

Appendix 8 The Tychos – Our Geoaxial Binary System

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Are all stars part of binary/double/multiple systems?

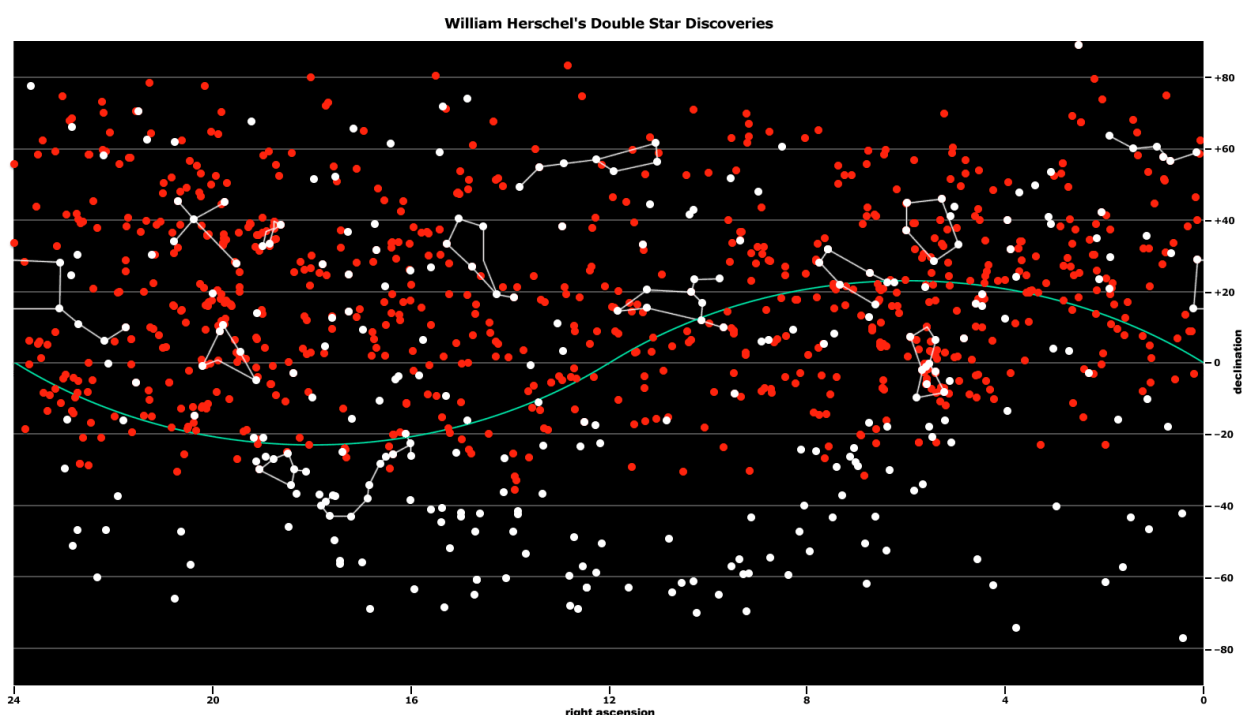
In the first pages of my book on the Tychos model,² I point out that at Tycho Brahe's time (the end of the 16th century) no one knew of the existence of double stars, or what is generally referred to as "binary" star systems. Everyone thought that all the visible stars in the firmament were so-called single stars. Still today, our Sun is considered to be a single, companionless star. It was only in 1650 (50 years after Tycho Brahe's death) that Giovanni Riccioli discovered the very first double star. Of course, the Tychos model proposes that our solar system is a binary system composed of the Sun and Mars, similar to the binary system of Sirius A and Sirius B (the two systems having the same relative proportions, as I serendipitously discovered: Mars is 0.4881% the diameter of the Sun, whereas Sirius B is 0.4888% the diameter of Sirius A).

Interestingly, Giovanni Riccioli³ was the author of the "New Almagest" which proposed a modified version of Tycho Brahe's geo-heliocentric solar system. On the cover below, note the old Ptolemaic model that lies discarded on the ground, made obsolete by the telescope's discoveries.



