Boletim da Sociedade Astronômica Brasileira, **29**, no.1, 26-53

Boletim da S A B

Naming the extrasolar planets

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Received January 14th 2010; accepted August 25th 2010

Resumo. Planetas extrassolares não são nomeados e são referenciados apenas pela sua designação científica. A razão apresentada pela UAI para não os nomear é que isso seria impraticável dado que os planetas devem ser comuns. Apresento algumas razões sobre porquê essa lógica é insustentável, e sugiro nomes para os 429 candidatos a planetas extrassolares conhecidos até fevereiro de 2010. Os nomes seguem uma associação com a constelação à qual a estrela parental pertence e, desta forma, são em sua maioria retirados da mitologia greco-romana. Outras mitologias podem ser também usadas desde que uma associação adequada seja estabelecida.

Abstract. Extrasolar planets are not named and are referred to only by their assigned scientific designation. The reason given by the IAU to not name the planets is that it is considered impractical as planets are expected to be common. I advance some reasons as to why this logic is flawed, and suggest names for the 429 extrasolar planet candidates known as of Feb 2010. The names follow a scheme of association with the constellation that the host star pertains to, and therefore are mostly drawn from Roman-Greek mythology. Other mythologies may also be used given that a suitable association is established.

Keywords. Extrasolar planets – constellations

1. Introduction

Since the discovery of the first extrasolar planet, around the star 51 Pegasi (Mayor & Queloz 1995), over 400 planets surrounding other stars have been discovered. It is no exaggeration to say that, for astronomy, the year of 1995 has a historic resonance with 1781, 1846, and 1930. However, unlike Uranus, Neptune, and Pluto, the almost totality of these extrasolar planets are known by no other name than the scientifically dry designations given to them.

It is my intent to make the case that naming these planets is desirable. Poincaré (1905) emphasized the usefulness of astronomy by saying that "it is useful because it raises us above ourselves, because it is great, because it is beautiful". Planet MOA-2008-BLG-310-L b, a sub-Saturnian mass planet recently detected in the Galactic Bulge with the technique of microlensing (Janczak et al. 2009), certainly inspires this feeling of transcendence Poincaré describes. But its name hardly helps on conveying it.

One of the main reasons I consider for naming the extrasolar planets is the Copernican Principle itself. Our place in the cosmos is not special in any way, so there is no reason why only the planetary objects in the solar system should be named. Shakespeare would perhaps disagree with me and say that Io by any other name would smell as bad; and it is true that HD 128311 b will have the same radial velocity curve irrespectively of us naming it after a catalog number or after Bacchus. However, the non-special nature of our place in the Universe is better underscored by naming our neighbors. Mercury - Venus - Earth - Mars is a sequence of equals. Sol b - Sol c - Earth - Sol d would implicitly imply that the Earth is special in some way. Likewise, Jupiter is being paired to obscure names such as XO-1 b, TrES-4 b, and OGLE-TR-182 b, which does not help educators convey the message that these planets are quite similar to Jupiter. In stark contrast, the sentence"planet Apollo is a gas giant like Jupiter" is heavily - yet invisibly - coated with Copernicanism.

One reason given by the IAU for not considering naming the extrasolar planets is that it is a task deemed impractical. One source is quoted as having said "if planets are found to occur very frequently in the Universe, a system of individual names for planets might well rapidly be found equally impracticable as it is for stars, as planet discoveries progress." [1]. This leads to a second argument. It is indeed impractical to name all stars. But some stars are named nonetheless. In fact, all other classes of astronomical bodies are named. Galaxies are named. Stars are named. Even asteroids are named. So why not name the exoplanets? Granted, not all galaxies have names. Only the nearby ones, and in this case, the names are easily fixed due to the shape of the galaxy - Whirlpool, Antenna, Sombrero -, or of the constellation - Andromeda, Circinus, Carina. Star naming also has a criterion - the brightness. All stars brighter than V=1.5 have a proper name, the frequency of named stars declining as the magnitude increases[2]. Yet nothing has stopped people from naming over 15,000 asteroids and minor planets. In fact, it seems to be that the main reason for over 400 known exoplanets remaining unnamed is that no one has yet done the job of naming them all. Indeed, as discoveries proceed (and hopefully skyrocket with the Gaia

[1] http://www.iau.org/public_press/themes/extrasolar_planets/

[2] S. Boscardin, from Observatório Nacional, Rio de Janeiro, Brazil, pointed to me that there are four unnamed stars brighter than V=2.5. They are gamma and delta Velorum, of magnitudes V=1.8 and 2.0, and epsilon and eta Centauri, both of magnitude V=2.5. I credit him here for this information, and echo his suggestion that the IAU should consider naming these four lone stars. He further informs me that there are 84 stars between 2.5<V<3.0, 51 of which are named; and 106 stars between 3.0<V<3.5, 33 of which are named.

mission), naming all planets will be impractical. But the benefits of having some of them named is as clear as in the case of stars. In this manuscript, I set myself to the task.

In some cases, planets have already been nicknamed. For some, the epithet is sound. On naming 51 Pegasi b, I immediately thought of Bellerophon, the rider of the winged horse. Then I found out that someone else also shared the same taste for mythological associations and had already nicknamed the planet with the same name. I also came across the webpage of the "Extrasolar planet naming society", created in November 2008 with the idea of organizing a concerted collective effort to name the known exoplanets. Unfortunately, it did not seem to have gained any momentum. Individual efforts seem to beat collective ones in this case. I highlight here the webpage of Devon Moore, where over 40 exoplanet names have been suggested [3]. Some of the names Moore chose are indeed good, some I have reasons to object. I will go back to that later.

Discoverers have also attempted to name the fruit of their labor. The three planets around Upsilon Andromedae have been nicknamed "Fourpiter", "Twopiter", and "Dinky". These names were suggested by a class of 4th graders, and have the advantage of carrying information on the planets' size. However, they are tantalizingly unpalatable to those of a more classical mind. No offense to the very creative children, but apparently long gone are the times of Venitia Burney, then 11 years old, who suggested the name of Pluto, the Roman-Greek god of the underworld (not the Disney dog), for the distant, cold, (ex-)planet discovered in 1930. 70 Virginis b was similarly nicknamed "Goldilocks", for its position in the habitable zone of its star. One could imagine that had the discovery been made by a Swedish team if they would have called the planet *Lagom*, after their unique word for "just right". Not to mention the internal names used by discovery teams that sometimes leak to the media, such as "Xena", "Easterbunny" and "Santa" (the Kuiper Belt objects Eris, Makemake, and Haumea, respectively).

In this manuscript, I advocate a return to classic tradition, and propose a simple way to name the known exoplanets, exposed in Sect 2. It basically consists of giving them names from Roman-Greek mythology associated with the constellation that the host star pertains. Other mythologies are also used given that a suitable association with the constellation can be established. The columns in Table 1 show, respectively, the names of the planets listed by constellation, the name used in the astronomical literature, their masses in units of Jupiter's mass (M_J), semi-major axes in astronomical units (AU), eccentricities, right ascension, declination, and, finally, the proposed name[4]. The mythological associations for these names are explained in Sect 3.

The method used was the following. I got the planets from Jean Schneider's *The Extrasolar Planets Encyclopaedia*, and listed the planets by constellation. I then suggest names for the planets with the help of a dictionary of Greek mythology (Dixon-Kennedy 1998) and extensive use of Wikipedia. It is commonplace that information in Wikipedia is not always trustable, and has to be used with care. That is correct, but when well-handled, the information there available is vital. For instance, listing the planets by constellation would have been quite time-consuming without Wikipedia, since the papers not always mention it, giving only the coordinates. To my surprise and amazement, almost all extrasolar planets have a wiki, that also informs in which constellation the star is located. I also made use of the following online source, `http://www.theoi.com/`, that works as an online interactive dictionary of Greek mythology.

2. The naming convention

In assigning the names, it seems natural to follow the mythological stories of the constellations. Andromeda's myth for the planets in Andromeda, Hercules' myth for planets in Hercules. It is as simple as it sounds, though there are some caveats where subtleties apply.

In suggesting names for the planets, I was tempted to circumvent some problems that, in the end, proved unavoidable. One of them refers to too common personal names. For instance, Leda is a natural choice for a planet in Cygnus, the Swan. The name is not popular in the United States, but is quite popular in Brazil. I also assume that most native English speakers would not favor a planet called "Jason" even though Carina, Puppis, and Vela beg for the name.

However, any attempt to avoid these cases will invariably be doomed to failure. When I finished an earlier draft of this manuscript, I asked a Greek colleague to go through Table 1 and check that the names were not too common in modern Greece. She pointed a handful of semi-common names, a singer's last name, and added that Peristera (Sect. 3.24) simply meant "female pigeon", and that it sounded "a little funny". The problem, of course, is that one can only identify these special cases in languages and cultures one is familiar with.

The same problem exists for cacophonies. Take Uranus, for instance. It is an endless source of humor for each generation of ten-year old native English speakers, yet innocuous in any other language. This is a well known problem for commercial companies, since their well-tailored name may well be a common name or sound offensive in another language. Avoiding it in all languages would be virtually impossible. As one cannot guarantee that no single name picked is a common name or offensive word in any other language, it is less subjective to not avoid it even when one can identify it. Speaking of companies, I also made no attempt to avoid overly used commercial names such as Clio (Sect. 3.70), Python (Sect. 3.76), or Nike[5] (Sect. 3.62).

I did, however, perform some censorship. For instance, Electryon (one of the Perseids) sounds too much like electron (ispell even tried to correct it). Certainly we do not want to have high-school teenagers confused over if electron is a sub-atomic particle or a planet. Aesthetics also played a role, since many times when faced with two or more choices, I picked the names that I judged more beautiful. I imagine that an observational proposal to image planet Halirrhothius can be avoided. And planet Medusa would be just short of petrifying some. I am aware that this is subjective, and other persons would have different aesthetic sensitivities. However, I could not avoid it and will not pretend I did. Though I notice that when reading the names

[3] `http://nuclearvacuum.wikia.com/wiki/Names_for_extrasolar_planets`

[4] Table 1 can also be found online at `http://www.mpia.de/homes/lyra/planet_naming.html`

[5] Though I add that Nike should be read *nikki*, not *nyke*. Obviously the same applies to Dike, (Sect. 3.49), here stated lest I start getting emails of protest from conservative sects of society.

over and over again, I tend to get used to them. In fact, I am already starting to like the sound of Halirrhothius. I invite the reader to do the same exercise with unappetizing names that eventually show up in Table 1.

Another problem is that most names are already used for asteroids. Repetition in this case is unavoidable, since, as mentioned before, over 15,000 of them are named, which exhausted most of the mythological names. The policy is certainly not ideal. Yet, it is far from unacceptable. The ambiguity in names is actually already in vogue. Atlas is both a star of the Pleiades and a satellite of Saturn. We may doubly honor a deity in the same way that we may use the same name for cities in different countries. The post office is hardly ever confused between Memphis, Tennessee, and Memphis, Egypt. We also have Paris in Texas, Moscow in Idaho, Dublin in Ohio, London in Ontario, San Jose in California, Panama City in Florida, Birmingham in Alabama, York in Pennsylvania, Manchester in New Hampshire, Cambridge in Massachusetts, and Rome in New York, just to name a few. The point is that the fields are far enough apart that the two homonymous celestial bodies will rarely be mentioned in the same sentence. And should the unlikely case arise, I see little trouble in using a couple more words to clearly state the difference, i.e., "Leda, giant planet of HAT-P-7", and "Leda, minor satellite of Jupiter". However, I do refrain from using names of the major moons. So it is that Triton, Titan, and the Galilean moons shall not be used.

There are two points where I deviate from the norm of associating the planet name with the myth of the constellation where the host star pertains. The first is in the case of the pulsar planets. In the paucity of visible light, these planets are sunk in darkness, and I suggest they be named after the souls of the damned that inhabit the Tartarus. So it is that I suggest the planets of the pulsar PSR 1257+12 should be named after Sisyphus, Ixion, and Tantalus. The other deviation refers to planets that were already nicknamed after mythological figures. Take for instance HD 209458 b, one of the most studied planets. It was nicknamed Osiris. Being such a studied planet, I was tempted to suggest the name of one of the Olympians, and thought of Minerva, for her role in the myth of Pegasus. However, keeping the original name seems a good course of action. The name Osiris, though not associated with a constellation, is mythological, and has already found a considerable degree of acceptance among the general public. The same can be said of Gliese 581 c, nicknamed Ymir, as well as PSR B1620-26, nicknamed Methuselah. The name Osiris was given because of HD 209458 b's evaporating atmosphere. Ymir because it is possible that Gliese 581 c is an icy-rocky world, and Methuselah because PSR B1620-26 is thought to be extremely old.

2.1. Comparison between this and Moore's suggestion

In Moore's webpage, as mentioned, ~50 planet names were already suggested. I acknowledge Moore for anticipating in some way the method that I propose here, i.e., naming the planets after some association, even loose, to the constellation of the host star. So it is that the quadruple system around Gliese 581, in the constellation of Libra, may as well be named after Themis, the Titanian goddess of justice, and her offspring, the Horae. Eirene (peace), Dike (trial), and Eunomia (rule of law). Moore had already suggested Dike for the planet 23 Librae b, but to have Themis' offspring following her seems a more natural choice. Another point of coincidental agreement regards the already mentioned planets around Upsilon Andromedae. Both Moore and I independently found it natural to name them after the descendants of Andromeda. We only chose different sons. While he chooses Alcaeus and the confusing name of Electryon, I prefer Heleus, Mestor, and Cynurus. It is my sincere hope that the discoverers find them better than Fourpiter, Twopiter, and Dinky.

A point that I disagree, however, is the policy of reserving a good name for yet-to-be-discovered planets. Moore does so with Orpheus, reserving the name for a planet around Vega. I am not insensitive to the poetry of the choice. Not only Vega is the brightest star of Orpheus' instrument, Lyra, the lyre, but it will also soon leave the main sequence. Vega's death would sink planet Orpheus into darkness, thus astronomically mimicking his famous descent into the underworld. Yet, no matter how likely, we cannot pre-assume that a planet will be found in Vega. I instead use Orpheus to name the planet HD 173416 b, also in Lyra. Below I discuss another main point of disagreement.

2.2. Non Roman-Greek mythologies

Many of the names suggested by Moore come from other mythologies rather than Roman-Greek. In particular, some of the planets were dubbed Yahweh, Jehovah, and Satan; perhaps following the "Metuselah" suggestion for the planet PSR B1620-26 b. I argue that names from Judeo-Christian tradition are to be avoided, due to their still widespread acceptance through the world in the current age. Adherents of the Abrahamic religions - and they go by the billions - certainly will not appreciate a planet named after Lucifer, and most likely will not like to see the name of their supreme deity being given to a ball of rotating gas.

The discussion about keeping or not keeping the classic tradition is by no means new. Galileo named the satellites he discovered *Medicia Sidera*, after his patron. Cassini followed his exampled and named the satellites of Saturn that he discovered *Sidera Lodoicea* (Louisian Stars), after king Louis XIV of France, also his patron. The naming of Uranus and Neptune is a fascinating chapter in the history of Astronomy, and to that I refer the reader to the excellent essays of Gingerish (1958) and Kollerstrom (2009). It suffices to say that the former was known as "George's star", "George's planet" or "Herschell" well into the mid-19th century, and the latter went by the name "Le Verrier" even though Le Verrier himself suggested the name by which we call it today.

The main argument given at the time for not keeping the mythological tradition was based on the fact that the classical planets (i.e., up to Saturn) were named by the ancients after their gods in an era long gone. William Herschel is quoted as saying that "In the present more philosophical era it would hardly be allowable to have recourse to the same method" (Dreyer 1912). Bode, however, argued for continuity, and remarked that just as Saturn was the father of Jupiter, the new planet should be named after the father of Saturn, Uranus. Uranus was also the consort of Gaia, the Earth. Since Venus sprang from Uranus, and both Mercury and Mars are Jupiter's children, the planets would coherently represent the mythological family.

Of course, that debate revolved around whether or not Roman-Greek classical tradition should be continued, whereas here the discussion is whether or not to include other mythologies rather than Roman-Greek. However, we can once again invoke Bode's argument. The method proposed here is to name the planets after some association to the constellation of the host star. As the constellations defined by the IAU are based on the Roman-Greek myths, the use of non Roman-Greek mythological names would break the coherency of the system.

There is one important exception though, occupying almost half of the sky. It is that of the southern constellations, most of which have no mythological connection. In these cases, if a suitable association can be found, names from other mythologies may be used without abandoning coherency. Moore also touches this point, for example, when suggesting a planet in Vulpecula, the fox, be called Anubis, after the jackal-headed Egyptian deity. He also suggests the name Qilin, after the Chinese mythical animal, for a planet in Monoceros, the unicorn. However, neither a jackal is a fox nor the qilin a unicorn, so I do not use these names. Nevertheless, loose associations with other mythologies are welcome and desirable, since they maximize the available names.

Further associations may be drawn from the fact that many Roman-Greek heroes, gods and demigods find counterparts in other mythologies. For instance, in Norse mythology, Odin plays the role of Jupiter, Tyr that of Mars, Hela the role of Pluto, Freya that of Venus, Njord that of Neptune, and Sigurd (Sigfried) that of Hercules. Sun-gods feature in most mythologies and may thus be easily associated whenever Helios is invoked. Also, the naming system is of associations between myth and constellation, so nothing impedes associations with the way other ancient cultures divided the sky. For instance, Orion is Gilgamesh in Sumerian mythology. Chinese and Indians also divided the sky differently, and names may be draw from Chinese or Vedic mythologies according to those constellations. Name suggestions from astronomers better acquainted with these mythologies are of course welcome.

However, even though I am sympathetic to the inclusion of Norse, Egyptian, and Sumerian mythologies (to name the most popular ones after Roman-Greek), as long as they do not break the symmetry of the system, attention should be draw to the fact that it is not obvious where to draw the line on which mythologies to include and which not to. In the case of the trans-Neptunian objects, names such as Makemake (from Easter Island mythology) and Haumea (from Inuit mythology) were adopted. But one particular insight that usually goes unstated is that the well-intended honoring may instead be embarrassing for cultures that, unlike the Greeks, are not used to the international spotlight. I do not know what the feelings of the inhabitants of Easter Island and Greenland are on this particular subject, but I suspect most Brazilians would object to a planet named after the Headless Mule.

