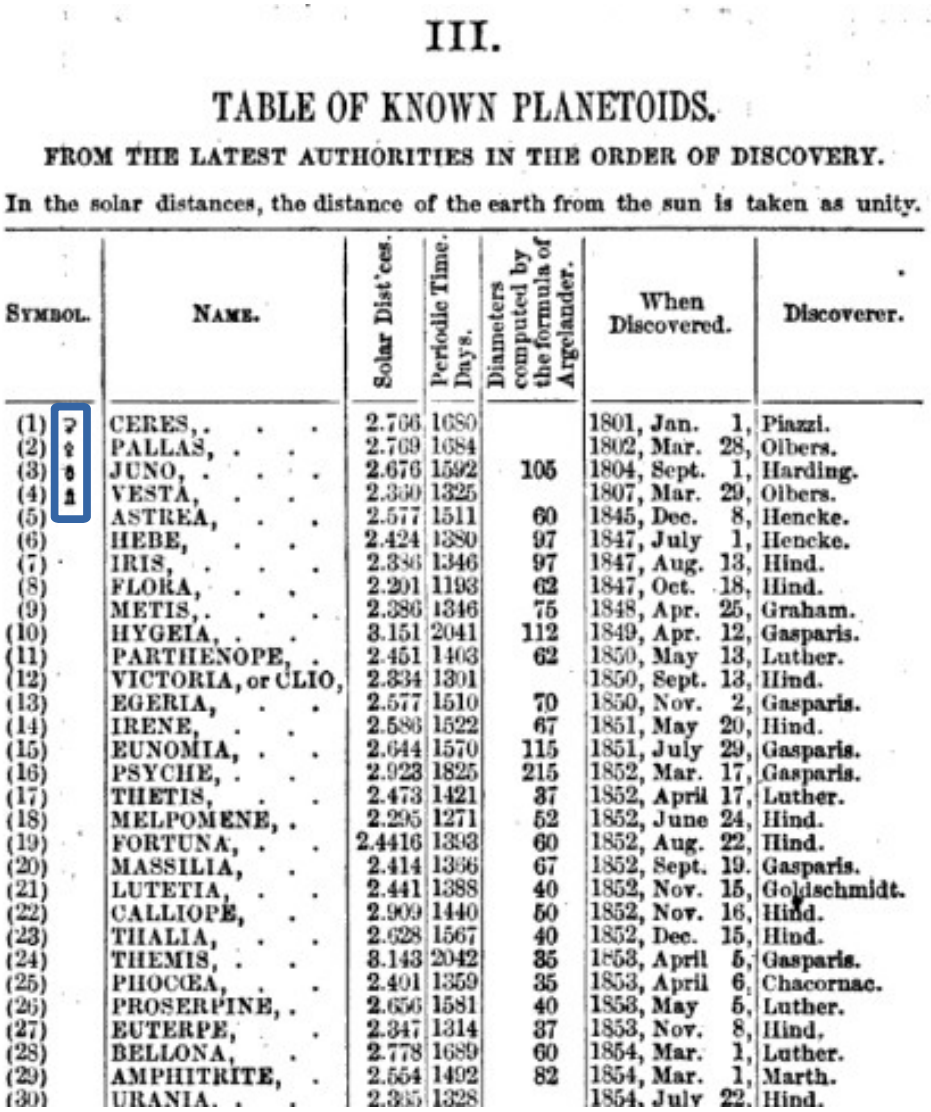
VICTORIA, OR CLIO

520. On the 13th of September, 1850, Mr. J. R. Hind, the discoverer of Flora and Iris, observed in the constellation of the Winged Horse (Pegasus,) a star of the *eighth* magnitude, near another which had frequently before been examined without the presence of its bright attendant being noticed. A peculiar appearance which it presented satisfied the observer that a planet was in sight, and that it was a *new one*, for all the *known* members of the asteroid group were then in different parts of the heavens. In *less than an hour* the bright object had *moved visibly to the west*, at such a rate as to leave no doubt that it was another planet belonging to the group existing between Mars and Jupiter.

521. The names of *Clio* and *Victoria* have been proposed by Mr. Hind from whence to select an appellation for the planet. The discoverer and the principal European astronomers have chosen the former, while their American brethren prefer the latter. The symbol of Victoria is a *star surmounted* by a *laurel branch*.

522. This asteroid *revolves* about the sun in 1,302 days at the *mean distance* of 222,373,000 miles, the *inclination* of her orbit being 8° 23′ 7″. When beaming

Figure 32. John Brocklesby, *Elements of Astronomy* (1855), p. 232. An alternate (12) Victoria glyph in the same work, but the text shows that it is intended to represent the same symbol (a star surmounted by a laurel branch).



III.

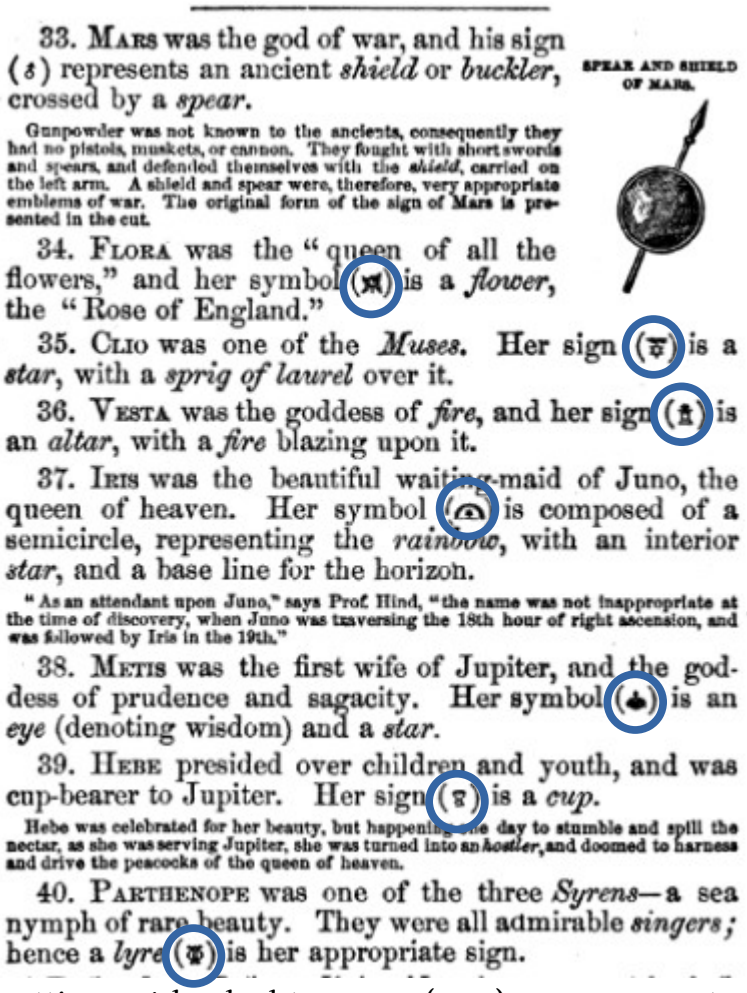
TABLE OF KNOWN PLANETOIDS.