*"The frontispiece to Riccioli's Almagestrum Novum tells his perspective on the state of astronomy in 1651. Urania, the winged muse of astronomy, holds up a scale with two competing models, a sun-centered Copernican model, and the Tychonic geocentric model. Under God's hand from the top of the image, the scale reports the Tychonic model to be heavier and thus the winner."*⁴

By the mid-18th century, double stars were still considered to be a rarity. This belief started to wane when the famous William Herschel started finding hundreds of double stars all over our celestial sphere. Here's a chart⁵ of Herschel's 805 certified double star systems:



Fast-forward to the 1980s, one of the world's top experts in binary star systems, Wulf Heintz, estimated by the end of his career that at least 85% of all the stars had to be part of binary systems. Heintz was the successor of the famed Peter van De Kamp, another world-renowned researcher in the field of binary stars. The two colleagues and one-time friends are known to have had a fallout over a bitter (and, as we shall see, ultimately ironic) dispute which is described in detail in another appendix.

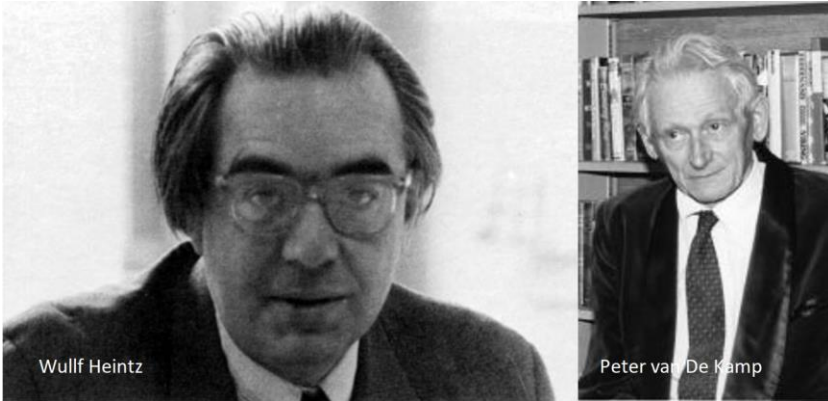
¹ <https://cluesforum.info/viewtopic.php?p=2411641#p2411641>

² <https://www.tychos.info/>

³ https://en.wikipedia.org/wiki/Giovanni_Battista_Riccioli

⁴ <https://www.loc.gov/static/collections/finding-our-place-in-the-cosmos-with-carl-sagan/articles-and-essays/modeling-the-cosmos/competing-cosmological-models.html>

⁵ <http://www.handprint.com/ASTRO/IMG/WHdisc.gif>, <http://www.handprint.com/ASTRO/herschel.html>



Today, the numbers of known binary star systems are in the range of several hundreds of thousands, as we can read in this Russian academic paper published by Malkov, Karchevsky, Kaygorodov, Kovaleva and Skvortsov as recently as October 2018:

“Binary Star Database (BDB): New Developments and Applications.

*The Identification List of Binaries (ILB) is a star catalogue constructed to facilitate cross-referencing between different catalogues of binary stars. [...] ILB currently contains about 520,000 entries: 120,000 systems, 140,000 pairs and 260,000 components.”*⁶

Clearly, binary systems are certainly not a rarity, as previously believed. To be sure, practically ALL of our nearest stars have now been firmly established as being double (or multiple) binary systems. You may verify this by yourself by looking them up one by one in the Wikipedia.⁷

But back to Heintz and Van De Kamp: we can read about their bitter controversy on Wikipedia. It had to do with Van de Kamp’s strong conviction, matured over many decades of studies, that even Barnard’s star had a binary companion. One of our nearest stars, Barnard’s star is famed for being the fastest-moving star in our skies. Yet, in a human lifetime, it will only move by about the angular diameter of our Moon, i.e. approximately 0.5°). Here is a summary of the relevant text on Wikipedia:

“Barnard’s Star affair

In the spring of 1937, Van de Kamp left McCormick Observatory to take over as director of Swarthmore College’s Sproul Observatory. There he made astrometric measurements of Barnard’s Star and in the 1960s reported a periodic “wobble” in its motion, apparently due to planetary companions. [...] Astronomer John L. Hershey found that this anomaly apparently occurred after each time the objective lens was removed, cleaned, and replaced. Hundreds more stars showed “wobbles” like Barnard’s Star’s when photographs before and after cleaning were compared—a virtual impossibility. Wulf Heintz, Van de Kamp’s successor at Swarthmore and an expert on double stars, questioned his findings and began publishing criticisms from 1976 onwards; the two are reported to have become estranged because of this. Van de Kamp never admitted that his claim was in error and continued to publish papers about a planetary system around Barnard’s Star into the 1980s, while modern radial velocity curves place a limit on the planets much smaller than claimed by Van de Kamp. Recent evidence suggests that there is, indeed, a planet orbiting Barnard’s Star, albeit of much lower mass than Van de Kamp could have detected.”