2.3. The southern constellations

The classical constellations described in the Almagest (Ptolomey 148) were of course drawn over the stars visible from the mid-latitudes of the northern hemisphere only. For these, the myths where to look for prospective names are obvious. However, most of the austral constellations defined during the Age of Navigation have no mythological association. I acknowledge Moore for also touching the important point of what to do with them.

The step here is to find an association between them and classical mythology. An obvious one is Horologium, the hourglass. He suggested Cronus, Greek name of Saturn, Titan god of time, for the planet of Iota Horologii. I agree with the suggestion. These constellations deserve further discourse.

2.3.1. Plancius' constellations

Petrus Plancius, Dutch cartographer and uranographer, mapped the stars of the southern sky into new constellations. He asked a navigator to draw the positions of the stars around the south pole, and arranged these stars as he saw fit. Those were later published by Johann Bayer in his sky atlas, the Uranometria (Bayer 1603). Of these constellations, twelve have become standard.

The drawback is that Plancius referred these constellations not to mythology, but to natural history. To that he added Indus, the Indian. Both follow the enthusiasm of the time over the newly discovered lands. His constellations are Apus, the bird of paradise; Chamaeleon; Dorado, the goldfish; Grus, the crane; Hydrus, the small water snake; Indus, the Indian; Musca, the Fly; Pavo, the Peacock; Phoenix; Triangulum Australe, the southern triangle; Tucana, the toucan; and Volans, the flying fish. He later also defined Columba, the dove.

These constellations are easily associated with Roman-Greek mythology. The sea animals may draw from the myth of Neptune. The land animals from Diana or Mercury. Diana for her role as protector of wildlife (in spite of being a hunter herself), Mercury for this role as protector of shepherds and flock animals (in spite of being a trickster himself). Grus (Sect. 3.39), Pavo (Sect. 3.61), Phoenix (Sect. 3.64), and Columba (Sect. 3.24) have other interesting associations on their own, namely with the Deluge, Juno, and Helios, respectively. Triangulum (Sect. 3.80), Indus (Sect. 3.44), and Hydrus (Sect. 3.43) also draw from other associations.

2.3.2. Lacaille's constellations

Nicolas Lacaille, french astronomer, performed observations of the southern sky from South Africa, from where he catalogued many stars and defined new constellations (Lacaille 1763). Fourteen of these are still with us today. These are namely Antlia, the pump; Caelum, the chisel; Circinus, the drawing compass; Fornax, the furnace; Horologium, the hourglass; Mensa, the table; Microscopium; Norma, the square; Octans, after the astronomical octant; Pictor, for the painter's easel; Pyxis, the mariner compass; Reticulum, Sculptor, and Telescopium.

As can be seen, Lacaille followed Plancius in discontinuing the mythological tradition and named these faint regions of the sky mainly after scientific inventions of the time (Mensa is named after the Table Mountains, in South Africa, that impressed him. Lacaille is further credited to splitting the gigantic constellation of Argo Navis into Carina, Puppis, and Vela).

I propose here to in some way revert this action and name planets in these non-mythological, engineer-related, constellations, after inventors in the Greek myths. The

first among them is of course Vulcan, the Olympian smith-god. Other god is Mercury, who invented the lyre, coinage, weights and measures, also sometimes related to sciences and inventions. Minerva, of course, goddess of wisdom, reverenced in most universities. Among mortals, Daedalus, father of Icarus, who constructed the labyrinth to trap the Minotaur, and also attempted flight. Yet another is Palamedes, who invented the dice during the siege of Troy according to Sophocles; Philoctetes, a master-archer, who invented other types of bow.

2.3.3. Hevelius' constellations

Johannes Hevelius defined ten new constellations (Hevelius 1690), seven of which are still in use today. Two of them are Canis Venatici, the hunting hounds, that he separated from Bootes; and Leo Minor, that he separated from Leo and defined as a lion cub that accompanies it. The other five of the new ones are Lacerta, the lizard; Lynx; Scutum, the shield; Sextans; and Vulpecula, the fox.

Canes Venatici and Leo Minor have their mythological associations bound to the constellations whence they sprung. He did not devise mythological associations for the other five, but we can establish them nonetheless. As animals, Lacerta, Lynx, and Vulpecula could be associated with Diana and Mercury, as suggested in Sect. 2.3.1. However, Lynx and Lacerta better resonate with Ceres, who transformed Lyncus, the king of Scythia, into a lynx. In another myth, she transformed Abas, a prince of Eleusis, into a lizard. Vulpecula finds echo with the myth of the Teumessian fox. Scutum has no planets discovered there yet, but as a shield, could be linked to Vulcan. As for Sextans, its being an instrument and thus fruit of human intelligence, allows for an association with Minerva. For its astronomical relevance, with Apollo. However, I prefer to use names from the epics of navigation, the Odyssey being the most famous.

2.4. Navigation Myths and the Age of Discoveries

The sources of names here proposed for the planets naturally come from the classical references of Roman-Greek mythology. Theogony (Hesiod ca700BC), the Iliad (Homer ca800BCa), the Odyssey (Homer ca800BCb), Argonautica (Apollonius ca250BC), the Aeneid (Virgil 19BC), and Metamorphoses (Ovid 8AD). The whole problem with the southern constellations is that they were drawn almost two thousand years later, during the Ages of Discoveries, when those stars were first seen by inhabitants of the Northern hemisphere.

As such, I am inclined to consider other sailing myth as well, namely, the Lusiad (Camões 1572). This masterpiece of Portuguese literature[6] by Luis de Camões (anglicized *Camoens*) tells the story of Vasco da Gama's sailing to India in much the same spirit of Homer's Odyssey and Virgil's Aeneid, i.e., as a tale of dispute between the Greek gods, and how they interfere on and control human affairs. Pertaining to the Renaissance, it is not part of standard classical Roman-Greek mythology. Yet Thomas Bulfinch found it an epic of enough importance to mention it in his *Age of Fable* (Bulfinch 1855).

The long poem starts after Vasco da Gama had already set sail to uncharted waters. Jupiter recognizes that this represents the coming of a new age in human history, the Age of Discovery, and summons a council of the Olympians to decide if they should help da Gama on reaching his goal. Jupiter gives his consent, as he knows that the Portuguese are destined by the Fates to reach the Indies. However, Bacchus fears that his cult will lose power if da Gama succeeds, and disagrees with the decision of Jupiter. Venus favors da Gama, as she sees the Portuguese as successors of the Romans, and knows that they will worship her as fervently as the ancients. A heated discussion soon starts, with the other gods taking either Venus or Bacchus' side, until Mars aggressively takes the word. He also takes the side of the Portuguese (for love of Venus or proud of the courageous sailors), and reminds the others that Jupiter had already decided. Jupiter agrees, and the council is finished. The gods will help da Gama in his way to the Indies, while Bacchus, the main antagonist, tries in infinite ways to stop him. The epic is full of mythological allegories, such as Venus sending her nymphs to seduce the winds, thus easing the voyage, a Gigante guarding the Cape of Good Hope, and a Homeric invocation to the nymphs of the river Tagus in the very first page. It draws from classic tradition even in geometry: the climax, the arrival in India, was placed at the point in the poem that divides the work according to the golden ratio.

Pertaining to the time when the southern constellations were drawn, it is well suited to the role of source of names to their planets, without invoking non-classical themes. Using a text written in the Renaissance for a constellation defined in the Renaissance provides a pleasant satisfaction for anyone who admires symmetry.

I am aware that by including the Lusiad I might be opening the door to other myths rather than classic ones, but I once again stress that I choose the Lusiad explicitly because it is unique in Renaissance literature in its close association with the Greek myths. Other works (renaissantist or not) such as France's *The Song of Roland*[7], Germany's *Song of the Nibelungs*[8], Italy's *Divine Comedy* (Alighieri 1321), Spain's *Don Quixote* (Cervantes 1605, 1615), Hungary's *Siege of Sziget* (Zrínyi 1651), or Finland's *The Kalevala* (Lönnrot 1849), to name some, do not meet this requisite.

There is one, though, that does. It is *The Columbiad*, written by Joel Barlow (1807). Written in the early 19th century, it aspired to be a national epic to the nascent USA. Like in the Lusiad, it tells a modern sailing voyage in classic style. The voyage is of course that of Columbus and the discovery of the New World. Also drawing from Roman-Greek mythology, Hesper(is), the Evening (thus West) appears in vision to Columbus. Inspired by that vison, he sails West. Naturally, Hesperis symbolizes the undiscovered lands of the American continent. Unlike the Lusiad, though, it did not gain the same popularity among its countrymen. One source (Vickers 1998) is quoted as saying that Barlow's heroic couplets "attempt to emulate the more skill-

[6] The fact that many Portuguese astronomers are formerly or currently associated with the Geneva group did not affect my choice to include the Lusiad. If it also serves the purpose of homage, so be it.

[7] Unknown author, ca.1150

[8] Unknown author, ca.1200. Even though the Nibelungenlied is excluded due its lack of association with Roman-Greek mythology, it can later be included due to the presence of Norse mythology.

ful Alexander Pope". His reception aside, the classical inspiration of the Columbiad suffices for the purpose of this essay. Furthermore, just as the Lusiad is an excellent association for Mensa (Sect. 3.53), the Columbiad pairs neatly with the constellation of Indus (Sect. 3.44), the Indian, that represents a native of the Americas.

2.5. Former constellations

In two cases, Camelopardalis (Sect. 3.11) and Microscopium (Sect. 3.54), I made use of former constellations defined in the same area of the sky. This was because these former constellations allowed for better mythological associations. In Camelopardalis, the giraffe, I used Custos Messium, the harvest keeper, defined by Lalande [9], that gives a good connection to Ceres.

In Microscopium I preferred to use Globus Aerostaticus (hot air balloon), another constellation drawn by Lalande. The balloon reminds us of mankind's attempts to fly, and thus to the myth of Daedalus and Icarus.

3. The planets per constellation

3.1. Andromeda

Andromeda, named after the Ethiopian princess, offered in sacrifice and later saved by Perseus, has an obvious mythological association. I suggest the planets around stars of that constellation be named after the descendants of Perseus and Andromeda. They are seven sons, Cynurus, Perses, Alcaeus, Heleus, Mestor, Sthenelus, and Electryon; and two daughter, Gorgophone, and Autochtoe. The dynasty of the Perseus and Andromeda, the Perseids, has a profusion of legends where to draw further names from.

3.2. Antlia

Antlia, the air pump, is a constellation invented by Lacaille, who, as mentioned in Sect. 2.3.2, discontinued the tradition of mythological names. As explained in that section, I propose to name planets in his constellations after inventors in the classical myths. I pick here Palamedes for the planet of HD 93083. As a fighter in the Trojan War, his myth has a reasonable length where to draw more names. Vulcan, Mercury, Minerva, and other inventors can be other sources as well.

3.3. Apus

Apus, the bird of paradise, is one of the constellations defined by Plancius. As a bird, it should be draw association with Diana, the hunter goddess and also protector of wildlife in general. The planet around HD 131664 in Apus could then be called Virbius (Roman counterpart of Hyppolytus), a fair hero (or god in the Roman version) who spent his days hunting with Diana.

3.4. Aquarius

The constellation of Aquarius represents Ganymede, the cup-bearer of the gods. His family tree therefore provides a good source of names for the planets in the constellation. The planets of Gliese 876 could be named Dardanus, Tros, and Ilus, after his great-grandfather, father, and brother, the founders of Dardania, Tros, and Illium, the three villages that amalgamated into Troy. The associated with Troy provides yet another source of names for futurely discovered planets.

Other planets could be called Assaracus (the other brother of Ganymede); Themiste, his niece, daughter of Ilus; Capys, his nephew, son of Assaracus and Aigesta (or Themiste, according to a variant of the legend). Other related character is Teucrus, after whom the land Teucria was named. Teucria is the former name of Dardania, and is yet another name for the Troad.

In another variant, the figure in the constellation is Deucalion, the water being poured representing the Deluge. I prefer to keep Aquarius as Ganymede, the more accepted version, and associate Decaulion with the constellation of Grus (Sect. 3.39)

3.5. Aquila

Aquila, the Eagle, appears three times in Greek mythology. First, it is the eagle that carried Jupiter's thunderbolts in the ten-year fight against his father Saturn and the Titans for the control of the world. Later, it is the eagle (or Jupiter himself in the shape on an eagle) that abducted Ganymede to Mount Olympus. In a third appearance, it is Ethon, the eagle sent by Jupiter to torture Prometheus by repeatedly eating his liver day by day.

As the myth of Ganymede is already used in Aquarius, the latter is a more useful source of names, embodied in the fascinating myth of Prometheus. Son of Iapetus, one of the Titans, Prometheus created mankind from clay, also giving them reason. The Olympics did not think much of the new integrants of the world, and actually welcomed the rituals of sacrifices and honor and reverence to them. The balance, however, tilted when Prometheus stole the fire of the gods and gave it to men. Men now did not need to fear cold or darkness, they could cook their grains, roast their meat, forge their weapons. Suddenly they were less dependent on the gods. The Olympics feared that men could eventually take their place on the command of the world, as they supplanted the Titans before them. Mankind's paradise had to be destroyed, and Prometheus punished for the crime of creating a race that rivaled the gods.

Ethon and Prometheus are obvious choices of name. Other is Epimetheus, Prometheus brother. Pandora does not strike as a planet's name, but Pithos, Pandora's box, could feature, as well as its most precious contents, Elpis, hope in ancient Greek. Prometheus was chained by Cratos, Bia, and Vulcan, on top of a mount in the Caucasus.

Bia (force) and Cratos (power) are two of four siblings, the other two being Nike (victory) and Zelus (zeal). The former is associated with Minerva, and should be reserved for her. Zelus fits, although the name closely resembles "celo" (jealousy) and "zelo" (zeal) in Spanish and Portuguese, respectively. Of course, there is no surprise, since the etymology of both words come from the Greek deity. I also suggest to name one of the planets after the mount where Prometheus was chained. The mount is usually associated with Mount Elbrus, the highest mount in the Caucasus.

[9] `http://en.wikipedia.org/wiki/Former_constellations`

3.6. Ara

Ara, the Altar, is associated with the altar of Lycaon, king of Arcadia, who slaughtered and dismembered one of his 50 sons, offering the flesh in a banquet to the gods. Jupiter restored the dead son to life, and punished Lycaon by striking the remaining 49 with lightning, and changing him into a werewolf. There are many different versions of the myth, one states that the offered child was Arcas, other that it was Nyctimus. In another version, the 49 remaining children were not killed, but also turned into wolves. In any case, we have enough names to choose from the kin of Lycaon. For the seven planets discovered in Ara, I suggest Pelasgus, Phassus, Nyctimus, Peucetis, Caucon, Cynaethus, Stymphalus, Melaeneus, Eumon, and Mantineus.

3.7. Aries

Aries represents Chrysomallos, the winged ram with golden fleece. It features prominently in the myth of Jason and the Argonauts, as the main goal of the expedition. As I reserve most of the myth for the constellation of Puppis, Vela, and Carina (the parts of the Argo), here I use only part of the myth of Aries that not associated with the Argonauts. As with Pegasus and Bellerophon, it is natural to associated a planet with the character(s) who rode Aries. In this case, it is Phrixus, son of Athamas and Nephele, the cloud goddess made by Jupiter in the shape of Juno, also mother of the centaurs. Nephele sent Aries to save Phrixus and his twin sister, Helle, from their evil stepmother Ino, who plotted to kill them. Phrixus flew to Colchis, where he was adopted by king Aeetes. There he married Chalciope, daughter of Aeetes, and sacrificed Aries to Jupiter.

We already have in this paragraph seven names for the planets found in Aries to date. The planets in the triple system around HIP 14810 can be named Phrixus, Helle, and Chrysomallos, thus the planets revolving around the star share a mythological resemblance with the flight of the twins on the back of the winged ram. In the myth, Helle fell and drowned in the Dardanelles, which is where the ancient name of the strait, Hellespont, comes from. HIP 14810d, the lighter and most eccentric of the three planets, can be named after her.

The planets around HD 12661 can be named Aeetes and Chalciope, after Phrixus new family in Colchis, while HD 20367 b can be named Colchis itself. The planet around 30 Ari B can be named Ino. The name Athamas can be reserved for a planet futurely found in the constellation. Nephele better fits with the centaurs, her more famous offspring.

3.8. Auriga

Auriga, the charioteer, usually represents the blacksmith god Vulcan. Planet Vulcan has become sort of a running gag in astronomy. It was the name given to a hypothetical planet supposed to exist in an intra-Mercurian orbit, the inner solar system equivalent to Planet X (not Pluto). Before Einstein's general relativity, a hypothetical planet was the favored explanation for the precession of Mercury's perihelion. Le Verrier called it Vulcan and calculated its orbit. His success with Neptune prompted a search and soon transits of Vulcan were reported. Le Verrier died convinced that he had discovered yet another planet, but in the end, no conclusively evidence of Vulcan could be found. The name nevertheless stuck with both with the general public and among astronomers, since the blacksmith god is such a good name for an object so close to a star. The former included a planet Vulcan in the series Star Trek, while the latter are still looking for hypothetical Vulcanoid asteroids between the Sun and Mercury. It was even suggested that the whole class of Hot Jupiters should be called "Vulcan Planets". It seems that we are just dying to use the name.

So here it is. The transiting planet WASP-12 b seems the best proxy of the class of Hot Jupiters among the planets discovered in Auriga. With a mass of 1.41 M_J, and a semi-major axis 0.0229 AU, it circles the star in 1.09 day. This scorched hot planet in Auriga certainly deserves the title of Vulcan. Since his beautiful wife Venus already lies in the Solar system, it seems fair that the smith god should have the benefit of Aglaia, the youngest of the three Graces, who is attributed to be his wife in a variant of the myth. Lemnos, the place where he landed when thrown from Olympus by his sweet of a mother; and Lycia, the place where his cult originated, are also good choices. Euthenia, one of his daughters with Aglaia closes the list of names for Auriga.