FROM THE LATEST AUTHORITIES IN THE ORDER OF DISCOVERY.

In the solar distances, the distance of the earth from the sun is taken as unity.

Symbol.	Name.	Solar Dist'ces.	Periodic Time. Days.	Diameters computed by the formula of Argelander.	When Discovered.	Discoverer.
(1)	CERES,	2.766	1680		1801, Jan. 1,	Piazzi.
(2)	PALLAS,	2.769	1684		1802, Mar. 28,	Olbers.
(3)	JUNO,	2.676	1592	105	1804, Sept. 1,	Harding.
(4)	VESTA,	2.360	1325		1807, Mar. 29,	Olbers.
(5)	ASTREA,	2.577	1511	60	1845, Dec. 8,	Hencke.
(6)	HEBE,	2.424	1380	97	1847, July 1,	Hencke.
(7)	IRIS,	2.386	1346	97	1847, Aug. 13,	Hind.
(8)	FLORA,	2.201	1193	62	1847, Oct. 18,	Hind.
(9)	METIS,	2.386	1346	75	1848, Apr. 25,	Graham.
(10)	HYGEIA,	3.151	2041	112	1849, Apr. 12,	Gasparis.
(11)	PARTHENOPE,	2.451	1403	62	1850, May 13,	Luther.
(12)	VICTORIA, or CLIO,	2.334	1301		1850, Sept. 13,	Hind.
(13)	EGERIA,	2.577	1510	70	1850, Nov. 2,	Gasparis.
(14)	IRENE,	2.586	1522	67	1851, May 20,	Hind.
(15)	EUNOMIA,	2.644	1570	115	1851, July 29,	Gasparis.
(16)	PSYCHE,	2.923	1825	215	1852, Mar. 17,	Gasparis.
(17)	THETIS,	2.473	1421	37	1852, April 17,	Luther.
(18)	MELPOMENE,	2.295	1271	52	1852, June 24,	Hind.
(19)	FORTUNA,	2.4416	1393	60	1852, Aug. 22,	Hind.
(20)	MASSILIA,	2.414	1366	67	1852, Sept. 19.	Gasparis.
(21)	LUTETIA,	2.441	1388	40	1852, Nov. 15,	Goldschmidt.
(22)	CALLIOPE,	2.909	1440	50	1852, Nov. 16,	Hind.
(23)	THALIA,	2.628	1567	40	1852, Dec. 15,	Hind.
(24)	THEMIS,	3.143	2042	85	1853, April 5,	Gasparis.
(25)	PHOCŒA,	2.401	1359	35	1853, April 6,	Chacornac.
(26)	PROSERPINE,	2.656	1581	40	1853, May 5,	Luther.
(27)	EUTERPE,	2.347	1314	37	1853, Nov. 8,	Hind.
(28)	BELLONA,	2.778	1689	60	1854, Mar. 1,	Luther.
(29)	AMPHITRITE,	2.554	1492	82	1854, Mar. 1,	Marth.
(30)	URANIA,	2.365	1328		1854, July 22,	Hind.

Figure 33. John Brocklesby, *Elements of Astronomy* (1872), p. 350. By the 1872 edition all iconic symbols had been removed except for those of the first four asteroids. (3) Juno and (4) Vesta appear in the more elaborate forms ⚵ and ⚶, but these can be treated as graphic variants of the current Unicode characters.



33. MARS was the god of war, and his sign (♂) represents an ancient *shield* or *buckler*, crossed by a *spear*.

SPEAR AND SHIELD OF MARS.

Gunpowder was not known to the ancients, consequently they had no pistols, muskets, or cannon. They fought with short swords and spears, and defended themselves with the *shield*, carried on the left arm. A shield and spear were, therefore, very appropriate emblems of war. The original form of the sign of Mars is presented in the cut.

34. FLORA was the "queen of all the flowers," and her symbol (⚘) is a *flower*, the "Rose of England."

35. CLIO was one of the *Muses*. Her sign (⚵) is a *star*, with a *sprig of laurel* over it.

36. VESTA was the goddess of *fire*, and her sign (⚶) is an *altar*, with a *fire* blazing upon it.

37. IRIS was the beautiful waiting-maid of Juno, the queen of heaven. Her symbol (⚴) is composed of a semicircle, representing the *rainbow*, with an interior *star*, and a base line for the horizon.

"As an attendant upon Juno," says Prof. Hind, "the name was not inappropriate at the time of discovery, when Juno was traversing the 18th hour of right ascension, and was followed by Iris in the 19th."

38. METIS was the first wife of Jupiter, and the goddess of prudence and sagacity. Her symbol (⚵) is an *eye* (denoting wisdom) and a *star*.

39. HEBE presided over children and youth, and was cup-bearer to Jupiter. Her sign (⚲) is a *cup*.

Hebe was celebrated for her beauty, but happening one day to stumble and spill the nectar, as she was serving Jupiter, she was turned into an *hostler*, and doomed to harness and drive the peacocks of the queen of heaven.

40. PARTHENOPE was one of the three *Syrens*—a sea nymph of rare beauty. They were all admirable *singers;* hence a *lyre* (♍) is her appropriate sign.

Figure 34. Hiram Mattison, *High-School Astronomy* (1872). pp. 33, excerpts. Shows the symbols in text for several of the asteroids (1) through (9), as well as for (11) Parthenope and (12) Victoria (here named 'Clio'). Curiously, the symbol given for (11) Parthenope is a lyre, ♍, rather than the star-over-fish ⚷ suggested by discoverer A. de Gasparis.

41. EGERIA was the counsellor of Numa Pompilius. Symbol not yet agreed upon by astronomers.

42. ASTRÆA was the goddess of *Justice*, and her sign (♎) is a balance.

Mythology teaches that Justice left heaven, during the golden age, to reside on the earth; but becoming weary with the iniquities of men, she returned to heaven, and commenced a constellation of stars. The constellations Virgo and Libra in the zodiac are representations of Astræa and her golden scales. So the female figure, holding a pair of *scales*, in the coat of arms of several of the United States, is a representation of Astræa, and denotes *Justice*.