And here’s what Wikipedia’s Barnard’s Star page has to say about the search for the Barnard’s Star’s elusive companion:

*“Even though this research greatly restricted the possible properties of planets around Barnard’s Star, it did not rule them out completely as terrestrial planets were always going to be difficult to detect. NASA’s Space Interferometry Mission, which was to begin searching for extrasolar Earth-like planets, was reported to have chosen Barnard’s Star as an early search target. This mission was shut down in 2010. ESA’s similar Darwin interferometry mission had the same goal, but was stripped of funding in 2007.”*⁸

So both NASA’s and ESA’s efforts to search for Barnard’s companion, we are told, were shut down. One may wonder why. Lack of funding? Really? Or are NASA and ESA perhaps unwilling—for some reason—to help establish that all the stars in our skies are in fact binary/double/multiple systems? Hmm. Maybe because this would imply the absurd notion that our Sun is the only non-binary star in the entire universe and thus utterly destroy the plausibility of the currently accepted Copernican (heliocentric) model?

Well, it now turns out that Heintz was wrong and that Van de Kamp was right all along: just last month (November 2018) the ground-based European Observatory announced:

“Super-Earth Orbiting Barnard’s Star

Red Dots campaign uncovers compelling evidence of exoplanet around closest single star to Sun A planet has been detected orbiting Barnard’s Star, a mere 6 light-years away. This breakthrough - announced in a paper published today in the journal Nature - is a result of the Red Dots and CARMENES projects, whose search for local rocky planets has already uncovered a new world orbiting our nearest neighbour, Proxima Centauri.

*The planet, designated Barnard’s Star b, now steps in as the second-closest known exoplanet to Earth. The gathered data indicate that the planet could be a super-Earth, having a mass at least 3.2 times that of the Earth, which orbits its host star in roughly 233 days. Barnard’s Star, the planet’s host star, is a red dwarf, a cool, low-mass star, which only dimly illuminates this newly-discovered world.”*⁹

And in this “sister” article, we can read something that is of interest to the Tychos model and its proposed 1.6-km/h-speed of Earth:

“There have actually been many previous searches for planets around Barnard’s Star, and even announcements of discoveries, but not one has ever been confirmed. The thing is that the candidate planet we found is so small and so far from its host star that its effect on the star is

⁶ https://res.mdpi.com/data/data-03-00039/article_deploy/data-03-00039.pdf?filename=&attachment=1

⁷ https://simple.wikipedia.org/wiki/List_of_nearest_stars

⁸ https://en.wikipedia.org/wiki/Barnard%27s_Star

⁹ <https://www.eso.org/public/news/eso1837/>

really, really tiny. The planet only changed the star's speed by 4.3 km/h in each direction and with a long period of 233 days, making it extremely difficult to detect. Finding the planet was only possible by collecting an enormous number of velocity measurements. In total, we combined nearly 800 measurements from seven different facilities."¹⁰

As it is, another quite recent discovery (August 2016) was that of a binary companion (now named "Proxima Centauri B") of our nearest star, Proxima Centauri. Here's what we can read about it:

*"The Pale Red Dot data, when combined with earlier observations made at ESO observatories and elsewhere, revealed the clear signal of a truly exciting result. At times Proxima Centauri is approaching Earth at about 5 kilometres per hour - normal human walking pace - and at times receding at the same speed. This regular pattern of changing radial velocities repeats with a period of 11.2 days. Careful analysis of the resulting tiny Doppler shifts showed that they indicated the presence of a planet with a mass at least 1.3 times that of the Earth, orbiting about 7 million kilometres from Proxima Centauri - only 5% of the Earth-Sun distance."*¹¹

Wow! Both these recent discoveries (of the companions of Barnard's star and Proxima Centauri) report extremely slow "wobbling" speeds in the range of "normal human walking pace", much like the tranquil orbital speed of Earth (1.6 km/h) proposed by the Tycho model. Just think about it: have we not all been accustomed to hear about extremely fast/supersonic/hypersonic speeds in the context of planetary motions in our cosmos? Yet, we now have nearby stars such as Barnard and Proxima "wobbling" back and forth at a mere 4 or 5 kilometres per hour?