3.9. Bootes

The constellation of Bootes, or herdsman, has no clear representation. In Roman-Greek mythology he is Arcas, the son of Callisto and Jupiter, whereas others interpret it as being Icarius (not Icarus), a herdsman who was taught the art of wine-making by Bacchus himself. Yet another interpretation has him as Atlas, who carried the world on his shoulders. The ambiguity is welcome, since the constellation is large. Arcas is also said to be Ursa Minor since, in a variant of the myth, Jupiter transformed both Callisto and Arcas into bears. Arcas lends its name to Arcadia, region of Greece famous for its bucolic lifestyle. Arcadia is also where the cult of Apollo flourished, as well as the region where Mount Cyllene, the birthplace of Mercury, stands. Mercury's mortal mother, Maia, also raised Arcas in a variant of the myth. Since Bacchus already appears in the constellation, we save Mercury for Lyra, the lyre, the instrument that he invented. Apollo has no clear strong association with any constellation (and loose associations with many), so I refrain from using his myth here as well.

I propose to name the planets of Bootis after Arcas (tau Boo b), Atlas (HD 128311 b), and Bacchus (HD 132406 b). Other names are Arcadia for WASP-14 b, and Pramnos for HAT-P-4 b. The second planet of HD 128311 could be called Aithra, after the Oceanid nymph with whom Atlas begot the Hyades.

Atlas is purposely included. It is already a name given to a star of the Pleiades, a satellite of Saturn, and a crater on the Moon. It illustrates that the same designation does not cause confusion since the objects pertain to different fields of study.

3.10. Caelum

Caelum, the chisel, contains no known planet-hosting stars as of Feb 2010. As an art-related constellations, names can be drawn from Apollo's myth.

3.11. Camelopardalis

Camelopardalis, the giraffe, is a constellation created by Plancius. As a land animal, names for planets should be drawn from Diana's myth.

Egeria, a nymph associated with Diana. Triklaria, one of her titles, and Ephesia, after her main local of adoration, may as well appear as names for planets in this constellation.

A loose association can be established with Ceres or other agricultural deities, as mentioned in Sect. 2.5. I therefore suggest one of the planets be called Opalia, after the festivities to the goddess Ops. Ops, mother of Ceres, is the Roman equivalent to Rhea, mother of Demeter (Cybele was actually her name in Phrigya).

3.12. Cancer

Cancer, the crab, plays a minor role in Greek-Roman mythology, namely, in Hercules' twelve labors. While Hercules was fighting the Hydra of Lerna, Juno sent a crab to distract him. Hercules simply crushed the insignificant creature. Grateful for the crab's effort, Juno gave it a place in sky.

The connection with the Hydra allows for associating Cancer with the region of Lerna, full of mythological detail. The Danaids, for instance, buried in Lerna the heads of their husbands. I take three names from the Danaids, Anthelea, Stygne, and Euippe. From Juno we may take two of her titles, Argive, and Teleia,

For the planet recently discovered around HD 73534, I draw again from the Danaids, and suggest the name of Pirene.

3.13. Canes Venatici

Canes Venatici, the hunting hounds, is a spurious constellation. Historically part of Bootis, it was mistranslated from Greek (as cudgel) to Arabic (hook) and once again from Arabic back to Latin (dogs). Hevelius (1690) formalized them as Bootes' hunting hounds, Asterion and Chara. Asterion is now known as Cor Caroli, which releases the name to planetary use. The only planet-hosting star in the constellation is HAT-P-12. I propose its planet be called Asterion, after the old name of Cor Caroli.

3.14. Canis Major

Canis Major represents the dogs of Orion, the mighty hunter. One source cites them as Leucomelaena, Maera, Dromis, Cisseta, Lampuris, Lycoctonus, Ptoophagus, and Arctophonus. We get the first six names. The constellation has a profusion of variants, maybe representing Laelaps, the mythological dog who never failed to catch a prey; maybe the hound of Procris, a nymph of Diana; or the mightily fast dog given by Aurora to Cephalus. Laelaps however, appears more prominently in the myth of the Teumessian fox, and therefore we choose to use it for a planet in Vulpecula (Sect. 3.88). In any case, there are plenty of sources for further names in Canis Major, that can as well be applied to Canis Minor, when planets are found there.

3.15. Canis Minor

Canis Minor contains no known planet-hosting stars as of Feb 2010.

3.16. Capricornus

The constellation of Capricornus, the goat, may represent Pan, the powerful Faun, or Amalthea, the goat that nourished the infant Jupiter. I prefer to connect the latter with Monoceros, that lacks other major mythological associations, and use Pan for Capricornus.

Pan is a pastoral deity, guardian of flocks and shepherds. His father was Mercury, who in the shape of a goat conceived him with a doubtful mother. The nymphs Dryope and Oeneis; Penelope, the wife of Ulysses; and even Amalthea herself, are mentioned in different versions of the myth. As a Faun, Pan is depicted as a man with horns, tail and feet of a goat. He lived among the nymphs, and claimed to have seduced many of them. One, Syrinx, was not so interested and fled in terror. She was turned into a clump of reeds, from which Pan made a pipe, syrinx, the pan flute. Echo, usually associated with Narcissus, was also loved by Pan in a variant of her myth.

The connection between Pan and Capricornus comes from the episode where he leapt into the Nile to escape Typhon as Jupiter struggled with the monster. His head became that of a goat, and his hindquarters the rear part of a fish. He was later elevated to the skies as Capricornus. The constellation is referred sometimes to as the "sea-goat" because of it. But the name in Latin, capri-cornus, translates simply as goat-horn.

I propose to name the three planets known in Capricornus Syrinx, Echo, and Dryope. Pan itself is not used since it is already a moon of Saturn. Actually, the main reason is subjective. Pan is homophonous to the widely used Greek word *pan*, to which the god has no connection. Echo has the same name as the acoustic phenomenon, but here there is an immediate connection since the phenomenon was named after the nymph or vice-versa.

3.17. Carina

Carina, like Puppis and Vela, is a part of the ancient constellation of Argo Navis, representing the ship of Jason and the Argonauts. Due to its immense size, Navis was divided by Lacaille (1763) into Carina, the keel, Puppis, the poop deck, and Vela, the sails. I will refer to the three of them as Navis or Ship. The myth can be no other than the myth of the Argonauts, the 50-60 heroes who boarded the Argo with Jason in his quest for Aries, the golden Fleece.

I include the name Jason, even though it is a common male name in English-speaking countries (I add though, that the original pronouncing is *Yasson*). Other planets in Carina are obviously named after the Argonauts. Puppis and Vela will naturally draw from the same source.

As the Ship takes a very large fraction of the sky, we expect many planets to be found there. Other sailing myths such as the Iliad and the Lusiad may be used in the future.

3.18. Cassiopeia

Cassiopeia, queen of Ethiopia, once unwisely bragged that she and her daughter Andromeda were fairer than the Nereids. This angered Neptune, that put her near the pole,

where she would spent half of her time upside down. I propose to name the planets in Cassiopeia after the Nereids, to better torment the poor vain queen. Eulimene, Orinthya, and Thetis are my choices for the three known planets.

3.19. Centaurus

The centaurs are well known to astronomers, as the minor bodies between the main belt and the Kuiper belt. As most of them are already designated after a mythological centaur, we have no choice but to used repeated names. However, I reserve Chiron for Sagittarius, the centaur usually associated with that constellation. In his place I include Nephele, the mother of the Centaurs.

3.20. Cepheus

Cepheus, Andromeda's father, is a constellation where just one planet has been confirmed. I propose to name it after Dannaus, Cepheus' brother.

3.21. Cetus

Cetus, the whale, is the sea monster sent by Neptune to terrorize the coast of Ethiopia in order to punish Cassiopeia for her arrogance. Cetus plays a non-negligible role in Greek mythology as she and her consort Phorcyd, a primordial sea god, sprang many other monsters, collectively called the Phorcyds. I propose they should name the planets circling stars in that constellation. Scylla, a six-headed monster; Stheno and Euryale, two of the Gorgons (the other being Medusa); Echidna, usually the mother of all monsters, but according to a variant of the legend also an offspring of Cetus; Deino, one of the Graeae, three horrible sisters that shared one eye and one tooth among them; and Thoosa, mother of the cyclops Polyphemus. Scylla also naturally brings Charybdis, the sea monster with whom she teams up on the task of dooming unadverted sailors.

Cetus is a part of the sky called the Sea, for the profusion of water-related constellations. As such, I strongly encourage the name of Ulysses for one of its planets, in honor of the hero who navigated through all these dangers. However, I use his Greek name Odysseus, since Ulysses is a semi-common male name. Planet Odysseus could be a planet of one of the double systems, HD 11964, so that the other planet is named after his son, Telemachus. The other double system, HD 11506, naturally goes to Scylla and Charybdis. The two most recent ones can be named after Callidice, wife of Odysseus during his voyage to Thesprotia, and Polypoites, their son. The presence of Odysseus also allows for the addition of characters of the Odyssey as more planets are discovered in the Sea. This area of the sky includes Cetus, Aquarius, Pisces, Piscis Austrinus, Eridanus, Delphinus, and Hydra. Some also include Navis, Crater, and Capricornus.

Whales also feature prominently in other mythologies. The Tlingit people of northwest North American tell the story of the hero Natsihlane, who created the Orca, carving it out of wood. It is a good name for the planet HD 1461 b.

3.22. Chamaeleon

Chamaeleon is one of Plancius' constellations. Being an animal, it welcomes a connection with Diana. However, I am inclined to first associate it with Proteus, son of Neptune. Proteus can tell the future, but will only tell it to someone who is capable of capturing him. To avoid that, he changes his shape.

Although shape-shifting is a common theme in Greek mythology, Proteus is the one deity mostly associated with it, as *protean* came to mean "versatile", and carries a positive connection of flexibility, versatility and adaptability, much in the same way as someone can be described as a "chameleon". It also allows to use the myth of Neptune, quite underrepresented so far, instead of Diana, who will be shared among many animal-related constellations. Nereus also has the ability to shape-shift, and may be used as well. He also figures in a version of the myth as Proteus father, the mother being a Naiad, nymphs of springs and fresh water.

As said in Sect. 2, I refrain from using the names of major moons. But Naiad is only a smaller moon of Neptune. It may as well figure as a planet with no major source of confusion.

3.23. Circinus

Circinus, the drafting compass, is one of Lacaille's constellations, and contains no mythological association. As of Feb 2010, one planet has been found orbiting a star in Circinus, HD 129445 b. Used to draw circles, it strongly suggests an association with geometry, hence with Minerva or Apollo (see Sect. 3.80). Yet, I will make use of a spin to illustrate the flexibility of the constellation-myth naming scheme. There is a mnemonic in Greek to remember the first numbers of π. It is a so-called "piem", a (pi-)"poem" in which the number of letters in each word is equal to the corresponding digit of π. The first sentence reads

Αεὶ ὁ θεὸς ὁ μέγας γεομετρεῖ τό σύμπαν,

whence it can be seen that the number of letters in each word is 3-1-4-1-5-9-2-6, the first numbers in the sequence of π. The spin is the following. The sentence translates into "*Always the great god uses geometry to everything*". The drafting compass is an instrument used to draw circles. The sentence equals it to something that the "great god" always uses. The great god being Jupiter, its "instrument" is the lightning, the weapon the god always bears. The lightning reminds us of Thor, the thunder-god of Norse mythology. Its instrument is Mjöllnir, the mighty hammer. Mjöllnir can thus be used as a name for HD 129445 b, and further planets in Circinus may draw names from Thor's many battles. Far-fetched? Precisely.

3.24. Columba

Columba, the dove, is one of Plancius' constellations. He named it after the dove of Noah, that gave him the information that the Flood had stopped. A flood legend also figures in Greek mythology, when Jupiter decided to end the Bronze Age and sent the Deluge. However, I associate that story with Grus (Sect. 3.39), and prefer to associate Columba with a passage of the Lusiad. Camões describes the chariot of Venus as being pulled by swans and surrounded by doves who playfully circle it. He names at least

one, Peristera[10], a nymph converted into a dove by Cupid. That fits well for the only planet discovered so far circling a star in Columba (though the "planet" actually seems to be a brown dwarf). Further discoveries may drawn from the myths of Venus and/or Cupid, like Pisces (Sect. 3.66).

3.25. Coma Berenices

Coma Berenices, or Berenice's Hair, is one of the few constellations that is named after a historical rather than mythological figure, Queen Berenice II of Egypt. However, Eratosthenes referred to it as both Berenice's Hair or Ariadne's Hair. I take the latter to keep the associations mythological.

Ariadne is the daughter of Minos, king of Crete, who ordered the construction of the Labyrinth to hold the Minotaur. This immediately associates the constellation with the myth of Daedalus and Icarus, the Labyrinth's most famous occupants after only the Minotaur himself, and perhaps Theseus, who killed the Minotaur. In the more common version of the myth, Ariadne fell in love with Theseus. In a variant, she is the bride of Bacchus.

Two stars in Coma Berenices are known to have substellar companions, though one of them, HD 114762, is probably circled by a brown dwarf. The other star, HD 108874, harbors a double system. The double system may be called Ariadne and Theseus. The massive planet can be called Naxos, after the island where Bacchus met Ariadne. HD 108874 b is a planet with close Earth-like insolation, so the name of the fair Ariadne is quite fit.

3.26. Corona Austrina

Corona Austrina, the southern crown, contains no known planet-hosting stars as of Feb 2010.

3.27. Corona Borealis

Corona Borealis is associated with a crown that Bacchus gave to Ariadne. Three stars with planets are known there, that I suggest be named after three of their children, Euanthes, Staphylus, and Latramys.

3.28. Corvus

Corvus, the crow, is the bird of Apollo. In the myth the crow as a speaking bird with white feathers, and loyal to the god. The bird was put in charge of watching over Apollo's love, Coronis, who was then pregnant with Asclepius (see Sect. 3.59). The crow witnessed Coronis being unfaithful to him with a mortal, Ischys, and reported it to Apollo. The god was furious, and unjustly turned his anger on the unfortunate bird, scorching his feathers black and removing its ability to speak. He later also had his sister Diana kill Coronis because he could not bear doing it himself.

As of Feb 2010, there is one known planet circling a star in Corvus. I suggest naming it Coronis.

[10] As English is language with a penchant for paroxitones, I explicitly inform that Peristera is a proparoxitone name, which, of course, makes it more beautiful.

3.29. Crater

Crater, the cup, represents the cup of Apollo. The legend does not extend beyond a couple of lines. Corvus serves him water, but lazily brings it with a water snake inside. Apollo angrily throws them all into the sky.

With little to draw from, we may as well associate the constellation with Ganymede again, or Hebe, the cupbearer before him. With Hercules, Hebe had two sons, Alexiares and Aniketus, gatekeepers of Olympus, who may lend their names to the two planets discovered so far in Crater. Hebe herself is too common a name.

3.30. Crux

Crux, the Southern Cross, is a constellation of major significance for navigation in the southern hemisphere. Unlike in the northern hemisphere, the celestial south pole has no bright star to mark its position. However, we can rely on the Southern Cross to point our direction. Its major arm, prolonged 4.5 times, marks the position of the celestial south pole. It is also of cultural significance, appearing in the flags of five countries, namely, Australia, Brazil, New Zealand, Papua New Guinea, and Samoa. In Brazil, where it is known as *Cruzeiro do Sul* or simply *Cruzeiro*, it even featured as the name of the currency (from 1942 to 1986 and again from 1990 to 1994), as well as of a football team. These facts underscore that its main association is not with Christianity, but with *south*.

Two planets are known in Crux, around the stars HD 108147 b, and NGC 4349 No 127 (that a star in a cluster). I suggest to name them after Livas, the Southwest wind, and Apeliotes, the southeast wind. The south wind Noto is used for a planet in Octans, the constellation that contains the south pole.

3.31. Cygnus

Cygnus, the swan, was the disguise used by Zeus to seduce and impregnate Leda, a much used theme in Renaissance art. I suggest the planets of Cygnus be named after Leda and her family. Thestius, her father; Iphicles, Eurypylus, two of her brothers; Althaea, her sister; Timandra, her daughter, and Echemus, Timandra's husband may name the double system of HD 187123. A futurely discovered planet may be named after Cycnus, name of three characters of Greek mythology who were transformed into swans.

Other mythologies also feature characters that were transformed into swans. Examples are Etaine and Mider, from Celtic mythology. These names may be used for the planets Kepler-5 b and Kepler-6 b, found in Cygnus. It also opens a rich mythology where to draw names for the long-awaited Kepler planets. The mission is monitoring 150,000 stars in a small portion of sky comprising Cygnus, Lyra, and Draco. As many planets are expected from the Kepler mission, the inclusion of other mythologies is more than welcome since it maximizes the available names.

3.32. Delphinus

Delphinus, the dolphin, has a minor role in Greek mythology, associated with Arion, a poet of Lesbos allegedly from the 7th century BC. Although his historical existence is a matter of ongoing debate, legendary for sure is the story of his kidnapping, that rendered the association with the dol-

phin. Sailing back home after winning a music competition, the crew of the ship plotted to kill him and steal the prize. His last wish was to play one last song, a hymn to Apollo. The beautiful song attracted dolphins, and he jumped to the sea, being saved by one of them. The story is perhaps inspired in the myth of Melikertes, also associated with the lesser known Roman deity Portunes, god of harbors and ports.

The myth allows for a loose association with Apollo. Although some might argue that Apollo as a solar deity should figure in a zodiacal constellation, the resemblance of the names Delphinus and Delphi, the Oracle of Apollo and the most famous in Greek mythology, somehow suggests the association. I therefore suggest the four planets known in Delphinus to be called Delphi, Apollo, Melikertes, and Portunes.

3.33. Dorado

Dorado is one of the constellations created by Plancius. Dorado or Dourado is the name given to many species of fishes, the best known of them being the goldfish ("dorado" literally means "golden" in Spanish). It is also a major fish of the Amazon. There are two known planets circling stars in Dorado. Being associated with water, I suggest one of them be named Tyro, lover of Enipeus, a river-god. She was also one of the many love adventures of Neptune. The other may as well be named Enipeus.