43. IRENE was one of the *Seasons*. The planet was so named by Sir John Herschel, in honor of the peace prevailing in Europe at the time of its discovery (May, 1851). Its symbol (⚵) is a *dove*, with an *olive branch* in her mouth, and a *star* upon her head.

44. EUNOMIA was another of the *Seasons*—a sister of Irene. (Symbol not ascertained.)

45. JUNO was the reputed queen of heaven, and her sign (♆) is an ancient *mirror*, crowned with a star—an emblem of beauty and power.

46. CERES was the goddess of *grain* and *harvests*, and her sign (⚳) is a *sickle*.

47. PALLAS (or Minerva) was the goddess of *wisdom* and of *war*. Her symbol (⚴) is *the head of a spear*.

1. The ancient *Palladium* was an image of Pallas, preserved in the castle of the city of Troy; for while the castle of the city of Minerva was building, they say this image fell from heaven into it, before it was covered with a roof.—*Tooke's Pantheon.*
2. To a similar fable, respecting an image falling from heaven, the Town-Clerk alludes, Acts xix. 35:—"Ye men of Ephesus, what man is there that knoweth not how that the city of Ephesus is a worshiper of the great goddess Diana, and of the *image* which fell down from Jupiter?"

48. HYGEIA was the goddess of *health*, and the daughter of Esculapius, the father of the healing art. (Symbol not ascertained.)

Our modern word *Hygeian*, which signifies the laws of health, is derived from the goddess Hygeia.

Figure 35. Hiram Mattison, *High-School Astronomy* (1872). pp. 34-35, excerpts, continued. Shows the symbols for the remainder of the asteroids (1) through (9), as well as for (14) Irene.

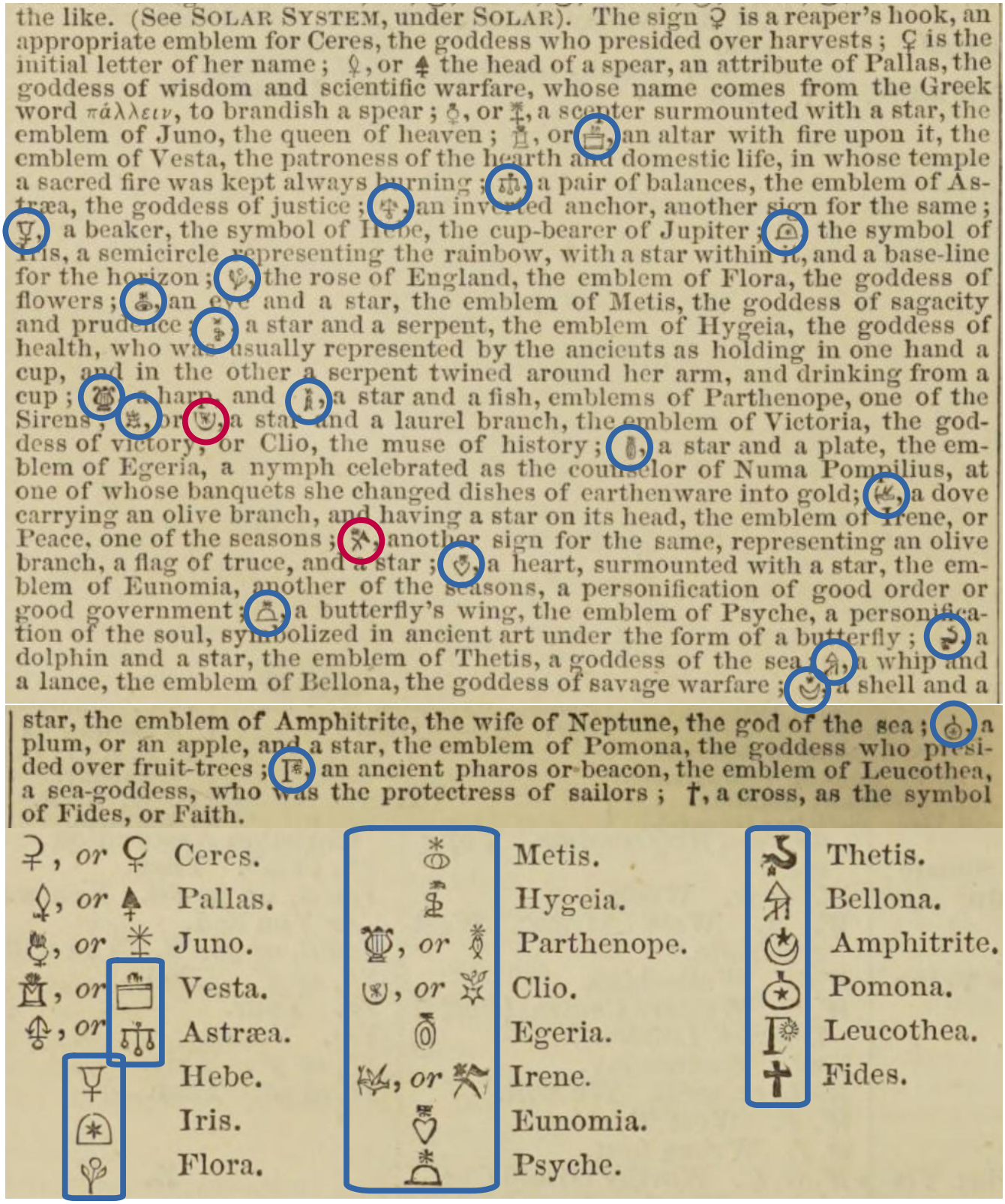
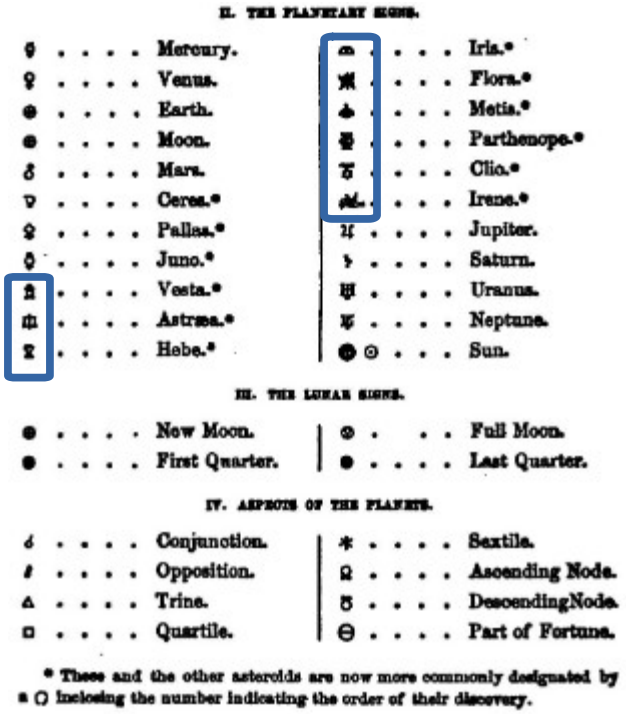