Well, as of the Tycho, "alien" astronomers living outside our solar system would conceivably be measuring our Sun's "wobble" as a 1.6 km/h motion, a speed which is very much within the range of the observed "wobbles" of Barnard and Proxima (4.3 km/h and 5 km/h, respectively).

And to be sure, it certainly now appears that, quite possibly, all our stars have a so-called "binary" companion. Hence, dear friends, what are the odds for the Sun to be the sole exception to this rule?

In conclusion: we live—in all likelihood—in a binary system composed by the Sun and Mars. Tycho Brahe's geometrical configuration of our solar system was basically correct. He only missed a few pieces of the puzzle, which the Tycho has now integrated in his original geoheliocentric model: the 1.6 km/h motion of Earth around its PVP orbit (Polaris-Vega-Polaris), rotating once a day around its axis and completing a PVP orbit in 25344 years. Mercury and Venus are the Sun's two moons. Phobos and Deimos are Mars's two moons. Jupiter, Saturn, Uranus, Neptune and Pluto/Charon (another mini-binary system)¹² all revolve in circular yet somewhat eccentric orbits around our Sun-Mars binary system.

One truly has to wonder why Riccioli (pronounced "Ritcholee" in English) is today virtually unknown to the general public, given that some scholars consider his work to have superseded that of Galileo. And remember, Riccioli can claim the extraordinary distinction of having been the first man on this planet to have discovered a double star.¹³

*"The historian of science Edward Grant has described [Riccioli's] Book 9 as being 'probably the lengthiest, most penetrating, and authoritative' analysis of this question made by 'any author of the sixteenth and seventeenth centuries', and one that, in his opinion, superseded Galileo's 'Dialogue Concerning the Two Chief World Systems - Ptolemaic and Copernican'. Indeed, one writer has recently described Book 9 as 'the book Galileo was supposed to write.'"*¹⁴

As for the problem that some of you will have with the definition of a binary or double star system (there are different types), I recommend reading a fine paper by Bruce McEvoy which explains how this only comes down to a question of nomenclature or semantics. For example, why do we call Mars a planet whereas we call Sirius B a star? They are very much alike, unless you buy the official Newtonian notion that Sirius B is 400,000 times denser/heavier than Earth while being slightly smaller than our planet:

"As it is grammatically confusing to give the same name to a thing and to the illusion of the thing - as if a mirage were called optical water - the received usage is profoundly defective. I adopt the following terminology:

—Optical pair (or optical group) for any stars joined by visual appearance only, without any evidence either for or against a possible gravitational bond;

—Pair asterism (or group asterism) for two or more stars assumed from available physical evidence - an extended linear relative motion, divergent proper motions or discrepant geometric or spectroscopic parallax distances - to be dynamically unrelated; and

*—Double star (without the redundant multiple star) to denote the three defining criteria that Heintz assigns to it."*¹⁵

¹⁰ <https://www.eso.org/public/blog/searching-for-an-exoplanet/>

¹¹ <https://www.eso.org/public/news/eso1629/>

¹² https://en.wikipedia.org/wiki/Double_planet, <https://academic.oup.com/mnras/article/404/1/442/3101592>

Giovanni Riccioli favoured a modified version of Tycho Brahe's system. Here is how he described the system that "came to [his] mind" when he was in Parma: "it shares everything with the Tycho system, except the orbits of Saturn and Jupiter; for [me] their center was not the Sun, but Earth itself". Later on though, Riccioli back-pedalled on this issue (in his "Astronomia reformata") - and eventually embraced Tycho Brahe's view that our superior planets revolve around the Sun.

¹³ Unless one considers legitimate the Dogon lore of multiple star systems.

¹⁴ https://en.wikipedia.org/wiki/Giovanni_Battista_Riccioli

¹⁵ <https://www.handprint.com/ASTRO/bineye5.html#binarystar>