3.34. Draco

Draco is a constellation representing Ladon, the hundred-headed dragon who guarded the garden of the Hesperides, nymphs of the evening, prominently featured as the 11th labor of Hercules. The names and number of the Hesperides varies according to variants of the myth. I list Aegle, Erysteis, Lipara, and Chrysothemis as possible names. Another of the five planets discovered circling a star in Draco can of course be named Ladon.

Also worth noting is that due to the precession of the equinoxes, Draco contained the north celestial pole in the early Bronze Age. In the area of modern-day Draco, the ancient egyptians saw Tawaret. Being the goddess of motherhood in their pantheon, the protective deity was associated with the ever-vigilant constellation that never sets. Her name is well-suited for the planet Kepler-4b, found in Draco. It further illustrates how other mythologies can be easily included in the proposed naming scheme.

3.35. Equuleus

Equuleus, the little horse, contains no known planet-hosting stars as of Feb 2010.

3.36. Eridanus

Eridanus in most versions of the Greek myths is a river that surrounds the world. Virgil, however, lists it as one of the rivers of Hades, the underworld, realm of Pluto. Hades has other five rivers, Acheron, Cocytus, Phlegethon, Lethe, and Styx. These are obvious choices for planets around the stars of Eridanus. Further names can be drawn from the myth of Pluto. In particular, instead of Lethe I include Radhamantus, one of the three judges of Hades. Eachus, other judge, is also included (the third judge is Minos).

3.37. Fornax

Fornax, the furnace, is one of Lacaille's constellations. Being a furnace, it is immediately associated with Vulcan. Aetna, or Etna, after the mountain where his workshop was supposedly located, invites for a naming after volcanos. Lipari, for the association with Vulcan. Milos, a volcano of Greece, and homonomous volcanic island, is welcome since it is also associated with the famous statues Venus of Milo, thus indirectly connecting Vulcan and Venus, as in the myth.

3.38. Gemini

Gemini, represent the twins Castor and Pollux, the dioscuri, sons of Leda. As both are already names of stars, I suggest the names of the other famous twins, Romulus and Remus, the mythical founders of Rome. The third planet in Gemini can be Lupa, the she-wolf that nourished the twins.

The Dioscuri also find counterparts in other mythologies. An example are the Ashvins of Vedic mythology, twin horseman gods that symbolize sunrise and sunset. They are called Nasatya and Dasra, which are also good names for planets in Gemini. Divine twins are a recurring theme in mythologies across the world, further myths exist for further planets futurely discovered in the constellation.

3.39. Grus

Grus, the bird crane, is one of Plancius' constellations. The crane appears once in classic mythology, associated with the Greek version of the flood, as already mentioned in Columba. When Jupiter was about the send the deluge, Prometheus advised his son Deucalion to build an ark. He and his wife Pyrrha were thus saved from the rising waters. When the deluge was over, Deucalion and Pyrrha consulted the oracle of Themis on how to repopulate the Earth. They were told to throw the bones of their mother over their shoulders. Pyrrha interpret the mother as being the Earth, the bones being stones. The stones Deucalion threw became men; the ones that Pyrrha threw become women.

Other men escaped from perishing in the deluge as well, by clinging to the top of high mountains. One of them was Megarus, who swam to the top of Mount Gerania, following the sound of cranes. There are four planets discovered around stars in Grus, that I suggest should be named Deucalion, Pyrrha, Megarus, and Gerania.

3.40. Hercules

Hercules, as one of the richest myths of ancient Greece, should be a plentiful source of names on its own.

In honor of the herculeous effort of those who discovered the exoplanets, I propose to name these planets after associations with the twelve labors of the hero. The first two, the Nemean Lion and the Lernaean Hydra, already have associated constellations, and should pertain there. But the other ten are there for the taking. I therefore suggest Cerenytis, Erymanthus, Augean, Alpheus, Peneus, Stymphalia, Diomedes, Geryon, and Cerberus.

It is worth noting that although Cerberus could figure in Eridanus, associated with Hades, it also fits well in Hercules. The reason is that Cerberus was a former constellation, defined by Hevelius (1690), who envisioned Hercules in the sky struggling with the three-headed dog.

Being an archetypical myth of the strong man, Hercules finds counterparts in virtually every mythology. His Norse version was Sigurd. From his myth I suggest his name and that of his foster father Regin for two planets in Hercules. Some similarities can be also be drawn between Hercules and the Egyptian god Horus, also a rich myth with plenty of names for future planets in Hercules.

3.41. Horologium

Horologium, the hourglass, is a modern constellation. As it associated with time, I can think of no other but Cronus, Saturn's Greek name, for the planet of HR 810, Iota Horologii, the only known planet-hosting star in that constellation.

3.42. Hydra

The constellation of Hydra, representing the Lernaean Hydra, deserves some pause. Hydra figures only as the 2nd labor of Hercules, yet it is the biggest of the 88 constellations. Even though Lerna is full of mythological detail, I feel forced to also use the constellation's association with the Sea, in order to maximize the possibilities of names for the constellation. So it is that apart from Lerna, I summon first some Nereids. Amphitrite, Galatea, Pasithea, Nausithoe, Menippe, Thaleia, Spio, Ianira, and Asia. Yes, Asia. The continent is named after her, just like Europe is named after Europa, another nymph, that also named the second Galilean moon. Also considering the difference in size between the continents, it sounds reasonable that if a moon is named after Europa, that a planet should be named Asia. Lest someone gets excited on the other side of the Atlantic, Vespucci was a sea man, not a sea beauty.

As said in Cancer, Lerna has other mythological significances. The Danaids, for instance, buried in Lerna the heads of their husbands. To complete the naming of the known planets in Hydra, we may use three Danaids, Adiante, Amymone, and Hyperippe. Amymone also resonates with the Hydra itself, since the monster had its lair in the spring of Amymone, deep in a cave in Lerna.

Another trick, need it be, and already used in Cancer, is to associate it with Juno. After all, it was her who forced Hercules to execute the labors.

Serpents-like monsters are also a recurring theme in mythologies, which is of course very welcome since the constellation is so big. I suggest Jormungand as a name for a planet in Hydra. In Norse mythology, Jormungand is the sea serpent that surrounds the world, and the nemesis of Thor.

3.43. Hydrus

Hydrus, the water snake, is a new constellation, but associated with the water snake that Corvus brought to Apollo in his cup (see Crater). Apollo angrily threw all of them to the sky. Being nothing but a small annoyance to the god, we may as well name planets in these constellations after another particular nuisance. Delos and Ortygia, his and Diana's places of birth may represent such difficulties. Juno, irritated with yet another love adventure of Jupiter, kidnapped Ilithyia, goddess of childbirth, in order to prevent Leto from going into labor.

3.44. Indus

Indus, the Indian, is one of Plancius' constellations. It represents an Indian, by the time referred to either a native of India or of the Americas. I suggest Hesper, the evening, the setting sun, and thus the Western Hemisphere. The same name is used by Joel Barlow to represent the lands of the American continent in the Columbiad.

3.45. Lacerta

Lacerta, the lizard, has one planet discovered. I suggest it be named after Abas, son of king Celeus and prince of Eleusis (see Linx, Sect. 3.51), who was transformed into a lizard by Ceres. Further names can be drawn from Ceres' myth.

3.46. Leo

Leo represents the Nemean lion, Hercules first labor. It may also be related to Bacchus, since the lion was an animal closely associated with the wine-god. Omphale, who wore the skin of the lion, Lamus, her son with Hercules; and Tmolus, of Omphale. Naturally, Nemea; Elissos, a river in Nemea; Iraklion, former name of Nemea; Lycurgus, kind of Nemea; and Cleoane, near where the Nemean Games took place,

Nemea also figures in the myth of the Seven Against Thebes (Aeschylus 467BC), concerning the battle between an Argive army led by Polynices and the army of Thebes. It is related to the myth of Oedipus and Jocasta, and a good source of future names for Leo and Leo Minor. It was written as a play, and reportedly won the first prize at the City Dyonisia, a large religious festival in ancient Athens in honor of Bacchus. The association with Leo is simple yet sufficient: the Seven pass by Nemea on their way to Thebes. The occurence was not exactly uneventful. It even resulted in a fatality, as described below in Leo Minor.

Lions also feature prominently in other mythologies. The yali, for instance, a mythical lion from Vedic mythology. Nergal, the Sumerian god of the underworld, has the shape of a winged lion with a human head.

3.47. Leo Minor

Leo minor, a lion cub accompanying Leo, has no myth of its own, being completely correlated with Leo. I suggest the name Archemoros for the planet recently discovered around HD 87883. Archemoros was a infant prince of Nemea who died strangled by a snake while his nanny Hypsipyle was off to fetch water to the Seven.

3.48. Lepus

Lepus, the hare, is the favorite prey of Orion and is constantly being hunted by him in the sky. I suggest that the planet around HD 33283 could go by the name of Epimelius. It is one of the many titles of Mercury, Hermes Epimelius, meaning keeper of flocks. Even though the hare

is a not a flock animal, Epimelius can be thought to highlight Mercury's animal welfare attributes in general. Being so routinely hunted by Orion, poor Lepus may be in need of some divine protection.

3.49. Libra

Libra, the weighting scale, can most obviously be associated with Themis, the Titanian who personificates Justice. I therefore propose to name the planets around Gliese 581 after her and the Horae, her daughters with Jupiter. These are Eirene, Dike, and Eunomia, as mentioned in an example in the introduction. Themis and Jupiter also fathered Astraea, the star-maiden, yet another personification of Justice. In a variant of the interpretation of the constellations, she is Virgo, and Libra the scales she carries. I do like to include her in Libra, but Virgo may be associated with a multitude of other goddesses of more relevance. The presence of the Horae also allows for an association with a different set of Horae, the Hours, allegories for the hours of the day. Hesper, already mentioned in Indus (Sect. 3.44), is one of them, representing Evening. We may as well pick Dysis, the Sunset.

Gods and goddesses of justice also feature in other mythologies. Forseti played this role in Norse mythology. It is a suitable name for the planet around HD 134987 c.

3.50. Lupus

Lupus, the wolf, may represent Lycaon, the werewolf, already mentioned in Ara. It was named Therion by Hipparchus (meaning beast). Its two known planets may therefore be named Lycaon and Therion, and further names be used from the myth of Lycaon or other generic beasts of mythology. From Norse mythology, Fenris can be used, after the wolf that eats Odin in the Ragnarok.

3.51. Lynx

Lynx is one of Hevelius' constellations. Although not named after a mythological figure, we can nevertheless draw an association with Lyncus, the king of Scythia, who was transformed into a lynx by Ceres.

When Demeter was looking for Persephone, having taken the form of an old woman called Doso, she received a hospitable welcome from Celeus, king of Eleusis. He asked her to nurse Demophon and Triptolemus, his sons by Metanira. As a gift to Celeus, because of his hospitality, Demeter planned to make Demophon immortal by burning away his mortal spirit in the family hearth every night. She was unable to complete the ritual because Metanira walked in on her one night. Instead, Demeter chose to teach Triptolemus the art of agriculture and, from him, the rest of Greece learned to plant and reap crops.

Lyncus, however, did not want to learn the arts, and tried instead to kill Triptolemus. As a punishment, Ceres turned Lyncus into a lynx.

3.52. Lyra

Lyra, the lyre, appears in many legends, since it is the main musical instrument of the Antiquity. According to the myth, the lyre was invented by Mercury, not long after his birth. The young god stole the cattle of Apollo, and sacrificed one. Making strings out of the stretched entrails of the animal and the arms from the horns, he fashioned the first lyre. Apollo went furious when he noticed the robbery, and went to Mount Cyllene with the intent to punish the trickster. However, Mercury played the lyre, and Apollo got marveled by the sweet sound of the instrument. He forgave Mercury in trade for the lyre, that became one of his main attributes. Indeed, Apollo's importance as patron of music, poetry, and arts predates his later association with Helios as sun-god.

As for mortals, the lyre figures most prominently in the myth of Orpheus. By some considered son of Apollo, Orpheus was taught the instrument by the Muses, and played it to perfection. Jason had him on board of the Argo on advice of Chiron, who said that he would be needed if the Argonauts were ever to pass the Sirens. The Sirens were sea monsters that, disguised as nymphs, played so sweet music that the seafarers were enchanted and lured to their deaths. When the Argo did pass by them, Orpheus drew his lyre. His music was more beautiful than that of the Sirens; so sublime that the bewitching chords went unnoticed by the Argonauts. Orpheus' most known myth, however, is his descent into Hades in the failed attempt to bring back his beloved Eurydice.

The association with Apollo is tempting. However, we are running out of names, and Lyra already has Mercury, Orpheus, and the Sirens as sound sources. Furthermore, Apollo has loose associations with many other constellations, some of which have him as only well-developed myth where to draw names from, as in the case of Delphinus. I therefore propose to name the planets in Lyra after Hermes, Mercury's Greek name; naturally Orpheus and Eurydice; and Siren. As the lyre is an instrument, other names could be Alipes, the winged sandals of Mercury, and Petasus, Mercury's winged hat.

Harp-related myths also feature in other mythologies. In Celtic mythology, for instance, the harp was one of the attributes of the Dadga, the benevolent leader of the pantheon. His harp had two magic names, one of which was Daurdabla. It should be noted that Lyra is the only constellation picturing a musical instrument, so any music-related myth (not only harps especifically) can be associated with it for the purpose of naming planets.

3.53. Mensa

Mensa, the table, is one of Lacaille's constellations, named after Table Mountain near Cape Town, in South Africa, where he spent time observing the southern sky.

This brings an immediate association with Adamastor, the Gigante brother of Enceladus who guards the Cape of Storms in the Lusiad. Adamastor appears as a stormy cloud, sinks the ships that try to round the cape, and dissipates into tears, which are the salty waters of the confluence of the Atlantic and the Indian Oceans. Also known as the Spirit of the Cape, his name is a near-anagram of Cape of Storms in Portuguese, *Cabo das Tormentas*, with suppression of letters. The constellation of Mensa and its association with Cape Town seems a good place for Adamastor, who represents the dangers sailors faced when trying to round the cape. May he now also represent that the stormy challenges of discovery of exoplanets were also turned into good hope.

3.54. Microscopium

Microscopium is one of Lacaille's constellations, with no mythological association. However, Lalande later tried to rename it to Globus Aerostaticus (hot air balloon). As such, it immediately refers to Daedalus, who attempted flight in order to escape the labyrinth he himself erected. Daedalus is also an inventor, so the association with one of the constellations of Lacaille is natural.

However, we may reserve Daedalus for a double system, so that the other planet could be called Icarus. The one in Coma Berenice seemed a good choice, since Ariadne is associated with the myth of the Minotaur. Instead, the double system of CoRot-7 seems better for physical reasons, since CoRot-7 b is the planet with smallest semi-major axis known to date. The planet is also rocky (Queloz et al. 2009), but the temperature on the substellar point is so high (1800-2600K, Léger et al. 2009) that its surface is probably molten on the day side. The name of the boy who flew too close to the Sun while wearing meltable wax wings is a suitable name for such a planet. Due to this, I prefer to abandon Coma Berenice and Microscopium (or the Balloon, for that matter), in favor of loosely associating Daedalus and Icarus with Monoceros.

Planets around Microscopium-Balloon may therefore be named after winged characters of Greek mythology. Alternatively, Perdix (or Talos), Daedalus nephew, may as well figure. He was pushed by Daedalus from a tower, but Minerva saved him by transforming him into the bird of same name. This notorious bird does not build nests on trees. Mindful of falls, it avoids high places. It may represent successful, yet careful, flight, as opposed to the failed and fatal flights of Daedalus and Icarus.

3.55. Monoceros

Monoceros, the unicorn, is one of Plancius' constellations. Unicorns do not appear in Roman-Greek mythology, but in treaties of natural history of the ancient Greeks. Ctesias of Cnidos (5th century BC) appears to be the first to mention them.

A loose association with mythology may be drawn from the myth of the Cornucopia, the horn of plenty. Cornucopia is the broken horn of Amalthea, the goat that nourished the infant Jupiter, as mentioned in Capricornus (Sect. 3.16). As a single-horned goat, Amalthea can be said to be the Greek version of the Unicorn. Although in this case, the magic horn is the missing one.

In Metamorphosis, Ovid has Achelous narrate to Theseus his fight with Hercules for the possession of Dejanira. He transformed himself into a bull to fight the semi-god, but Hercules tore off one of his horns. He trade it with the hero for the horn of Amalthea, which Hercules later gave to the Naiads, the nymphs of fountains and springs. They, in turn, transformed the horn into Cornucopia. It was a magic horn overflowing with fruits and grains. Because of this, it is associated with several agricultural deities, such as Gaia, Cybele, Ceres, and Pluto; as well as with the several river gods and nymphs, as fertilizers of the land.

The fact that Achelous narrates the story to Theseus reminds us of the Minotaur, and hence a loose association with the labyrinth, Daedalus, and Icarus. These can be the names of the planets around CoRoT-7, as explained in Sect. 3.54.

For the other planets in Monoceros, I therefore suggest the names Cornucopia; Achelous; Adamanthea, other name of Amalthea; and Cybele, Jupiter's mother Rhea by another name; and Dejanira, who prompted the fight between Hercules and Achelous. Also included is Dexamenus, Dejanira's father in a version of her myth. Amalthea also lends its name to Capella, diminutive of Capra in Latin, meaning "little female goat". The name Capra may be used here. To finish the naming, Caria, after the region where Cnidos is located, may figure as well, after the association with Ctesias.

3.56. Musca

Musca, the fly, is one of Plancius' constellations. Although he created it as *Apis*, the bee, Lacaille renamed it Musca Australis, in symmetry with then existing northern constellation of Musca Borealis, north of Aries. Although a modern constellation, we can draw some mythological association. A gadfly appears twice in Greek mythology. Jealous Juno sent a gadfly to torment Io, then turned into a cow. The other episode is when Bellerophon tried to reach the Olympus riding on Pegasus. Jupiter used the same dirty trick, now with almost fatal consequences. Bellerophon lost his grip, fell and was saved of certain death by Minerva.