Figure 36. Webster and Goodrich (1864: 1692), excerpts. List and in-text explanations of the symbols of the asteroids. The table was reproduced in Lutz D. Schmadel (2012) *Dictionary of Minor Planet Names*, a standard reference. "Pomona" is a mistake for "Proserpina." Symbols are shown for asteroids (1) through (17), (26), (28), (29), (35), and (37). Both the discoverer's

and later symbols are shown for (5) Astraea and (11) Parthenope. (10) Hygiea is shown as a snake around a staff (rod of Asclepius) with a star, conflating de Gasparis' and Gould's symbols. A simplified alternative ⊛ is given for (12) Victoria (here called Clio), and another alternative is given for (14) Irene. (29) Amphitrite is drawn with a star, ⍟, though none is mentioned in the original description in the discovery report.



II. THE PLANETARY SIGNS.

☿ . . . . Mercury.	☄ . . . Iris.*
♀ . . . . Venus.	⚘ . . . Flora.*
⊕ . . . . Earth.	⚵ . . . Metis.*
☾ . . . . Moon.	⚶ . . . Parthenope.*
♂ . . . . Mars.	⚷ . . . Clio.*
⚳ . . . . Ceres.*	⚸ . . . Irene.*
⚴ . . . . Pallas.*	♃ . . . . Jupiter.
⚵ . . . . Juno.*	♄ . . . . Saturn.
⚶ . . . . Vesta.*	♅ . . . . Uranus.
⚷ . . . . Astræa.*	♆ . . . . Neptune.
⚸ . . . . Hebe.*	☉ . . . Sun.

III. THE LUNAR SIGNS.

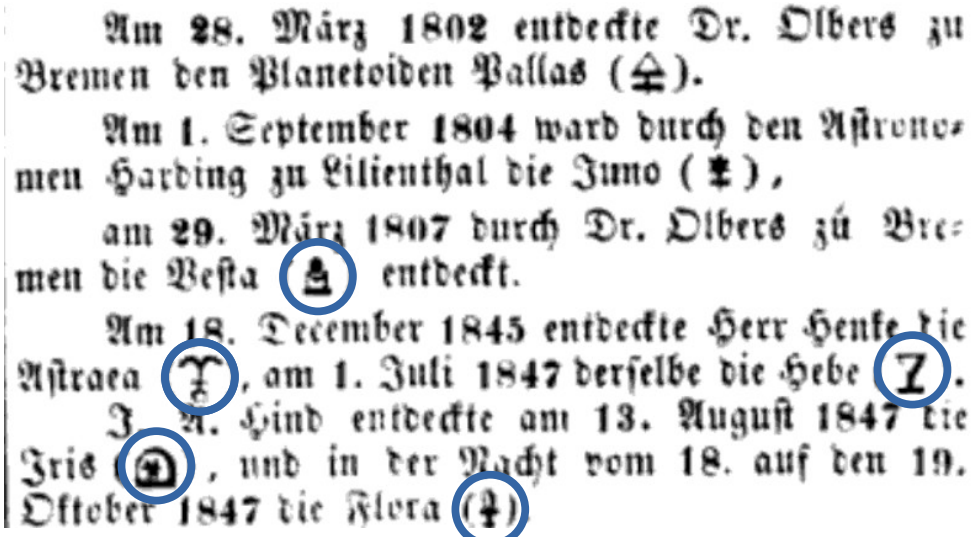
● . . . . New Moon.	○ . . . Full Moon.
◐ . . . . First Quarter.	◑ . . . . Last Quarter.

IV. ASPECTS OF THE PLANETS.

☌ . . . . Conjunction.	⚹ . . . . Sextile.
☍ . . . . Opposition.	☊ . . . . Ascending Node.
△ . . . . Trine.	☋ . . . . DescendingNode.
□ . . . . Quartile.	⊖ . . . . Part of Fortune.

* These and the other asteroids are now more commonly designated by a ○ inclosing the number indicating the order of their discovery.

Figure 37. John Wilson, *A Treatise on English Punctuation* (1899), p. 302. The copy consulted (on the Internet Archive) is barely legible, but the symbol forms appear to be close to those of Mattison's *High-School Astronomy*.



Am 28. März 1802 entdeckte Dr. Olbers zu Bremen den Planetoiden Pallas (⚴).

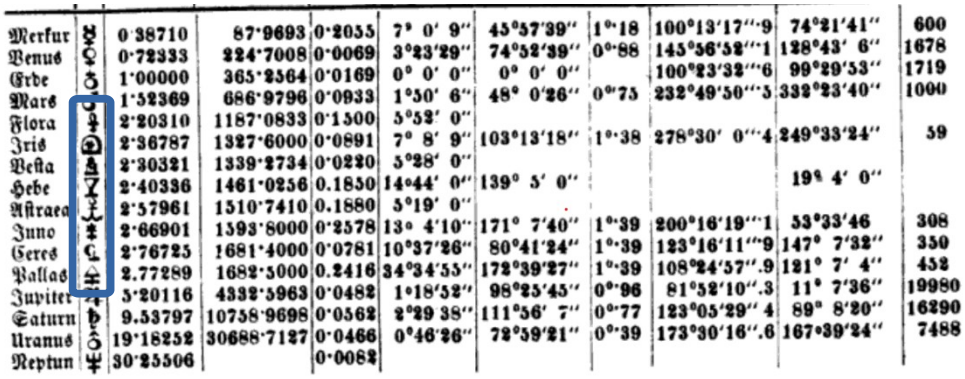
Am 1. September 1804 ward durch den Astronomen Harding zu Lilienthal die Juno (⚵),

am 29. März 1807 durch Dr. Olbers zu Bremen die Vesta (⚶) entdeckt.

Am 18. December 1845 entdeckte Herr Henke die Astraea (⚷), am 1. Juli 1847 derselbe die Hebe (⚸).

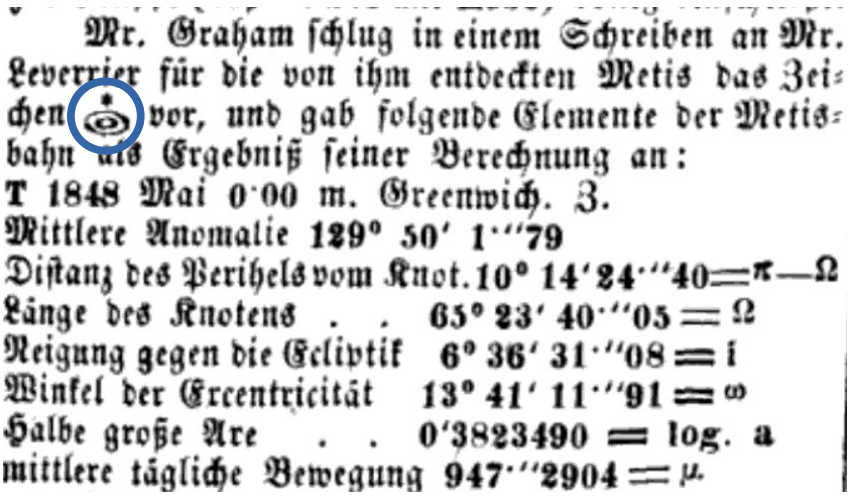
J. R. Hind entdeckte am 13. August 1847 die Iris (☄), und in der Nacht vom 18. auf den 19. Oktober 1847 die Flora (⚘).

Figure 38. *Österreichischer Universal-Kalender* (1849), p. xxxix. In-text usage of the symbols of (2) Pallas to (8) Flora. The design of (5) Astraea that of U+2BD4 PLUTO FORM THREE (⯔).



Merkur	☿	0·38710	87·9693	0·2055	7° 0′ 9″	45°57′39″	1°·18	100°13′17″·9	74°21′41″	600
Venus	♀	0·72333	224·7008	0·0069	3°23′29″	74°52′39″	0°·88	145°56′52″·1	128°43′ 6″	1678
Erde	♁	1·00000	365·2564	0·0169	0° 0′ 0″	0° 0′ 0″		100°23′32″·6	99°29′53″	1719
Mars	♂	1·52369	686·9796	0·0933	1°50′ 6″	48° 0′26″	0°·73	232°49′50″·5	332°23′40″	1000
Flora	⚘	2·20310	1187·0833	0·1500	5°53′ 0″					
Iris	☉	2·36787	1327·6000	0·0891	7° 8′ 9″	103°13′18″	1°·38	278°30′ 0″·4	249°33′24″	59
Vesta	⚶	2·30321	1339·2734	0·0220	5°28′ 0″					
Hebe	☽	2·40336	1461·0256	0.1850	14°44′ 0″	139° 5′ 0″			19° 4′ 0″	
Astraea	⚳	2·57961	1510·7410	0.1880	5°19′ 0″					
Juno	⚵	2·66901	1593·8000	0·2578	13° 4′10″	171° 7′40″	1°·39	200°16′19″·1	53°33′46	308
Ceres	⚳	2·76725	1681·4000	0·0781	10°37′26″	80°41′24″	1°·39	123°16′11″·9	147° 7′32″	350
Pallas	⚴	2.77289	1682·3000	0.2416	34°34′55″	172°39′27″	1°·39	108°24′57″.9	121° 7′ 4″	452
Jupiter	♃	5·20116	4332·5963	0·0482	1°18′52″	98°25′45″	0°·96	81°52′10″.3	11° 7′36″	19980
Saturn	♄	9.53797	10758·9698	0·0562	2°29 38″	111°56′ 7″	0°·77	123°05′29″ 4	89° 8′20″	16290
Uranus	♅	19·18252	30688·7127	0·0466	0°46′26″	72°59′21″	0°·39	173°30′16″.6	167°39′24″	7488
Neptun	♆	30·25506		0·0082						

Figure 39. Ibid, p. xl. All then-known planet symbols including asteroids (1) Ceres through (8) Flora. (5) Astraea is a rightside-up Pluto-like anchor, presumably a typo as it contradicts the previous figure.



Mr. Graham ſchlug in einem Schreiben an Mr. Leverrier für die von ihm entdeckten Metis das Zeichen ⊙ vor, und gab folgende Elemente der Metisbahn als Ergebniß ſeiner Berechnung an:

T 1848 Mai 0·00 m. Greenwich. 3.
Mittlere Anomalie 129° 50′ 1·″79
Diſtanz des Perihels vom Knot. 10° 14′ 24·″40 = π—Ω
Länge des Knotens . . 65° 23′ 40·″05 = Ω
Neigung gegen die Ekliptik 6° 36′ 31·″08 = i
Winkel der Excentricität 13° 41′ 11·″91 = ω
Halbe große Axe . . 0·3823490 = log. a
mittlere tägliche Bewegung 947·″2904 = μ.

Figure 40. *Österreichischer Universal-Kalender* (1850), p. xlv. The symbol for (9) Metis. It could be confused for the round form ⊛ of (13) Egeria.

Encke consultirte mich neulich über die Zeichen der Hygiea und Parthenope. Hygiea hat, glaube ich, den Schlangenstab des Aesculaps mit einem Sterne, Parthenope's Zeichen kenne ich gar nicht. Hind hat für seine Victoria dies Zeichen

das einen Lorbeerzweig vorstellen soll. Wenn noch mehrere von dieser Planetenfamilie entdeckt werden, so möchte es am Ende schwer halten, neue geeignete Zeichen aufzufinden, auch

Figure 41. *Briefwechsel zwischen C. F. Gauss und H. C. Schumacher*, Vol. 6, p. 115 (published 1865, edited by Christian August Friedrich Peters). A drawing of the symbol for (12) Victoria in an 1850 letter by Heinrich Christian Schumacher to Gauss.

Die Planeten.