Yet, the former name Apus serves for a better association, since bees play a more prominent role than gadflies in ancient culture. The bee was used as an emblem of Potnia, and priestesses of Diana and Minerva were referred as bees (Melissa). Melissa is also the name of the nymph who discovered honey, and helped Amalthea nourish the infant Jupiter. In a later version of the myth, she was given a father, Melisseus, or "honey-man". In Delphi, the priestesses were also called Delphic-bee, according to Pindar. The connexion with Delphi allows for a interesting association. Melaina, one of the Naiads, is associated with the springs of Delphi, and loved by Apollo. Melissa is too common a female name for a planet, but Melaina, although not sharing the same etymology, is phonetically similar, as thus fit for the name of HD 111232 b.

3.57. Norma

Norma is one of Lacaille's constellations, and as such, has no mythological association. It represents a right angle, a rule, or a carpenter's square. Its association being related to design, architecture and sciences in general, Minerva is the closest association. I suggest one of the three planets in Norma be named after Metis, Titanian also associated with wisdom, and mother of Minerva, albeit in a most unusual birth.

The other planets could be named Aegis, after the shield of Minerva, made by Vulcan himself; Pallas, or Pallax, after one of her most widespread titles, Pallas Athena; and Labrys, after the double axe that Vulcan used to open Jupiter's skull and give birth to Minerva.

3.58. Octans

Octans is named after the octant, a navigation instrument. Its significance is that it is where the celestial south pole is located. Two planets are known in Octans, that I propose be named Auster and Notus, two names for the South Wind.

3.59. Ophiuchus

Ophiuchus or Serpentarius, the snake-holder, represents Asclepius, son of Apollo and the mythological founder of medicine and healing. Its five planets could be called him and his kin. Vediovis (after his Roman name), Yaso, Epione and Meditrina, daughters, and Aratus, his son.

Another association for Ophiucus comes from the recurring theme of serpent-worship in other mythologies. From the Vedic myths, we may take Shesha, the king of all nagas (serpents).

3.60. Orion

Orion the Hunter figures prominently in the sky, but not much in Greek mythology, in the sense that his myth is not as well developed as, say, Orpheus, Perseus, or Theseus. At the time of the Illiad and the Odyssey, he is already dead, and Homer and Hesiod already mention him as a constellation. In the Odyssey, Ulysses sees him in the underworld, spending the eternity hunting animals. He is mentioned in a few lines in the oldest works of Greek mythology, but no great work developed the myth to the point of creating a standard.

In one of the most accepted versions of the myth, he is a giant son of Neptune, extremely handsome, and an excellent hunter. His favorite prey, as mentioned before, is the hare, Lepus. Orion falls in love with Merope (not the pleiad), seduces her, and is blinded by her father, Oenopion. An Oracle told him that his sight could be restored if he travelled to the east and exposed his eyes to the rising sun. He made it to Lemnos, where Vulcan provided him with a guide, Cedalion. Guided by Cedalion, he met his goal and had his sight restored by the sun-god Helios, and Eos, the Dawn.

The tale of his death is the most variant point of the myth. In one version, he bragged that he could kill any beast. The Earth, horrified, then sent a giant scorpion, Scorpius, to sting and kill him. In a variant, he befriended Diana, going on many hunters with the mighty goddess, much to Apollo's dislike. One day, Apollo saw him swimming, and dared Diana on arrow shooting using the distant rock as a target. The rock was actually Orion's head, and so Diana accidentally killed him. Many other variants exist, and as my intent is not to re-tell the myths (especially one with so many variants), but to draw names for planets, I will allow myself to narrate just one more. This variant combines both stories by having Scorpio chasing Orion, who swims aways just to be shot by Diana. The position of the constellations in the sky, diametrically opposite, perpetuates the chase.

Four planets have been found around stars of Orion. I propose Cedalion, Eos, and Sidde. The latter is an earlier love affair of Orion. To establish a connection with other mythologies, I also use Gilgamesh, the hero after which the Sumerians named the constellation.

3.61. Pavo

Pavo, the peacock, is one of Plancius' constellations. Some mythological association can be drawn since the peacock is the bird associated with Juno, and one of the main symbols of the mighty queen of the gods. In the myth, she took the hundred eyes of dead Argus and placed it on the peacock's tail.

I suggest the planets in Pavo be named after Juno. However, since Juno is already the name of one of the biggest asteroids, her Greek name, Hera, is more suitable. Cithaeron, the mountain where she married Jupiter; Argolia, the place of her adoration; Cydippe, a priestess of Hera; and Vesta, her sister, goddess of the hearth, should complete the naming of the four planets discovered in Pavo. Vesta also goes by her Greek name, Hestia, because she also already names a major asteroid.

The peacock also features in other mythologies. In Vedic mythology, for instance, the deities have vahanas, or mounts, that are closely associated with them. A peacock called Parvani or Neelkanth is the mount of Skanda, the lord of war. Both may be used for planets in Pavo.

3.62. Pegasus

Pegasus, the winged horse, and his brother Chrysaor both sprang from the blood of the severed head of Medusa as it fecunded the Earth (or in some variants, the ocean). The horse was tamed by Bellerophon, or in a variant, by Minerva, who later gave the horse to Bellerophon. Pegasus aided Bellerophon in his fight against the Amazons and the Chimera, a monster sibling of Cerberus and the Hydra.

There are 11 planets so far discovered in Pegasus, including the very first, 51 Pegasus b. This planet was actually already nicknamed Bellerophon, after the obvious connection. In another obvious connection, I propose the name Chrysaor. Other names may be Anteia, who desired Bellerophon; Iobates, her father; and Philonoe, her sister. These may name the triple system of HR 8799. Chimera is also an obvious choice. The fight with the Amazons also inspires the inclusion of Penthesilea and her sister Hypolita, even though the former is more associated with the Trojan War, and the latter with Hercules' labors.

The presence of Minerva in the myth allows for yet another interesting addition. The other two planets then can be drawn from her myth. Parthenos, one of her many titles, and Nike, the goddess of victory, who follows Minerva. As explained in the introduction, the name Osiris is kept for HD 209458 b.

3.63. Perseus

Perseus, one of the great heroes of the Greek, has an extensively developed myth where to draw suitable names from. I suggest to name the five planets known to date in Perseus after Danae, his mother; Eurymedon, his title (Perseus Eurymedon, according to Appollonius' Argonautica); Seriphos, the island where Danae and infant Perseus were ashore, and Kibisis, the pouch where Perseus' held the severed head of Medusa. As I do not envision a stiff naming system where the Perseids are only in the constellation of Andromeda, I suggest here one of the planets be named Nicippe, after Sthenelus' wife.

3.64. Phoenix

Phoenix is one of Plancius' constellations, named after the mythological fire-bird. The mythology, however, is not Greek but Phoenician. Closely associated with the cult of their sun-gods, Pheonicians and Egyptians knew the Phoenix as the Bennu, a bird identified with a stork or a heron. The ancient Greeks associated it their own word

for phoenix, which means crimson. They and the Romans subsequently pictured the bird more like a peacock or an eagle. According to the Greeks, the phoenix lived in Phoenicia next to a well. At dawn, it bathed in the water of the well, where the sun-god Helios stopped his chariot in order to listen to its song.

We may name the planets in Phoenix after the horses that pulled the chariot of Helios. They have different names according to the sources. For Homer, two of them are named Abraxas and Therbeeo. For Eumelus they are Eous, Aethiops, Bronte or Tonitrua, and Sterope or Fulgitrua. Ovid calls them Pyrius, Eous, Aethon, and Phlegon.

3.65. Pictor

Pictor, representing a painter's easel, is one of Lacaille's constellations. Being art-related, Apollo is the possible mythological association.

Being related to painting, the portraits made in the Renaissance also come to mind. I pick one painting in particular, representing a famous episode concerning Apollo, that of the duel of Marsyas. Marsyas was a flutist who challenged Apollo to a musical duel. Apollo naturally won and, as a punishment, hung Marsyas on a tree and skinned him alive. Among the judges was Midas, the only one who voted for Marsyas. As a punishment for his clearly non-musical ear, Apollo changed his ears into donkey's ears.

Midas is also a most interesting character. He once hosted the satyr Silenus, who was also Bacchus' foster father. Grateful, Bacchus promises to give Midas whatever he wanted. His famous wish was that everything he touched be turned into gold. At first excited by his new gift, he offered a feast. He soon realized how unwise his wish was as wine and food turned into solid hard gold as he touched them; his family and servants also going the same fate as he held them in despair. Begging Bacchus to take the cursed gift away, he was told to wash himself in the river Pactolus. Afterwards, Midas lost his lust for richness and lived a pastoral life, worshipping Pan.

Planets in Pictor may therefore be called Marsyas, Midas, Silenus, and Pactolus. Also Sardis, after where the duel of Apollo and Marsyas took place; and Asellus, meaning donkey, after Midas' punishment for the unwise judgement. Lityerses, Midas' son, completes the naming.

Midas is a suitable name for the planet of beta Pictoris, that is still on the make inside its protoplanetary disk. As Midas, planets in this phase of their evolution have evolved their own version of Midas' touch. In their feeding frenzy, they grow so massive that their gravity carves a deep gap centered in its feeding zone, thus halting further growth.

3.66. Pisces

According to an ancient Syrian legend, Pisces represent Venus and her son Cupid (Eros). Greek legend recounts that they leapt into the Euprathes in order to escape from Typhon, transforming themselves into fishes to swim away from the danger. This association allows for the use of what is perhaps the most beautiful myth of Greek mythology, that of Eros and Psyche. For the 6 planets found in Pisces, I therefore propose the names Porus and Penia (poverty and necessity), parents of Eros according to one variant of the myth; naturally, Eros and Psyche for the double system of HD 217107; Hedone, after Eros' and Psyche's son; and Zephyrus, the West wind, who carried Psyche to Eros' cave.

3.67. Piscis Austrinus

Piscis Austrinus, the southern fish, is seen in the sky drinking water from Aquarius' jar. Since Aquarius represents Ganymede, I find a good choice that Piscis Austrinus be associated with Troy. It is only natural that Ganymede, from Olympus, should keep watching over and providing to his home city, where his parents still grieve his absence. The planet of Fomalhaut b therefore could be named Illion, the one around HD 216770b, Troad, whereas HD 205739 b could be called Dardania, one of the other names of Troy.

3.68. Puppis

Puppis, the poop deck, with Carina and Velorum, constitute the Argo Navis. Of the 9 planets found in Puppis, three circle the star HD 69830. It is the only triple system in the Argo, and I cannot resist the temptation of calling them after the Fates. Clotho, Lachesis, and Atropos, who decide the fate of men. It is a good point to introduce names from the Lusiads in the Argo, since Jupiter agreed to their voyage because the Fates had so decided. For a sailing epic, Navis is but a natural place. Lusus, the mythical founder of Lusitania, and Tagide, after the Tagides, nymphs of the Tagus, can be used for two planets. Back to the argonauts, I randomly pick Lynceus, Iolaus, and Mopsus. Medea, the tragic lover of Jason, completes the planet naming in the constellation.

3.69. Pyxis

Pyxis, the mariner's compass, is one of Lacaille's constellations. Being magnetic in nature, I tend to associate the constellation with the region of Magnesia. Magnes, descendant of Deucalion, and first king of Magnesia is one of the names of choice. Of his descendants, Dictys and Hymenaios may serve as well.

3.70. Reticulum

Reticulum, like Telescopium, is in some ways an example of meta-naming, in the sense that it is associated with astronomy itself. It refers to the reticle, the piece in front of the telescope cross-haired in a + shape, that renders stars in photographs their distinct "spikes".

Being astronomy-related, Urania, the heavenly Muse of Astronomy, would be the natural choice. The choice may be considered bad, since we already have Uranus as a planet in our own solar system. Nevertheless, I stick to this choice. Having Uranus and Urania featuring in the sky is as confusing as having Rome and Rumania, Turkey and Turkomenistan, Niger and Nigeria, i.e., they are simply two names with the same radical, Ouranos, the Greek work for sky. Providing Uranus with a similarly sounding drone is also a good opportunity to alleviate the cacophonia of its name in English.

Other muses may integrate the constellation. The eight other muses, Calliope (epic poetry), Clio (history), Euterpe (lyric poetry), Melpomene (tragedy), Polyhymnia (choral poetry), Terpsichore (dance), and Thalia (comedy), have interesting associations on their own, and I use some of

the names in Ursa Major. The myth of the Muses evolved in time, so that prior to the nine usually recognized as nine muses, there were others. Pausanias lists three, Aoide (songs), Melete (practice), and Mneme (memory), daughters of Uranus and Plusia. Mneme also resonates with Mnemosyne, the Titanian that personifies memory. The myth of the Titans would of course be a good source of names, but they are almost all already used to name the moons of Saturn. I already use at least one of them, Saturn himself, albeit with his Greek name, to name the only planet found in Horologium.

I therefore pick the names of Melete, Mneme, and Plusia. Other names may draw from the Titans, Uranus, and Apollo. The latter due to his association with the Muses.

3.71. Sagitta

Sagitta, the arrow, represents the arrow that Hercules used to kill Ethon, the eagle that tortured Prometheus. In another variant it is the arrow of Cupid, or the arrow with which Apollo killed a cyclops, or yet an arrow that Chiron (Sagittarius) shoots at Scorpion.

In any case, Sagitta should be a homage to famous archers of the Greek myths. There is only one planet so far discovered in Sagitta. I propose to name it Paris since he, with an arrow, succeeded where Hector failed with a sword.

3.72. Sagittarius

Sagittarius, the archer, is usually associated with Chiron, the first among the Centaurs. Even though Chiron is already a minor body of the solar system, naming one of the planets in Sagittarius after him is almost unavoidable. In the most accepted version of the myth, he is born of the union between Ixion and the cloud goddess Nephele, yet an older version has him being the fruit of Cronus and Philyra, the nymph who taught humanity how to make paper. Chiron's haunts were on Mount Pelion; there he married the nymph Chariclo who bore him three daughters, Melanippe (or Arne), Endeis, and Okyrhoe, and one son, Carystus.

Chiron's figures prominently in mythology as being the mentor of many heroes, such as Asclepius, Ajax, Aeneas, Theseus, Achilles, Jason, and Hercules. I pick Ajax, Caeneus, Actaeon, Telamon, Patroclus, Aeneas, Alcathous, and Achilles among Chiron's disciples for planets in Sagittarius.

3.73. Scorpius

Scorpius, the scorpion, represents the giant scorpion that killed (or according to a variant, chases) Orion. There is at least one more connection in mythology where the scorpion appears, and that has to do with Helios, the sun god, and his son, Phaeteon, the shining-one. Helios once promised Phaeteon anything that he wanted, to which the boy asked to drive the sun chariot for one day. Helios reluctantly consented, which proved a disaster. Phaeteon was not able to maneuver, and flew too close to the Earth, burning half of Africa and turning it into a desert. In one version, Jupiter fulminated him with a lightning before he could do more damage. In another version, he flew too close to Scorpius, already a constellation, and was stung and killed by him.

The planets in Scorpion may then be named after this myth and that of Helios. I propose Phaeteon and Clymene, his mother. Clymene was also mother of the Heliades, Phaeteon sisters, who wept copiously after his death. They are Aegiale, Aetheria, Helia, and Dioxippe. Leucothoa and Euryphaessa are other love interests of Helios. One of his grandchildren, Ialysos, may also figure. Phaeteon, who flies or too close or too far, is a suitable name for an eccentric planet. One of the Heliades was also known as Merope. Merope is also a star of the Pleiades, and I purposevely suggest to include her name among the exoplanets, for the same reason Atlas was used in Sect. 3.9.

Scorpions are feature prominently in other mythologies. In the epic of Gilgamesh, the hero travels to the door of the underworld, which is guarded by deadly Scorpion-beings. Unfortunately, these Scorpion-being never introduce themselves. The mountain where the door lays is named though, Mount Masha. In Egyptian mythology, Selket is the goddess of healing, and represents the very deification of scorpions.

In Scorpius, there also figures a planet around a pulsar, PSR B1620-26 b. As explained in Sect. 2, I propose to name these after the damned ones in the Tartarus. However, that particular planet was actually already nicknamed "Methuselah".

3.74. Sculptor

Sculptor is one of Lacaille's constellations. Lacaille envisioned it as Apparatus Sculptoris, the sculptor's studio. The name was later shortened.

The way of reverting Lacaille's tradition is obvious. The planets in Scultor may be named after several sculptors in the Greek myths. The most notable of which is Prometheus, the sculptor per excellence, who sculpted mankind from clay and gave them life. I prefer to avoid it though, since in the current age we still have people believing in this creation myth, albeit in its Semitic version. Besides, Prometheus already figures in Aquila.

Another notable mythical sculptor is Pygmalion, who fell in love with his own sculpture (in Ovid's metamorphosis). He prays to Venus, who concedes life to the statue. Of their union springs a son and a daughter, Paphos and Metharme.

3.75. Scutum

Scutum, the shield, contains no known planet-hosting stars as of Feb 2010.

3.76. Serpens

Serpens, the snake, is the reptile being held by Ophiuchus, the snake holder. In mythology, it can associated with many monsters, most notably Python and Typhon. With Echdina, Typhon fathered the well-known Cerberus and the lesser-known Orthrus, a two-headed dog slain by Hercules in his tenth labor. Typhon is said by Homer to dwell in a cave with the she-dragon Drakaina, or Delphyne. I propose the double system around HD 168443 be named Typhon and Delphyne. Other planes can be named Python, Orthrus, Askalaphos (after Asklepius), and Arima, the

mythical place where Jupiter slain Typhon, also the place where most of these monsters were confined.

Also worth noting is that Python was slain by Apollo, so Serpens is yet another constellation that can be associated with him. Through Cerberus, Pluto's myth can also be used for further discovered there.

3.77. Sextans

Sextans is one of Hevelius' constellations, named after the astronomical sextant. As an instrument and thus fruit of human intelligence can be associated with Minerva. For its astronomical relevance, with Apollo. Yet I draw from its use in navigation, to associate it with navigations myth such as the Odyssey, the Argonauts or the Lusiad. The more natural would be the Lusiad, since the sextant was invented in the Middle Ages. However, I prefer to keep the associations loose, and draw names from the Odyssey for the four planets known in Sextans. Calypso and Circe, two of the many reasons that so delayed Ulysses' return to Ithaca; Telegonus and Nausinous, kin of Ulysses and Circe.