I. Die größeren Planeten:

Mercur (☿) | Venus (♀) | Erde (♁) | Mars (♂) | Jupiter (♃) | Saturn (♄) | Uranus (♅) | Neptun (♆)

II. Die kleineren Planeten (Asteroiden):

(☾) Ceres	(16) Psyche	(31) Euphrosyne	(46) Hestia	(61) Echo	(75) Eurydice
(⚴) Pallas	(17) Thetis	(32) Pomona	(47) Aglaja	(62) Erato	(76) Freia
(⚵) Juno	(18) Melpomene	(33) Polyhymnia	(48) Doris	(63) Ausonia	(77) Frigga
(⚶) Vesta	(19) Fortuna	(34) Circe	(49) Pales	(64) Angelina	(78) Diana
(☆) Asträa	(20) Massalia	(35) Leukothea	(50) Virginia	(65) Cybele	(79) Eurynome
(♆) Hebe	(21) Lutetia	(36) Atalante	(51) Nemausa	(66) Maja	(80) Sappho
(☆) Iris	(22) Kalliope	(37) Fides †	(52) Europa	(67) Asia	(81) Terpsichore
(☆) Flora	(23) Thalia	(38) Leda	(53) Kalypso	(68) Leto	(82) Alkmene
(☆) Metis	(24) Phocäa	(39) Lätitia	(54) Alexandra	(69) Hesperia	(83) Beatrice
(10) Hygiea	(25) Proserpina	(40) Harmonia	(55) Pandora	(70) Panopäa	(84) Clio
(11) Parthenope	(26) Themis	(41) Daphne	(56) Melete	(71) Niobe	(85)
(12) Victoria	(27) Euterpe	(42) Isis	(57) Mnemosyne	(72) Feronia	(86)
(13) Egeria	(28) Bellona	(43) Ariadne	(58) Concordia	(73) Clytia	Die beiden letzteren haben noch keine Namen.
(14) Irene	(29) Amphitrite	(44) Nysa	(59) Elpis	(74) Galatea	
(15) Eunomia	(30) Urania	(45) Eugenia	(60) Danae		

Figure 42. *Neuer Prager Kalender für Stadt und Land* (1867), p. 52. Asteroids listed with circled-number symbols from (10) Hygiea onward. (1) Ceres through (9) Metis have their old iconic symbols, and (37) Fides has both the iconic symbol and the circled number.

wir ſogleich ſehen werden, mit glänzendem Erfolge vorgeſchlagenen genauen Sternkarten des Aequators, welche die Berliner Akademie im Jahre 1825 herauszugeben unternahm, richteten die Aufmerkſamkeit wieder auf dieſe verhältnißmäßig leichte Art, ſich einen bleibenden Namen in der Wiſſenſchaft zu erwerben. Die gleichzeitige Verbreitung guter Fernrohre erlaubte weit kleinere Sterne als früher in den Bereich der Unterſuchung zu ziehen und trug dazu bei, ſolche Forſchungen zu einem auch den Dilettanten völlig zugänglichen Gemeingute zu machen. Ein eifriger Liebhaber der Aſtronomie, Herr Hencke in Drieſen, der von einzelnen Theilen des Himmels reichhaltige Sternkarten im großen Maßſtabe angefertigt und von Zeit zu Zeit mit dem Himmel verglichen hatte, eröffnete ſo nach fünfzehnjährigen Bemühungen und mit Hülfe eines Blattes der Berliner Karte im Jahre 1845 wieder die Laufbahn durch die Entdeckung der Aſträa, die den Namen von Encke und als Zeichen einen Anker (☆) vom Entdecker, ſpäter (5) erhielt. Nachdem im darauf folgenden Jahre 1846 in ganz anderer Sphäre die berühmte Entdeckung des Neptun erfolgt war, fand wieder Hencke noch nicht zwei Jahre nach ſeinem erſten Funde, wieder mittelſt einer Berliner Karte, die Hebe, welche Namen und Zeichen (♆) einen Becher, von Gauß erhielt; ſtatt dieſes Zeichens wurde ſpäter (6) eingeführt.

Figure 43. Joseph Johann Littrow, Edmund Weiss & Karl Ludwig Littrow (1878), *Wunder des Himmels oder gemeinfasslische Darstellung des Weltsystemes*, p. 416ff. The iconic symbols for (5) Astraea and (6) Hebe drawn in the text (blue), along with the circled numbers that would replace them (red).

Es war dies ſo ziemlich die letzte überraſchende Entdeckung dieſer Art, denn als Hind, Aſtronom an der Privatſternwarte des Hrn. Biſhop in London, wenige Wochen ſpäter mit der nächſten Auffindung eines neuen Planeten, der von ihm ſelbſt mit Namen und Zeichen Stern unter einem Regenbogen, verſehenen Iris, die ſpäter das Zeichen (7) erhielt, auftrat, wurde die Durch

Figure 44. *Ibid.* for (7) Iris.

des Planetenſyſtems von Sir John Herſchel vorgeſchlagen war, der nun auch das Zeichen eine Blume, beſtimmte, das ſpäter in (8) überging. Dieſes Zeichen, obſchon an ſich ohne Widerſpruch angenommen, war zu complicirt, um, wie die bisher gewählten, als Abkürzung in der Schrift zu dienen und regte die erſten Zweifel gegen den Gebrauch ſolcher beſonderer Zeichen überhaupt an, der kurz darauf ganz aufgegeben wurde. Flora iſt übrigens der uns nächſte unter den bisher bekannten Aſteroiden.

Die zunächſt aufgefundene Metis erhielt das Zeichen Auge und Stern, ſpäter (9), ſowie den Namen, bekanntlich ſo zu ſagen der Mutter Minervens, vom Entdecker Graham zu Ehren des klugen Rathes des Beſitzers Cooper der Sternwarte zu Markree Caſtle, an welcher Herr Graham als Obſervator beſchäftigt war; dieſer Rath hatte den Entdecker nämlich nach wenigen Wochen auf den neuen Himmelskörper geführt.

Hygiea wurde durch Vergleichung einer Berliner akademiſchen Sternkarte mit dem Himmel gefunden und führte uns in der Perſon des Herrn de Gasparis, damals Aſſiſtent an der Sternwarte zu Neapel, einen neuen Entdecker vor. Capocci, der Vorſteher der genannten Anſtalt, gab den zuerſt wieder mit einem Epithet (Borbonica) verſehenen Namen und das Zeichen Stab und Schlange [ſpäter (10)]. Demſelben Entdecker gelang nach Jahresfriſt die Auffindung der Parthenope, die Namen und Zeichen, Fiſch und Stern [ſpäter (11)], nach einer

Figure 45. *Ibid.* for (8) Flora, (9) Metis, and ? for (10) Hygiea. The iconic symbol for (11) Parthenope (red) is described (*Fisch und Stern*) but not drawn.

Victoria, Hind's dritter Planet, wurde nach kaum dreistündiger Vergleichung des Himmels mit einer Berliner Karte aufgefunden und von Bishop und Hind mit Namen und einem schon nie recht in Gebrauch gekommenen, weil viel zu verwickelten Zeichen (⚳) Lorbeerkranz und Stern [später (⑫)], versehen. Die amerikanischen Astronomen machten gegen diesen Namen Opposition und schlugen Clio vor, ohne jedoch durchzudringen; in der That konnte der Name Victoria eben so gut einer Göttin des Alterthums als der Königin Victoria von England gelten.

Den nächsten Fund, Egeria, verdankte der Entdecker de Gasparis den nun auch von ihm schon angefertigten ekliptischen Karten. Le Verrier wählte den Namen nach Herschel's Grundsatz, die Bestimmung eines Zeichens unterblieb zum ersten Male anfangs ganz; später fiel diesem Planeten das Zeichen (⑬) zu.

Figure 46. *Ibid.* for (12) Victoria, an elaborate variant with a star under a laurel wreath. The source erroneously claims that an iconic symbol was not chosen for (13) Egeria.

Irene (⑭) war der erste Asteroid, der, ein Beweis der vielseitigen eifrigen Forschung, von zwei Astronomen kurz nacheinander entdeckt wurde: Hind fand ihn am 19., de Gasparis am 23. Mai. Sir John Herschel taufte ihn und gab wieder kein besonderes Zeichen. Eunomia (⑮), erhielt Namen und Zeichen (♡) Herz und Stern, vom Entdecker de Gasparis, der, wenn wir nicht irren, seine Loyalität damit bekunden wollte. Psyche (⑯) wurde ebenfalls von de Gasparis aufgefunden und vom Entdecker getauft ohne Zeichen. Hind

Figure 47. *Ibid.* for (15) Eunomia. The source again erroneously claims that (14) Irene and (16) Psyche were given no symbol.

Thetis, nahe an Flora aufgefunden, macht uns wieder mit einem neuen Planeten-Entdecker ex professo bekannt: Robert Luther, Vorsteher der von Benzenberg in Bilk bei Düsseldorf gegründeten und durch Vermächtniß des Besitzers an die letztgenannte Stadt übergegangenen Sternwarte. Name (leider sehr ähnlich dem eines Satelliten des Saturn) und Zeichen (⚵) griechisch Theta, einem Delphine ähnlich, und Stern, rühren von Argelander, Director der k. Sternwarte in Bonn. Von nun an kommen die Versuche, besondere Symbole

Figure 48. *Ibid.* for (17) Thetis, with a cursive variant of the tail of the dolphin.

Proserpina (⑯), von Luther aufgefunden, wurde von A. v. Humboldt getauft und erhielt ausnahmweise wieder ein Symbol: (⚶) Granatapfel und Stern. Euterpe (⑰) ist, wenn wir nicht irren, vom Entdecker Hind benannt. Bellona (⑱) erhielt Namen und Zeichen (⚔) Spieß und Geisel, zum Andenken der kriegerischen Zeit, in welche die Entdeckung durch Luther fiel, von Encke.

Figure 49. *Ibid.* for (26) Proserpina and (28) Bellona.

Leucothea (35), von Luther aufgefunden, wurde mit Namen so wie Zeichen ⚓ Leuchtthurm, von C. A. F. Peters, Director der Sternwarte zu Altona, und C. Rümker, Vorsteher des Hamburger Observatoriums, versehen. Bei Leucothea tritt übrigens zum ersten Male die Merkwürdigkeit ein, daß in Folge der Ueberbürdung mit zeitraubenden Berechnungen und Beobachtungen neuer Himmelskörper die Astronomen mit den Entdeckern, denen bei weitem der leichtere Theil zugefallen war, nicht Schritt halten konnten, und von nun an öfter Gefahr vorhanden ist, einen kaum gefundenen Planeten wieder zu verlieren, wie dies, freilich aus ganz andern Gründen, bei dem Erstlinge Ceres der Fall gewesen. Die Wiederauffindung wird so zuweilen wieder ein besonderes Verdienst, da bei der Unbestimmtheit des Ortes, wo der Planet nach seiner Zusammenkunft mit der Sonne sich aufhalten soll, ein großer Fleck des Himmels zu durchforschen ist; bei Leucothea wird deshalb ausdrücklich erwähnt, daß Breen, Astronom an der Cambridger Sternwarte, diesen Asteroiden bei seiner zweiten Sichtbarkeit wieder auffand. Aehnliche Schwierigkeiten, wenngleich in weit geringerem Maße, hatten sich übrigens auch schon bei Circe gezeigt.

Atalante (36), ein weiterer Fund Goldschmidt's, wurde von Le Verrier getauft. Fides (37), eine Stunde nach Atalante von Luther entdeckt, erhielt Namen und Zeichen ☩, ein Kreuz, vom Gemeinderathe der Stadt Düsseldorf, wohl mit Anspielung auf Treue und Glaubensfestigkeit. Es ist dies bisher der letzte Versuch, den früheren Gebrauch besonderer Symbole wieder in Gang zu

Figure 50. *Ibid.* for (35) Leukothea and (37) Fides.

Am Schlusse des Jahres 1847 kannte man demnach 8 Asteroiden, welche in folgender Reihe um die Sonne kreisen:

	Namen.		Entfernung.		Umlaufszeit.		
1.	Flora	⚘	46 Mill. M.		3 Jahre	+	
2.	Vesta	⚶	48	—	3	"	229 T.
3.	Iris	☼	49	—	3	"	235 "
4.	Hebe	♅	50	—	3	"	265 "
5.	Asträa	♁	53	—	4	"	52 "
6.	Juno	⚵	55	—	4	"	131 "
7.	Ceres	⚳	57	—	4	"	223 "
8.	Pallas	⚴	57	—	4	"	225 "

Figure 51. Adolph Diesterwe, *Astronomische Geographie und populäre Himmelskunde* (1852), p. 200. The symbols for asteroids (1) Ceres through (8) Flora.

Graham entdeckte am 25. April 1848 zu Makree in Irland die Metis (☿);
de Gasparis am 12. April 1849 (zu Neapel) die Hygiea (☾);
— — — 11. Mai 1850 — die Parthenope (☽);
— — — 2. Nov. 1850 — die Egeria;
— — — 29. Juli 1851 — die Eunomia;
Hind — 13. Sept. 1850 — die Victoria (◎);
— — 19. Mai 1851 — die Irene;
Die Zahl der Asteroiden ist also bis zum Jahre 1852 bis auf 15 gewachsen, so daß wir jetzt 23 Planeten kennen. Jene 15 bewegen sich in 1300 bis 2000 Tagen um die Sonne.