3.78. Taurus

Taurus, the bull, is usually associated with the myth of the abduction of Europa. The princess of Phoenicia was raptured by Jupiter, in the shape of a bull. Another association is with the bull of Crete, the seventh of Hercules' labors. The association with Europa leads immediately to her most famous brother, Cadmus, who Herotodus credits as bringing the Phoenician alphabet to Greece, and hence to Europe (Cilix and Phoenix were her other brothers). Cadmus is also the mythical founder of Thebes, and has a rich myth where to drawn names from. Cadmus is also the consort is Concordia (Harmonia), the goddess of harmony. A suggestion from Moore, and I concur, is that a double system should be named after Corcordia and Pax, peace, her sister, as both often go together. However, Moore chose for that the system of Gliese 876, in Aquarius. I find Taurus a more proper place, given the association with Cadmus. The three are suitable names for the planets around HD 37124. Cadmus allows for yet another interesting association. Semele, the mortal mother of Bacchus, is his and Corcordia's daughter. The association with an Olympic is a welcoming addition. Semele, Cilix, Cadmus, Pax and Corcordia are my choices for the known planets in Taurus.

3.79. Telescopium

Telescopium contains no known planet-hosting stars as of Feb 2010.

3.80. Triangulum

Triangulum is a constellation with no mythological association. It is was listed by Ptomely because its brightest stars seem to form a small isosceles triangle.

Representing geometry, it may be associated with Minerva, due to hers being patron of mathematics. Also, Pythagoras' reputation was so vast and his life so involved in secrecy (because of the Pythagorean brotherhood), that he was thought to be "born to Zeus-beloved Apollo", sent by the gods to benefit humankind, and so described by one of his ancient biographers, Iamblichus. Also, the triangle is a percussion instrument, and thus also related to Apollo.

Another possibility are the Dactyls, who worked in the forge of Vulcan and are said to have taught metalworking, mathematics, and the alphabet to humans. In a version of the myth, they go by the name of Acmon (anvil), Damnameneus (hammer), and Celmis (casting), which I use for Triangulum and Triangulum Australe.

Another association can be drawn from gods and goddesses of wisdom in other mythologies. The myths of Saa and Thoth, Egyptian gods of wisdom, may be used for planets in Triangulum as well as other, geometry-related, constellations.

3.81. Triangulum Australe

See Triangulum (Sect. 3.80).

3.82. Tucana

Tucana, representing the toucan, a bird of South America, is one of Plancius' constellations and has no mythological association. As an animal, it may be linked with Mercury or Diana. Taking Mercury, I propose for the two planets in Tucana the names Cylenne, after the mount where Mercury was born; and Nysa, the mount where Mercury took the infant Bacchus to be raised by nymphs.

Being a bird of South America, Tucana also invites an association with that continent and the Western hemisphere. Birds feature in many mythologies of the native western peoples, a prominent example being the mythical Thunderbird of North America. Toucans or macaws also feature in the Inca version of the flood myth, where woman-faced birds feed two brothers that survive the waters, and with them repopulate the land. Yet another interesting native american myth involves the woodpecker, which is related to the toucan. The legend tells how a boy was marvelled by the song of Wagnuka, the redheaded woodpecker, and how the bird in turn helped the boy fashion the first flute. The boy was later known as "tayazo hoksine", or "flute boy".

3.83. Ursa Major

Ursa Major, the great bear, represents Callisto, as mentioned in Bootes. I draw loosely on the myth, since a good part of it is reserved to Bootis. Callisto is a nymph of Diana, and through her Ursa Major gets an Olympic association. Planets in Ursa Major therefore can be named after Artemis, Diana's Greek name; Leto, the mortal mother of Apollo and Diana; Adonis, since Diana is usually implicated in his death; Atalanta, the huntress, Diana's protegé and the only woman among the Argonauts; Calydon, after the hunt for the Calydonian Boar; and Niobe, the tragic queen of Thebes and mother of fourteen kids, who looked down on Lato's lower fertility rate, just to have all her kin wiped out by an angered pair of deities. An ancient example on the old quantity vs. quality debate.

I deliberately cut short the name-drawing from Diana's myth. My purpose is to include some from Apollo, to further stress that the naming convention I intend to convey is flexible, based on loose, even far-fetched associations. The purpose is to maximize name sources from classic antiquity to a particular constellation. Even though Apollo was

already summoned to several constellations, he is Diana's brother. From his quality as patron of arts, I use the names of Calliope, Clio and Euterpe, three of the muses, for further planet names in Ursa Major.

And, last but not least, Ursa Major represents in the north what Crux is for the southern hemisphere: an easily recognizable asterism that points to the pole. Skiron and Kaikias, northwest and northeast wind, complete the naming of planets in Ursa Major.

3.84. Ursa Minor

Ursa Minor, the little bear, containing the north pole, mirrors the Octans in the southern hemisphere, although with much more abundance of bright stars. It may represent Arcas - although Bootis may as weel -, a dog, or the garden of the Hesperides, the stars being golden apples, or the Hesperides themselves. In any case, the connection with North is the most obvious. Two planets have been found in Ursa Minor (though one of them is doubtful). I propose the names Boreas, after the north wind, and Hiperborea - the mythical country where the sun shone 24 hours a day. Being associated with north, both Ursa Minor and Ursa Major may eventually use names from the Valkyries of Norse mythology, female riders send by Odin to decide who would die in battles. It was imagined that light reflecting on their armors caused the Northern lights.

3.85. Vela

Vela, along with Carina and Puppis, constitute the Argo Navis. I randomly choose the following argonauts: Argus, Peleus, Echion, Idmon, Talaus, and Palaemon.

3.86. Virgo

Virgo, the maiden, can be associated with any prominent goddess. Juno, Minerva, Diana, Ceres or Proserpina, have all been connected to the constellation. The association with Proserpina is the one I find most interesting. Her return from the Underworld to the company of her mother marks the beginning of spring. Similarly, Virgo is the spring constellation in the northern hemisphere. I choose her myth to name the planets in Virgo.

The double system of HD 102272 could be named after Ceres and Proserpina, albeit with their Greek names Demeter and Persephone, to celebrate the long awaited reunion of mother and daughter. 70 Virginis b, nicknamed Goldilocks, may better go by the name of Cora, Persephone's name prior to the abduction. Names for other planets could be Nycteus and Alastor, two of the four horses Pluto used to abduct Persephone; Eleusis, where the abduction took place, according to the Greek myth, or Enna according to the Roman; Hecate, goddess of darkness, who followed Persephone into Hades (in another variant, one of Demeter's guises as a trinity goddess, Persephone herself being the other); Rodi, Greek for pomegranate; and Narcissus. The later because the flower named after the handsome lad is what distracted Persephone and her companions, thus facilitating the abduction. His presence also allows for yet another myth to be used in the naming, from which I pick the nymph Liriope, his mother; the river-god Cephisus, his father; and Ameinias, who in an earlier variant of the myth was the rejected lover of Narcissus (Echo is already used in Sect. 3.16).

From Ceres' myth, I suggest the names Erinys (anger), one of her titles; and Callichoron, the well where she copiously wept for the abduction of Persephone.

The planets around the pulsar PSR 1257+12, as mentioned in Sect. 2, should receive names of the damned in the Tartarus. I propose to name them after Sisyphus, Ixion, and Tantalus. As the Underworld is the realm of Persephone, these three poor souls are in the right place in the sky.

Virgin goddesses are also a recurring theme across cultures. Tuonetar from Finnish mythology, Tamar from Georgian, Devana from Slavik, and Anat from Semitic mythology are but a few examples. I suggest their names be used for planets in Virgo.

3.87. Volans

Volans, the flying fish, is one of Plancius' constellations. I draw again on the myth of Neptune, and for the planet around HD 76700 I pick a Nereid, Nesaea. She was one of the Nereids who gathered round Thetis in her sympathetic grief for Achilles' loss of Patroclus.

3.88. Vulpecula

Vulpecula, the fox, is one of Hevelius' constellations. Although Hevelius did not create it for any mythological association, we can therefore find one fox in Greek mythology. That is the Teumessian fox, a gigantic animal of the kin of Echidna. The Teumessian fox had the particular property that it could never be caught. It was chased by Laelaps, the dog that caught anything. The contradiction that was set caught the attention of Jupiter, who elevated both to the skies, which is why in some myths it represents Lepus, the prey of Orion. We may as well conclude that it simply underscores the philosopher's taste for paradoxes.

4. Summary and concluding remarks

In this manuscript I suggest names for the 429 extrasolar planet candidates known as of February 2010. The suggestion is based on the classical tradition of giving mythological names to astronomical bodies. The association with the myths is in many cases purposively loose, to enable more flexibility on naming further planets as they are discovered. As said in Sect. 2.2, the system does not exclude other mythologies, which may be used if a suitable association with the constellation can be established.

The system also has some power of prediction. We can say for instance, that the next planet discovered in Eridanus could be called Minos, after one of the three judges of Hades. Indeed, in a former version of this manuscript I had suggested that the next three planets could be called Minos, Eachus, and Radhamantus. Then, on Sep 17, the Encyclopedia of Extrasolar Planets was updated. One of the new planets was in Eridanus, and I promptly added it to Table 1 as Radhamantus. In the update of Oct 9, another planet in Eridanus was announced. I added it to Table 1 as Eachus. Along the course of writing this manuscript, I could already experience another small benefit of having the planets named. Scrolling the long table up and down, it was much easier to remember "Typhon" than "HD 168443 c"

I further stress that the system proposed here does not intend to supplant the one in vogue. It is not a change, but an addition. Stars are known by many names. Merope is also known as 23 Tau, HD 23480, HIC 17608, HR 1156, 2MASS J03461958+2356541, and V971 Tau, to name a few. The current naming scheme of assigning minor letters to the names of stars will of course be kept for scientific publications, much in the same way that we use HD 135742 instead of Zubenelschamali and NGC 4755 instead of Jewel Box. The proper name is a bonus aimed at popular writings.

One drawback I can think of is that it may lead the public to assume that the constellations are somehow physical. In some way, the misconception already exists. I recall this anecdote, for which I unfortunately cannot find the reference, that a piece of popular scientific writing once defined a constellation as "a group of stars. Up to date, astronomers have found only 88". On the other hand, we can invert the argument and see it as a golden opportunity to fight this misconception. Along with the names and their associations, it has to be pointed that the constellations are human invention and just a useful way of mapping the sky. Naming the planets after the myth of the constellations is no more misleading than using stellar names such as 14 Herculi, 70 Virginis or Upsilon Andromedae.

It should also be pointed that this manuscript was sent to the IAU Commission 53 on exoplanets, whose majority still opposes the idea of adding names to planets. The strongest concern of the commission had to do with the definition of an exoplanet. The Encyclopedia of Extrasolar Planets, complete as it is, lists candidate planets, and some of them are not confirmed. Therefore, some of the candidates assigned names here may as well be just low luminosity stars, brown dwarfs, a stellar spot or, as noted by a member of the commission, even a mote of dust in the spectrograph. In that case, the name should be withdrawn and re-assigned to other, confirmed, planet.

Another criticism is that there are billions of planets in the Galaxy, which is too big for all of our myths. That is correct. However, we do not need to name all planets. As many other astronomers pointed before me, we only need to name some of them. The first 1000 planets, or the ones within a distance of 1000 parsecs. Beyond that, only planets that generate a great deal of interest needed be named. A stellar example is Proxima Centauri so named because it is the closest star to us.

Acknowledgments. I thank the reading and comments of J. Alves, S. Boscardin, A. Johansen, M.-M. Mac Low, A. Moitinho, N. Piskunov, H. Rocha-Pinto, S. Soter, and P. Tsalmantza, that helped me on identifying the main points of critique. Interestingly, Portuguese speakers expressed concern regarding the use of the Lusiad. Westerns were concerned with the supposed Eurocentrism of mainly using Roman-Greek myths. It is great to see that we are living in multicultural times and that instead of trying to inflate national prides and highlighting boundaries, we are actually trying to distance ourselves from them. I also thank M. Schmitz for organizing an unorthodox peer review among the IAU Comission 53 and playing the role of editor.

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Table 1. Extrasolar planet names

Constellation	Planet	Mass (M_J)	SMA (AU)	Ecc.	RA	Dec	Name
Andromeda	14 And b	4.8	0.83	0.0	23 31 17	+39 14 10	Perses
	ups And b	0.69	0.059	0.013	01 36 48	+41 24 38	Heleus
	ups And c	1.92	0.832	0.224	01 36 48	+41 24 38	Mestor
	ups And d	4.13	2.51	0.267	01 36 48	+41 24 38	Cynurus
	HAT-P-6 b	1.057	0.05235	0.0	23 39 06	+42 27 58	Sthenelus
	WASP-1 b	0.89	0.0382	0.0	00 20 40	+31 59 24	Alkaios
Antlia	HD 93083 b	0.37	0.477	0.14	10 44 20	-33 34 37	Palamedes
Apus	HD 131664 b	18.15	3.17	0.638	15 00 06	-73 32 07	Virbius
Aquarius	Gliese 876 b	2.64	0.211	0.029	22 53 13	-14 15 13	Dardanus
	Gliese 876 c	0.83	0.132	0.266	22 53 13	-14 15 13	Tros
	Gliese 876 d	0.02	0.021	0.139	22 53 13	-14 15 13	Ilus
	HD 210277 b	1.23	1.1	0.472	22 09 29	-07 32 32	Themiste
	HD 222582 b	7.75	1.35	0.725	23 41 51	-05 59 08	Assaracus
	Gj 849 b	0.82	2.35	0.06	22 09 40	-04 38 27	Capys
	HD 219449 b	2.9	0.3	–	23 15 53	-09 05 15	Aigesta
	WASP-6 b	0.503	0.0421	0.054	–	–	Teucrus
Aquila	CoRoT-3 b	21.66	0.057	0.0	19 28 13	00 07 19	Cratos
	HD 179079 b	0.08	0.11	0.115	19 11 10	-02 38 18	Epimetheus
	HD 183263 b	3.69	1.52	0.38	19 28 24	+08 21 28	Elpis
	HD 183263 c	3.82	4.25	0.253	19 28 24	+08 21 28	Pithos
	HD 192263 b	0.72	0.15	0.0	20 13 59	-00 52 00	Prometheus
	HD 192699 b	2.5	1.16	0.149	20 16 06	+04 34 5	Hesione
	ksi Aql b	2.8	0.68	0.0	19 54 15	+08 27 41	Ethon
	CoRoT-6 b	2.96	0.0855	0.1	18 44 18	+06 39 48	Zelus
Ara	HD 154672 b	5.02	0.6	0.61	17 10 05	-56 26 57	Pelasgus
	HD 154857 b	1.8	1.2	0.47	17 11 15	-56 40 50	Phassus
	HD 160691 b	1.676	1.5	0.128	17 44 08	-51 50 02	Nyctimus
	HD 160691 c	0.03321	0.09094	0.172	17 44 08	-51 50 02	Peucetis
	HD 160691 d	0.5219	0.921	0.0666	17 44 08	-51 50 02	Caucon
	HD 160691 e	1.814	5.235	0.0985	17 44 08	-51 50 02	Cynaethus
	GJ 674 b	0.037	0.039	0.2	17 28 40	-46 53 43	Stymphalus
	HD 156411 b	0.75	–	–	17 19 51	-48 32 58	Melaeneus
	GJ 676A b	4	–	–	17 30 11	-51 38 13	Eumon
	HD 152079 b	3	3.2	0.6	16 53 30	-46 19 51	Mantineus
Aries	HD 12661 b	2.3	0.83	0.35	02 04 34	+25 24 51	Aeetes
	HD 12661 c	1.57	2.56	0.031	02 04 34	+25 24 51	Chalciope
	HD 20367 b	1.07	1.25	0.23	03 17 40	+31 07 37	Colchis
	HIP 14810 b	3.88	0.0692	0.1427	03 11 14	+21 05 50	Chrysomallos
	HIP 14810 d	0.57	1.89	0.173	03 11 14	+21 05 50	Helle
	HIP 14810 c	1.28	0.545	0.164	03 11 14	+21 05 50	Phrixus
	30 Ari B b	9.88	0.995	0.289	02 36 58	+24 38 53	Ino
Auriga	HAT-P-9 b	0.78	0.053	0.0	07 20 40	+37 08 26	Euthenia
	HD 40979 b	3.32	0.811	0.23	06 04 29	+44 15 37	Aglaia
	HD 43691 b	2.49	0.24	0.14	06 19 35	+41 05 32	Lycia
	HD 45350 b	1.79	1.92	0.778	06 28 45	+38 57 46	Eurynome
	HD 49674 b	0.115	0.058	0.23	06 51 30	+40 52 03	Lemnos
	WASP-12 b	1.41	0.0229	0.049	06 30 33	+29 40 20	Vulcan
Bootes	HAT-P-4 b	0.68	0.0446	0.0	15 19 58	+36 13 47	Pramnos
	HD 128311 b	2.18	1.099	0.25	14 36 00	+09 44 47	Bacchus
	HD 128311 c	3.21	1.76	0.17	14 36 00	+09 44 47	Aithra
	HD 132406 b	5.61	1.98	0.34	14 56 55	+53 22 56	Atlas
	tau Boo b	3.9	0.046	0.018	13 47 17	+17 27 22	Arcas
	WASP-14 b	7.725	0.037	0.0903	14 33 06	+21 53 41	Arcadia
Camelopardalis	HD 104985 b	6.3	0.78	0.03	12 05 15	+76 54 20	Triklaria
	HD 33564 b	9.1	1.1	0.34	05 22 33	+79 13 52	Ephesia
	XO-3 b	11.79	0.0454	0.26	04 21 53	+57 49 01	Egeria
	HD 32518 b	3.04	0.59	0.01	05 09 37	+69 38 22	Opalia
Cancri	55 Cnc f	0.144	0.781	0.2	08 52 37	+28 20 02	Stygne
	55 Cnc b	0.824	0.115	0.014	08 52 37	+28 20 02	Anthelea

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Constellation	Planet	Mass (M_J)	SMA (AU)	Ecc.	RA	Dec	Name
	55 Cnc c	0.169	0.24	0.086	08 52 37	+28 20 02	Teleia
	55 Cnc d	3.835	5.77	0.025	08 52 37	+28 20 02	Argive
	55 Cnc e	0.024	0.038	0.07	08 52 37	+28 20 02	Euippe
	HD 73534 b	1.15	3.15	0.046	08 39 16	+12 57 37	Pirene
Canes Venatici	HAT-P-12 b	0.211	0.0384	0.0	13 57 34	43 29 37	Asterion
Canis Major	HD 47536 b	5	–	0.2	06 37 47	-32 20 23	Leucomelaena
	HD 45364 b	0.1872	0.6813	0.1684	06 25 38	-31 28 51	Maera
	HD 45364 c	0.6579	0.8972	0.0974	06 25 38	-31 28 51	Dromis
	HD 47186 b	0.07167	0.05	0.038	06 36 09	-27 37 20	Cisseta
	HD 47186 c	0.35061	2.395	0.249	06 36 09	-27 37 20	Lampuris
	HD 47536 c	7	–	–	06 37 47	-32 20 23	Lycoctonus
	HD 43197 b	0.6	–	–	06 13 36	-29 53 50	Arctophonus
Capricornus	HD 202206 b	17.4	0.83	0.435	21 14 57	-20 47 21	Syrinx
	HD 202206 c	2.44	2.55	0.267	21 14 57	-20 47 21	Echo
	HD 204313 b	4.05	3.082	0.131	21 28 12	-21 43 35	Dryope
Carina	HD 65216 b	1.21	1.37	0.41	07 53 4	-63 38 50	Jason
	OGLE-TR-111 b	0.53	0.047	0.0	10 53 1	-61 24 20	Laocoon
	OGLE-TR-113 b	1.32	0.0229	0.0	10 52 24	-61 26 48	Iphitos
	OGLE-TR-132 b	1.14	0.0306	0.0	10 50 34	-61 57 25	Autolycus
	OGLE2-TR-L9 b	4.5	–	–	11 07 55	-61 08 46	Erginus
	OGLE-TR-182 b	1.01	0.051	0.0	11 09 19	-61 05 43	Euryalus
	OGLE-TR-211 b	1.03	0.051	0.0	10 40 15	-62 27 20	Hylas
	HD 63765 b	0.69	–	–	07 47 50	-54 15 51	Acastus
Cassiopeia	HD 240210 b	6.9	1.33	0.15	23 10 29	+57 01 46	Eulimene
	HD 7924 b	0.029	0.057	0.17	–	–	Orithya
	HD 17156 b	3.212	0.1623	0.6753	02 49 44	+71 45 12	Thetis
Centaurus	HD 101930 b	0.3	0.302	0.11	11 43 30	-58 00 24	Nephele
	HD 102117 b	0.172	0.1532	0.106	11 44 50	-58 42 13	Eurytion
	HD 114386 b	1.24	1.65	0.23	13 10 39	-35 03 17	Pholus
	HD 114729 b	0.82	2.08	0.31	13 12 44	-31 52 24	Nessus
	HD 117207 b	2.06	3.78	0.16	13 29 21	-35 34 15	Rhoecus
	HD 117618 b	0.178	0.176	0.42	13 32 25	-47 16 16	Hylaeus
	HD 121504 b	1.22	0.33	0.03	13 57 17	-56 02 24	Asbolus
	HD 109749 b	0.28	0.0635	0.01	12 37 16	-40 48 43	Amycus
	HD 103197 b	0.1	–	–	11 52 53	-50 17 34	Hylonome
	HD 125595 b	0.045	–	–	14 21 23	-40 23 38	Cyllarus
Cepheus	gamma Cephei b	1.6	2.044	0.115	23 39 20	+77 37 56	Dannaus
Cetus	81 Cet b	5.3	2.5	0.206	02 37 42	-03 23 46	Stheno
	BD-17 63 b	5.1	1.34	0.54	00 28 34	-16 13 35	Thoosa
	HD 11506 c	0.82	0.639	0.42	01 52 51	-19 30 25	Charybdis
	HD 11964 b	0.11	0.229	0.15	01 57 09	-10 14 32	Scylla
	HD 16141 b	0.23	0.35	0.21	02 35 19	-03 33 38	Odysseus
	HD 19994 b	1.68	1.42	0.3	03 12 46	-01 11 45	Telemachus
	HD 224693 b	0.71	0.233	0.05	23 59 54	-22 25 41	Euryale
	HD 2638 b	0.48	0.044	0.0	00 29 59	-05 45 50	Phorcys
	HD 11506 b	3.44	2.43	0.22	01 52 51	-19 30 25	Echidna
	HD 11964 c	0.61	3.34	0.06	01 57 09	-10 14 32	Deino
	HD 5319 b	1.94	1.75	0.12	00 55 01	+00 47 22	Polyphemus
	HD 6718 b	1.65	–	–	01 07 49	-08 14 01	Callidice
	HIP 5158 b	1.3	–	–	01 06 02	-22 27 11	Polypoites
	HD 1461 b	0.0239	0.063438	0.14	00 18 42	-08 03 11	Natsihlane
Chamaeleon	HD 63454 b	0.38	0.036	0.0	07 39 21	-78 16 44	Naiad
	CT Cha b	17	440	–	11 04 09	-76 27 19	Nereus
Circinus	HD 129445 b	1.6	2.9	0.7	14 46 03	-68 45 45	Mjöllnir
Columba	HD 43848 b	25	3.4	0.69	06 16 31	-40 31 55	Peristera
Coma Berenices	HD 108874 b	1.36	1.051	0.07	12 30 26	+22 52 47	Ariadne
	HD 108874 c	1.018	2.68	0.25	12 30 26	+22 52 47	Theseus
	HD 114762 b	11.02	0.3	0.34	13 12 19	+17 31 01	Naxos
Corona Borealis	kappa CrB b	1.8	2.7	0.19	15 51 14	+35 39 27	Euanthes
	rho CrB b	1.04	0.22	0.04	16 01 03	+33 18 51	Staphylus

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Constellation	Planet	Mass (M_J)	SMA (AU)	Ecc.	RA	Dec	Name
	XO-1 b	0.9	0.0488	0.0	16 02 12	+28 10 11	Latramys
Corvus	HD 104067 b	0.16	–	–	11 59 10	-20 21 14	Coronis
Crater	BD-10 3166 b	0.48	0.046	0.07	10 58 28	-10 46 13	Alexiares
	HD 96167 b	0.68	1.3	0.71	11 05 15	-10 17 29	Aniketos
Crux	NGC 4349 No 127 b	19.8	2.38	0.19	12 24 08	-61 52 18	Livas
	HD 108147 b	0.261	0.102	0.53	12 25 46	-64 01 19	Apeliotes
Cygnus	HAT-P-7 b	1.8	0.0379	0.0	19 28 59	+47 58 10	Leda
	HD 185269 b	0.94	0.077	0.3	19 37 12	+28 30 00	Eurypylus
	HD 187123 b	0.52	0.042	0.03	19 46 57	+34 25 15	Timandra
	HD 190360 b	1.502	3.92	0.36	20 03 37	+29 53 48	Eurythemis
	HD 190360 c	0.057	0.128	0.01	20 03 37	+29 53 48	Thestius
	16 Cyg B b	1.68	1.68	0.689	19 41 51	+50 31 03	Althaea
	HAT-P-11 b	0.081	0.053	0.198	19 50 50	+48 04 51	Iphicles
	HD 187123 c	1.99	4.89	0.252	19 46 57	+34 25 15	Echemus
	Kepler-5 b	2.114	0.05064	0.0	19 57 38	+44 02 06	Etaine
	Kepler-6 b	0.669	0.04567	0.0	19 47 21	+48 14 24	Mider
Delphinus	18 Del b	10.3	2.6	0.08	20 58 26	+10 50 21	Delphi
	HD 195019 b	3.7	0.1388	0.014	20 28 17	+18 46 12	Apollo
	HD 196885 b	2.58	2.37	0.462	20 39 51	+11 14 58	Melikertes
	WASP-2 b	0.914	0.03138	0.0	20 30 54	+06 25 46	Portunes
Dorado	HD 30177 b	9.17	3.86	0.3	04 41 54	-58 01 14	Tyro
	HD 28254 b	1.16	–	–	04 24 51	-50 37 20	Enipeus
Draco	42 Dra b	3.88	1.19	0.38	18 25 59	+65 33 49	Ladon
	HD 139357 b	9.76	2.36	0.1	15 35 16	+53 55 20	Aegle
	HD 167042 b	1.6	1.3	0.03	18 10 32	+54 17 12	Eryteis
	HIP 75458 b	8.82	1.275	0.7124	15 24 55	+58 57 57	Lipara
	TrES-2	1.199	0.03556	0.0	19 07 14	+49 18 59	Chrysothemis
	Kepler-4 b	0.077	0.0456	0.0	19 02 28	+50 08 09	Tawaret
Eridanus	eps Eridani b	1.55	3.39	0.702	03 32 55	-09 27 29	Styx
	Gl 86 b	4.01	0.11	0.046	02 10 14	-50 50 00	Aqueron
	HD 10647 b	0.93	2.03	0.1	01 42 29	-53 44 27	Cocytus
	HD 28185 b	5.7	1.03	0.07	04 26 26	-10 33 02	Phlegethon
	HD 30562 b	1.29	2.3	0.76	04 48 36	-05 40 27	Radhamantus
	HIP 12961 b	0.47	–	–	02 46 43	-23 05 12	Eachus
Fornax	HD 16417 b	0.069	0.14	0.2	02 36 59	-34 34 41	Etna
	HD 20782 b	1.9	1.381	0.97	03 20 03	-28 51 14	Lipari
	HD 20868 b	1.99	0.947	0.75	03 20 43	-33 43 48	Milos
Gemini	HD 50554 b	4.9	2.38	0.42	06 54 42	+24 14 44	Romulus
	HD 62509 b	2.9	1.69	0.02	07 45 18	+28 01 34	Remus
	HD 59686 b	5.25	0.911	0.0	07 31 48	+17 05 09	Lupa
	BD+20 1790 b	6.54	0.066	0.05	07 23 44	+20 24 51	Nasatya
Grus	HD 208487 b	0.45	0.49	0.32	21 57 19	-37 45 49	Megarus
	HD 213240 b	4.5	2.03	0.45	22 31 00	-49 25 59	Deucalion
	HD 216435 b	1.26	2.56	0.07	22 53 37	-48 35 53	Pyrrha
	GJ 832 b	0.64	3.4	0.12	21 33 34	-49 00 32	Gerania
Hercules	14 Her b	4.64	2.77	0.369	16 10 23	+43 49 18	Cerenytis
	HAT-P-2 b	9.09	0.06878	0.5171	16 20 36	+41 02 53	Erymanthus
	HD 149026 b	0.359	0.04313	0.0	16 30 29	+38 20 50	Augean
	HD 154345 b	0.947	4.19	0.044	17 02 36	+47 04 55	Alpheus
	HD 155358 b	0.89	0.628	0.112	17 09 35	+33 21 21	Peneus
	HD 155358 c	0.504	1.224	0.176	17 09 35	+33 21 21	Stymphalia
	HD 164922 b	0.36	2.11	0.05	18 02 30	+26 18 46	Diomedes
	TrES-3	1.92	0.0226	0.0	17 52 07	+37 32 46	Geryon
	TrES-4	0.919	0.05091	0.0	17 53 13	37 12 42	Cerberus
	Gl 649 b	0.328	1.135	0.3	16 58 09	+25 44 39	Sigurd
	HD 156668 b	0.0131	0.05	0.0	17 17 40	+29 13 38	Regin
Horologium	HR 810 b	1.94	0.91	0.24	02 42 31	-50 48 12	Cronus
Hydra	2M1207 b	4	46	–	12 07 33	-39 32 54	Lerna
	HD 122430 b	3.71	1.02	0.68	14 02 22	-27 25 47	Adiante
	HD 70573 b	6.1	1.76	0.4	08 22 50	+01 51 34	Amphitrite

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Constellation	Planet	Mass (M_J)	SMA (AU)	Ecc.	RA	Dec	Name
	HD 72659 b	2.96	4.16	0.2	08 34 03	-01 34 05	Galatea
	HD 74156 b	1.88	0.294	0.64	08 42 25	+04 34 41	Amymone
	HD 74156 c	8.03	3.85	0.43	08 42 25	+04 34 41	Thaleia
	HD 74156 d	0.396	1.01	0.25	08 42 25	+04 34 41	Pasithea
	HD 82943 b	1.75	1.19	0.219	09 34 50	-12 07 46	Nausithoe
	HD 82943 c	2.01	0.746	0.359	09 34 50	-12 07 46	Menippe
	WASP-15 b	0.542	0.0499	0.0	13 55 43	-32 09 35	Asia
	HD 86264 b	7	2.86	0.7	09 56 58	-15 53 42	Hyperippe
	GJ 433 b	0.019	–	–	11 35 27	-32 32 24	Spio
	HD 90156 b	0.055	–	–	10 23 55	-29 38 44	Ianira
	HD 86226 b	1.5	2.6	0.73	09 56 30	-24 05 58	Jormungand
Hydrus	GJ 3021 b	3.37	0.49	0.511	00 16 12	-79 51 04	Delos
	HD 11977 b	6.54	1.93	0.4	01 54 56	-67 38 50	Ortygia
Indus	HD 216437 b	2.1	2.7	0.34	22 54 39	-70 04 25	Hesper
Lacerta	HAT-P-1 b	0.524	0.0553	0.067	22 57 47	+38 40 30	Abas
Leo	BD20 2457 b	21.42	1.45	0.15	10 16 45	+19 53 29	Omphale
	BD20 2457 c	12.47	2.01	0.18	10 16 45	+19 53 29	Lamus
	GJ 436 b	0.072	0.02872	0.15	11 42 11	+26 42 23	Nemea
	HD 100777 b	1.16	1.03	0.36	11 35 52	-04 45 21	Elissos
	HD 81040 b	6.86	1.94	0.526	09 23 47	+20 21 52	Iraklion
	HD 88133 b	0.22	0.047	0.133	10 10 07	+18 11 12	Polynices
	HD 89307 b	1.78	3.27	0.241	10 18 21	+12 37 15	Lycurgus
	HD 99109 b	0.502	1.105	0.09	11 24 17	-01 31 44	Cleonae
	HD 99492 b	0.109	0.1232	0.254	11 26 46	+03 00 22	Tmolus
	DP Leo b	6.28	8.6	–	11 17 16	+17 57 41	Yali
	gamma 1 Leo b	8.78	1.19	0.144	10 19 58	+19 50 29	Nergal
Leo Minor	HD 87883 b	1.78	3.6	0.53	10 08 43	+34 14 32	Archemoros
Lepus	HD 33283 b	0.33	0.168	0.48	05 08 01	-26 47 50	Epimelius
Libra	Gl 581 c	0.01686	0.07	0.17	15 19 26	-07 43 20	Ymir
	Gl 581 d	0.02231	0.22	0.38	15 19 26	-07 43 20	Eunomia
	Gl 581 b	0.0492	0.041	0.0	15 19 26	-07 43 20	Themis
	Gl 581 e	0.006104	0.03	0.0	15 19 26	-07 43 20	Eirene
	HD 134987 b	1.59	0.81	0.233	15 13 28	-25 18 33	Astraea
	HD 141937 b	9.7	1.52	0.41	15 52 17	-18 26 09	Dysis
	HD 134987 c	0.82	5.8	0.12	15 13 28	-25 18 33	Forseti
Lupus	Lupus-TR-3 b	0.81	0.0464	0.0	15 30 19	-42 58 46	Lycaon
	GQ Lup b	21.5	103	–	15 49 12	-35 39 03	Therion
	HIP 70849 b	5	–	–	14 29 19	-46 27 50	Fenris
Lynx	6 Lyn b	2.4	2.2	0.134	06 30 47	+58 09 46	Scythia
	XO-4 b	1.72	0.0555	0.0	07 21 33	+58 16 05	Metanira
	XO-5 b	1.077	0.0487	0.0	07 46 52	+39 05 41	Lyncus
	HD 75898 b	2.51	1.19	0.1	08 53 51	+33 03 25	Celeus
	WASP-13 b	0.46	0.0527	0.0	–	–	Doso
	XO-2 b	0.57	0.0369	0.0	07 48 07	+50 13 33	Demophon
Lyra	HD 173416 b	2.7	1.16	0.21	18 43 36	+36 33 24	Orpheus
	HD 177830 b	1.28	1	0.43	19 05 20	+25 55 14	Eurydice
	HD 178911 B b	6.292	0.32	0.1243	19 09 03	+34 35 59	Siren
	TrES-1	0.61	0.0393	0.0	19 04 09	+36 37 57	Hermes
	HAT-P-5 b	1.06	0.04075	0.0	18 17 37	+36 37 18	Petasus
	WASP-3 b	1.76	0.0317	0.0	18 34 32	+35 39 42	Alipes
	Kepler-7 b	0.433	0.06224	0.0	19 14 20	+41 05 23	Daurdabla
	Kepler-8 b	0.603	0.0483	0.0	18 45 09	+42 27 04	Dagda
Mensa	HD 39091 b	10.35	3.29	0.62	05 37 09	-80 28 08	Adamastor
Microscopium	WASP-7 b	0.96	0.0618	0.0	20 44 10	-39 13 31	Talos
Monoceros	HD 45652 b	0.47	0.23	0.38	06 29 13	+10 56 02	Capra
	HD 46375 b	0.249	0.041	0.04	06 33 12	+05 27 46	Dejanira
	HD 52265 b	1.13	0.49	0.29	07 00 18	-05 22 01	Adamanthea
	HD 66428 b	2.82	3.18	0.465	08 03 28	-01 09 45	Caria
	CoRoT-4 b	0.72	0.09	0.0	06 48 47	-00 40 22	Cornucopia
	CoRoT-7 b	0.0151	0.0172	0.0	06 43 49	-01 03 46	Icarus

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Constellation	Planet	Mass (M_J)	SMA (AU)	Ecc.	RA	Dec	Name
	CoRoT-7 c	0.0264	0.046	0.0	06 43 49	-01 03 46	Daedalus
	CoRoT-1 b	1.03	0.0254	0.0	06 48 19	-03 06 08	Achelous
	CoRoT-5 b	0.467	0.04947	0.09	06 45 07	00 48 55	Cybele
	HD 44219 b	0.58	–	–	06 20 14	-10 43 30	Dexamenus
Musca	HD 111232 b	6.8	1.97	0.2	12 48 51	-68 25 30	Melaina
Norma	HD 142415 b	1.62	1.05	0.5	15 57 40	-60 12 00	Metis
	HD 143361 b	3.12	2	0.15	16 01 50	-44 26 04	Aegis
	HD 330075 b	0.76	0.043	0.0	15 49 37	-49 57 48	Pallax
	HD 148156 b	0.91	–	–	16 28 17	-46 19 03	Labrys
Octans	HD 142022 A b	4.4	2.8	0.57	16 10 15	-84 13 53	Auster
	HD 212301 b	0.45	0.036	0.0	22 27 30	-77 43 04	Notus
Ophiuchus	HD 148427 b	0.96	0.93	0.16	16 28 28	-13 23 59	Vediovis
	HD 156846 b	10.45	0.99	0.8472	17 20 34	-19 20 01	Yaso
	HD 170469 b	0.67	2.24	0.11	18 29 11	+11 41 44	Epione
	HD 171028 b	1.83	1.29	0.61	18 32 15	+06 56 45	Meditrina
	HD 149143 b	1.33	0.053	0.016	16 32 51	+02 05 05	Aratus
	GJ 1214 b	0.0179	0.014	0.27	17 15 19	+04 57 50	Shesha
Orion	HD 37605 b	2.3	0.25	0.677	05 40 01	+06 03 38	Cedalion
	HD 38529 b	0.78	0.129	0.29	05 46 34	+01 10 05	Eos
	HD 38529 c	12.7	3.68	0.36	05 46 34	+01 10 05	Sidde
	HD 290327 b	2.54	–	–	05 23 22	-02 16 39	Gilgamesh
Pavo	HD 181433 d	0.54	3	0.48	19 25 10	-66 28 08	Cithaeron
	HD 196050 b	3	2.5	0.28	20 37 51	-60 38 04	Hera
	HD 181433 b	0.0238	0.08	0.396	19 25 10	-66 28 08	Hestia
	HD 181433 c	0.64	1.76	0.28	19 25 10	-66 28 08	Argolia
	HD 190984 b	3.1	–	–	20 11 31	-64 37 14	Cydippe
	HD 175167 b	7.8	2.4	0.54	19 00 01	-69 56 39	Neelkanth
	SCR 1845 b	8.5	4.5	–	18 45 07	-63 57 43	Parvani
Pegasus	51 Peg b	0.468	0.052	0.0	22 57 27	+20 46 07	Bellerophon
	BD14 4559 b	1.47	0.777	0.29	21 13 36	+14 41 22	Chimera
	HD 209458 b	0.685	0.04707	0.07	22 03 10	+18 53 04	Osiris
	HD 210702 b	2	1.17	0.152	22 11 51	+16 02 2	Hypolita
	HD 219828 b	0.066	0.052	0.0	23 18 47	+18 38 45	Penthesilea
	HR 8799 b	7	68	0.4	23 07 29	+21 08 03	Philonoe
	HR 8799 c	10	38	0.4	23 07 29	+21 08 03	Iobates
	HR 8799 d	10	24	0.4	23 07 29	+21 08 03	Anteia
	V391 Peg b	3.2	1.7	0.0	22 04 12	+26 25 08	Chrysaor
	HAT-P-8 b	1.52	0.0487	0.0	22 52 10	+35 26 50	Nike
	WASP-10 b	3.06	0.0371	0.057	23 15 58	+31 27 46	Parthenos
Perseus	HD 16175 b	4.4	2.1	0.59	02 37 02	+42 03 45	Danae
	HD 16760 b	14.3	1.13	0.067	02 42 21	+38 37 07	Nicippe
	HD 17092 b	4.6	1.29	0.166	02 46 22	+49 39 11	Eurymedon
	HD 23596 b	7.19	2.72	0.314	03 48 00	+40 31 50	Seriphos
	WASP-11/HAT-P-10 b	0.46	0.0439	0.0	03 09 29	30 40 25	Kibisis
Phoenix	HD 142 b	1.03	1	0.37	00 06 19	-49 04 30	Pyrius
	HD 2039 b	4.9	2.2	0.67	00 24 20	-56 39 00	Phlegon
	HD 6434 b	0.48	0.15	0.3	01 04 40	-39 29 17	Bronte
	WASP-18 b	10.43	0.02047	0.0092	01 37 25	-45 40 40	Fulgitrua
	WASP-5 b	1.637	0.02729	0.0	23 57 24	-41 16 38	Tonitrua
	WASP-4 b	1.1215	0.023	0.0	23 34 15	-42 03 41	Abraxas
	HD 5388 b	1.96	–	–	00 55 11	-47 24 21	Aethon
	HD 8535 b	0.63	–	–	01 23 37	-41 16 11	Therbeeo
Pictor	AB Pic b	13.5	275	–	06 19 12	-58 03 15	Silenus
	beta Pic b	8	8	–	05 47 17	-51 03 59	Midas
	HD 40307 b	0.0132	0.047	0.0	05 54 04	-60 01 24	Asellus
	HD 40307 c	0.0216	0.081	0.0	05 54 04	-60 01 24	Marsyas
	HD 40307 d	0.0288	0.134	0.0	05 54 04	-60 01 24	Sardis
	HD 41004 A b	2.54	1.64	0.39	05 59 49	-48 14 22	Pactolus
	HD 41004 B b	18.4	0.0177	0.081	05 59 50	-48 14 23	Lityerses
Pisces	HD 10697 b	6.38	2.16	0.1	01 44 55	+20 04 59	Hedone

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Constellation	Planet	Mass (M_J)	SMA (AU)	Ecc.	RA	Dec	Name
	HD 217107 b	1.33	0.073	0.132	22 58 15	-02 23 42	Eros
	HD 217107 c	2.49	5.27	0.517	22 58 15	-02 23 42	Psyche
	HD 3651 b	0.2	0.284	0.63	00 39 21	+21 15 01	Porus
	HD 4203 b	2.07	1.164	0.519	00 44 41	+20 26 56	Penia
	HD 8574 b	2.11	0.77	0.288	01 25 12	+28 34 00	Zephyrus
Piscis Austrinus	Fomalhaut b	3	115	0.11	22 57 39	-29 37 20	Illion
	HD 216770 b	0.65	0.46	0.37	22 55 53	-26 39 31	Troad
	HD 205739 b	1.37	0.896	0.27	21 38 08	-31 44 15	Dardania
Puppis	HD 48265 b	1.16	1.51	0.18	06 40 02	-48 32 31	Medea
	HD 50499 b	1.71	3.86	0.23	06 52 02	-33 54 56	Lynceus
	HD 60532 b	3.15	0.77	0.278	07 34 03	-22 17 46	Iolaus
	HD 60532 c	7.46	1.58	0.038	07 34 03	-22 17 46	Mopsus
	HD 69830 b	0.033	0.0785	0.1	08 18 23	-12 37 55	Lachesis
	HD 69830 c	0.038	0.186	0.13	08 18 23	-12 37 55	Atropos
	HD 69830 d	0.058	0.63	0.07	08 18 23	-12 37 55	Clotho
	HD 70642 b	2	3.3	0.1	08 21 28	-39 42 19	Lusus
	NGC 2423 3 b	10.6	2.1	0.21	07 37 09	-13 54 24	Tagide
Pyxis	HD 73256 b	1.87	0.037	0.03	08 36 23	-30 02 15	Magnes
	HD 73267 b	3.06	2.198	0.256	08 36 18	-34 27 36	Dictys
	GJ 317 b	1.2	0.95	0.193	08 40 59	-23 27 23	Hymenaios
Reticulum	HD 23079 b	2.61	1.65	0.1	03 39 43	-52 54 57	Urania
	HD 23127 b	1.5	2.4	0.44	03 39 24	-60 04 40	Melete
	HD 27442 b	1.28	1.18	0.07	04 16 29	-59 18 07	Mneme
	HD 27894 b	0.62	0.122	0.049	04 20 47	-59 24 39	Plusia
Sagitta	HD 231701 b	1.08	0.53	0.1	19 32 04	+16 28 27	Paris
Sagittarius	HD 169830 b	2.88	0.81	0.31	18 27 49	-29 49 00	Chiron
	HD 169830 c	4.04	3.6	0.33	18 27 49	-29 49 00	Philyra
	HD 179949 b	0.95	0.045	0.022	19 15 33	-24 10 45	Nauplius
	HD 187085 b	0.75	2.05	0.47	19 49 33	-37 46 50	Pelion
	HD 190647 b	1.9	2.07	0.18	20 07 20	-35 32 19	Chariclo
	MOA-2007-BLG-192-L b	0.01	0.62	–	18 08 04	-27 09 00	Endeis
	OGLE-06-109L b	0.727	2.3	–	17 52 35	-30 05 16	Melanippe
	OGLE-06-109L c	0.271	4.5	0.15	17 52 35	-30 05 16	Okyrhoe
	OGLE-TR-10 b	0.63	0.04162	0.0	17 51 28	-29 52 34	Carystos
	OGLE-TR-56 b	1.29	0.0225	0.0	17 56 35	-29 32 21	Ajax
	OGLE235-MOA53 b	2.6	5.1	–	18 05 16	-28 53 42	Caeneus
	SWEEPS-04	3.8	0.055	–	17 58 54	-29 11 21	Actaeon
	SWEEPS-11	9.7	0.03	–	17 59 03	-29 11 54	Telamon
	MOA-2007-BLG-400-L b	0.9	0.85	–	18 09 42	-29 13 27	Achilles
	OGLE-05-169L b	0.04	2.8	–	18 06 05	-30 43 57	Arne
	HD 171238 b	2.6	2.54	0.4	18 34 44	-28 04 20	Patroclus
	HD 181720 b	0.37	–	–	19 22 53	-32 55 09	Aeneas
	HD 164604 b	2.7	1.13	0.24	18 03 07	-28 33 38	Alcathous
Scorpius	HD 145377 b	5.76	0.45	0.307	16 11 36	-27 04 41	Aetheria
	HD 147513 b	1	1.26	0.52	16 24 01	-39 11 34	Clymene
	HD 153950 b	2.73	1.28	0.34	17 04 31	-43 18 35	Aegiale
	HD 159868 b	1.7	2	0.69	17 38 60	-43 08 44	Phaeteon
	HD 162020 b	13.75	0.072	0.277	17 50 38	-40 19 06	Helia
	OGLE-05-071L b	3.5	3.6	–	17 50 09	-34 40 23	Dioxippe
	OGLE-05-390L b	0.017	2.1	–	17 54 19	-30 22 38	Leucothoa
	PSR B1620-26 b	2.5	23	–	16 23 38	-26 31 53	Methuselah
	MOA-2008-BLG-310-L b	0.23	1.25	–	17 54 14	-34 46 41	Ialysos
	WASP-17 b	0.49	0.051	0.129	15 59 51	-28 03 42	Euryphaessa
	GJ 667C b	0.018	–	–	17 18 59	-34 59 48	Merope
	HIP 79431 b	2.1	0.36	0.29	16 12 42	-18 52 32	Masha
	OGLE-2007-BLG-368L b	0.0694	3.3	–	–	–	Selket
Sculptor	HD 4113 b	1.56	1.28	0.903	00 43 13	-37 58 57	Pygmalion
	HD 4208 b	0.8	1.7	0.04	00 44 26	-26 30 56	Metharme
	HD 9578 b	0.62	–	–	01 33 17	-38 14 42	Paphos
Serpens	CoRoT-2 b	3.31	0.0281	0.0	19 27 07	+01 23 02	Arima

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Constellation	Planet	Mass (M_J)	SMA (AU)	Ecc.	RA	Dec	Name
	HD 168443 b	8.02	0.3	0.5286	18 20 04	-09 35 34	Delphyne
	HD 168443 c	18.1	2.91	0.2125	18 20 04	-09 35 34	Typhon
	HD 168746 b	0.23	0.065	0.081	18 21 49	-11 55 21	Askalaphos
	HD 175541 b	0.61	1.03	0.33	18 55 41	+04 15 55	Orthrus
Sextans	HD 86081 b	1.5	0.039	0.008	09 56 06	-03 48 30	Calypso
	HD 92788 b	3.86	0.97	0.334	10 42 48	-02 11 01	Circe
	BD-082823 b	0.045	0.056	0.15	10 00 48	-09 31 00	Telegonus
	BD-082823 c	0.33	0.68	0.19	10 00 48	-09 31 00	Nausinous
Taurus	eps Tau b	7.6	1.93	0.151	04 28 37	+19 10 50	Semele
	HD 37124 b	0.64	0.529	0.055	05 37 02	+20 43 50	Cadmus
	HD 37124 c	0.683	3.19	0.2	05 37 02	+20 43 50	Pax
	HD 37124 d	0.624	1.64	0.14	05 37 02	+20 43 50	Concordia
	HD 285968 b	0.0265	0.066	0.0	04 42 56	+18 57 29	Cilix
Triangulum	HD 13189 b	14	1.85	0.28	02 09 40	+32 18 59	Acmon
	HD 9446 b	0.7	0.189	0.2	01 33 20	+29 15 55	Saa
	HD 9446 c	1.82	0.654	0.06	01 33 20	+29 15 55	Thoth
Triangulum Australe	HD 147018 b	2.12	0.2388	0.4686	16 23 00	-61 41 20	Damnameneus
	HD 147018 c	6.56	1.922	0.133	16 23 00	-61 41 20	Celmis
Tucana	HD 221287 b	3.09	1.25	0.08	23 31 20	-58 12 35	Cyllene
	HD 4308 b	0.0405	0.118	0.27	00 44 39	-65 38 58	Nysa
	HD 215497 b	0.017	–	–	22 46 37	-56 35 58	Wagnuka
	HD 215497 c	0.33	–	–	22 46 37	-56 35 58	Hoksine
Ursa Major	4 Uma b	7.1	0.87	0.432	08 40 13	+64 19 41	Calliope
	47 Uma b	2.6	2.11	0.049	10 59 29	+40 25 46	Clio
	47 Uma c	0.46	3.39	0.22	10 59 29	+40 25 46	Euterpe
	HAT-P-13 b	0.851	0.0426	0.021	08 39 32	+47 21 07	Skiron
	HAT-P-13 c	15.2	1.186	0.691	08 39 32	+47 21 07	Kaikias
	HAT-P-3 b	0.599	0.03894	0.0	13 44 23	+48 01 43	Atalanta
	HD 68988 b	1.9	0.071	0.14	08 18 22	+61 27 38	Leto
	HD 80606 b	3.94	0.449	0.93366	09 22 37	+50 36 13	Niobe
	HD 81688 b	2.7	0.81	0.0	09 28 40	+45 36 05	Calydon
	HD 89744 b	7.99	0.89	0.67	10 22 10	+41 13 46	Artemis
	HD 118203 b	2.13	0.07	0.309	13 34 02	+53 43 42	Adonis
Ursa Minor	11 UMi b	10.5	1.54	0.08	15 17 06	+71 49 26	Boreas
Vela	HD 73526 b	2.9	0.66	0.19	08 37 16	-41 19 08	Argus
	HD 73526 c	2.5	1.05	0.14	08 37 16	-41 19 08	Peleus
	HD 75289 b	0.42	0.046	0.054	08 47 40	-41 44 12	Palaemon
	HD 83443 b	0.4	0.0406	0.008	09 37 11	-43 16 19	Echion
	HD 85390 b	0.14	–	–	09 50 02	-49 47 25	Idmon
	WASP-19 b	1.15	0.0164	0.02	09 53 40	-45 39 33	Talaus
Virgo	70 Vir b	7.44	0.48	0.4	13 28 26	+13 47 12	Cora
	HD 102195 b	0.45	0.049	0.0	11 45 42	+02 49 17	Erinys
	HD 102272 b	5.9	0.614	0.05	11 46 24	+14 07 26	Demeter
	HD 102272 c	2.6	1.57	0.68	11 46 24	+14 07 26	Persephone
	HD 106252 b	6.81	2.61	0.54	12 13 29	+10 02 29	Eleusis
	HD 107148 b	0.21	0.269	0.05	12 19 13	-03 19 11	Enna
	HD 110014 b	11.09	2.14	0.462	12 39 14	-07 59 44	Callichoron
	HD 114783 b	0.99	1.2	0.1	13 12 43	-02 15 54	Nycteus
	HD 130322 b	1.08	0.088	0.048	14 47 32	-00 16 53	Alastor
	HW Vir b	19.2	–	–	12 44 20	-08 40 17	Hecate
	HW Vir c	8.5	–	–	12 44 20	-08 40 17	Rodi
	PSR 1257+12 b	7e-05	0.19	0.0	13 00 03	12 40 57	Sisyphus
	PSR 1257+12 c	0.013	0.36	0.0186	13 00 03	12 40 57	Ixion
	PSR 1257+12 d	0.012	0.46	0.0252	13 00 03	12 40 57	Tantalus
	WASP-16 b	0.855	0.0421	0.0	14 18 44	-20 16 32	Liriope
	HD 125612 b	3.2	1.2	0.39	14 20 54	-17 28 53	Narcissus
	HD 125612 c	0.067	–	–	14 20 54	-17 28 53	Ameinias
	HD 125612 d	7.1	–	–	14 20 54	-17 28 53	Cephisus
	QS Vir b	6.4	4.2	–	13 49 52	-13 13 38	Anat
	61 Vir b	0.016	0.050201	0.12	13 18 24	-18 18 40	Devana

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Constellation	**Planet**	**Mass** (M_J)	**SMA** (**AU**)	**Ecc.**	**RA**	**Dec**	**Name**
	61 Vir c	0.0573	0.2175	0.14	13 18 24	-18 18 40	Tamar
	61 Vir d	0.072	0.476	0.35	13 18 24	-18 18 40	Tuonetar
Volans	HD 76700 b	0.197	0.049	0.13	08 53 55	-66 48 03	Nesaea
Vulpecula	HD 188015 b	1.26	1.19	0.15	19 52 04	+28 06 01	Laelaps
	HD 189733 b	1.13	0.03099	0.0	20 00 43	+22 42 39	Teumesia
	HD 190228 b	4.99	2.31	0.43	20 03 00	+28 18 24	Alopekos