Figure 52. *Ibid.*, p. 201. Asteroids (9) Metis through (12) Victoria are mentioned with their symbols; (13) Egeria through (15) Eunomia are given without symbols. (12) Victoria is again divergent.

5) In ziemlich gleichem Abstande von der Sonne stehen die kleinen, erst in diesem Jahrhundert entdeckten Planeten, wegen ihrer Kleinheit von Herschel Asteroide, noch gewöhnlicher Planetoide genannt, von denen gegenwärtig 27 bekannt sind. Von diesen wurden Ceres (⚳) von Piazzi in Palermo 1. Jan. 1801, Pallas (⚴) von Olbers in Bremen 28. März 1802, Juno (⚵) von Harding in Lilienthal bei Bremen 1. Sept. 1804, Vesta (⚶) von Olbers 29. März 1807, Asträa und Hebe von Hencke 8. Dec. 1845 und 1. Juli 1847 entdeckt. Im J. 1847 wurden sodann noch zwei (Iris und Flora), 1848 einer (Metis), 1849 gleichfalls einer (Hygiea), 1850 drei (Parthenope, Victoria oder Klio, Egeria), 1851 zwei (Irene und Eunomia),

Figure 53. *Allgemeine deutsche Real-Encyclopaedie für die gebildeten Stände* (1854), p. 174. The symbols for asteroids (1) Ceres through (4) Vesta, the last in Gauss' original form.

1852 nicht weniger als acht (Psyche, Thetis, Melpomene, Fortuna, Massilia, Lutetia, Kalliope, Thalia), endlich 1853 vier (Phocäa, Themis, Proserpina und Euterpe) entdeckt. Die meisten derselben, nämlich neun, hat Hind in London aufgefunden (Iris, Flora, Victoria oder Klio, Irene, Melpomene, Fortuna, Kalliope, Thalia, Euterpe), ferner de Gasparis in Neapel sieben (Hygiea, Parthenope, Egeria, Eunomia, Psyche, Massilia, Themis), Luther in Bilk bei Düsseldorf zwei (Thetis und Proserpina). Graham in Irland entdeckte die Metis, Goldschmidt in Paris die Lutetia, Chacornac in Marseille die Phocäa. Als Zeichen der seit 1845 entdeckten Planetoide sind vorgeschlagen und theilweise eingeführt worden: für Asträa (umgekehrter Anker), für Hebe (♉), für Iris (⚲), für Flora (⚘), für Metis (⚇), für Hygiea eine Schlange mit einem Stern über dem Kopfe, für Klio ein Stern mit einem Lorberzweig, für Thetis ein Delphin mit einem Stern darunter, für Proserpina (einen Granatapfel vorstellend). Gewöhnlicher bezeichnet man sie jedoch nach Gould's Vorschlage durch einen Kreis, in welchem eine die Reihenfolge der Entdeckung anzeigende Zahl steht, sodaß z. B. Euterpe das Zeichen (9)

Figure 54. *Ibid.*, p. 175. Symbols for (5) Astraea through (9) Metis, plus a divergent design for (26) Proserpina. (6) Hebe and (8) Flora have crosses at bottom. The symbols for (10) Hygiea, (12) Victoria, and (17) Thetis are described (red) but not drawn: *eine Schlange mit einem Stern über dem Kopfe* (a snake with a star over its head), *ein Stern mit einem Lorberzweig* (a star with a laurel branch), *ein Delphin mit einem Stern darunter* (a dolphin with a star underneath).

ISO/IEC JTC 1/SC 2/WG 2
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646[1]
Please fill all the sections A, B and C below.
Please read Principles and Procedures Document (P & P) from std.dkuug.dk/JTC1/SC2/WG2/docs/principles.html for guidelines and details before filling this form.
Please ensure you are using the latest Form from std.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html.
See also std.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html for latest *Roadmaps*.

A. Administrative

1. **Title:** *Historical asteroid symbols*
2. Requester's name: *Gavin Jared Bala, Kirk Miller*
3. Requester type (Member body/Liaison/Individual contribution): *individual*
4. Submission date: *2023 September 18*
5. Requester's reference (if applicable):
6. Choose one of the following:
   This is a complete proposal: *yes*
   (or) More information will be provided later:

B. Technical – General

1. Choose one of the following:
   a. This proposal is for a new script (set of characters): *yes*
      Proposed name of ~~script~~ block: *Miscellaneous Symbols Supplement*
   b. The proposal is for addition of character(s) to an existing block: *yes*
      Name of the existing block: *Alchemical Symbols*
2. Number of characters in proposal: *21*
3. Proposed category (select one from below - see section 2.2 of P&P document):

A-Contemporary		B.1-Specialized (small collection)	x	B.2-Specialized (large collection)	
C-Major extinct		D-Attested extinct		E-Minor extinct	
F-Archaic Hieroglyphic or Ideographic				G-Obscure or questionable usage symbols	

4. Is a repertoire including character names provided? *yes*
   a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? *yes*
   b. Are the character shapes attached in a legible form suitable for review? *yes*
5. Fonts related:
   a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard? *Kirk Miller*
   b. Identify the party granting a license for use of the font by the editors (include address, e-mail, ftp-site, etc.): *Kirk Miller*
6. References:
   a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? *yes*
   b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached? *yes*
7. Special encoding issues:
   Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)? *no*

8. Additional Information:

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at www.unicode.org for such information on other scripts. Also see Unicode Character Database (www.unicode.org/reports/tr44/) and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

1. Form number: N4502-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10, 2007-03, 2008-05, 2009-11, 2011-03, 2012-01)

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before? *no*
   If YES explain
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? *no*
   If YES, with whom?
   If YES, available relevant documents:
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? *no*
   Reference:
4. The context of use for the proposed characters (type of use; common or rare) *astronomical, historical, rare*
   Reference:
5. Are the proposed characters in current use by the user community? *no*
   If YES, where? Reference: *See figures*
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP? *no*
   If YES, is a rationale provided?
   If YES, reference:
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)? *no*
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? *no*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? *no*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to, or could be confused with, an existing character? *no*
    If YES, is a rationale for its inclusion provided?
    If YES, reference:
11. Does the proposal include use of combining characters and/or use of composite sequences? *no*
    If YES, is a rationale for such use provided?
    If YES, reference:
    Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?
    If YES, reference:
12. Does the proposal contain characters with any special properties such as control function or similar semantics? *no*
    If YES, describe in detail (include attachment if necessary)
13. Does the proposal contain any Ideographic compatibility characters? *no*
    If YES, are the equivalent corresponding unified ideographic characters identified?
    If YES, reference: