Scutum: Cosmic Background

Intro (00:00)

Jordan: [upbeat music] Hi, I'm Jordan.

Kit: And I'm Kit.

Jordan: Welcome to Starry Time, where stars plus lines...

Kit: Equal stories.

Jordan: In today's episode, we'll be talking about the astronomy and other cosmic background of the constellation Scutum, the shield.

Background (00:36)

Kit: This week we have another constellation proposed by Polish astronomer, multi-hyphenate, Johannes Hevelius, and this one was proposed in 1684.

Jordan: Not to be confused with Johann Bayer, this is Johann Hevelius.

Kit: Uh, lots of Johann, Johannes, sort of adjacent names here.

Jordan: So actually, we've met Hevelius before. He's also responsible for Leo Minor, which we discussed earlier this season, and spoilers, we're not through with all the Hevelius constellations.

Kit: This particular constellation, Scutum, was officially adopted by the IAU in 1922.

Jordan: It was named after John III Sobieski, a king of Poland and Grand Duke of Lithuania in the 17th century, between 1674 and 1696. He's not an insignificant feature in Scutum, so we'll talk about him more next week, but this marks one out of the two constellations in the night sky that have been named after real people, real historical royalty.

Kit: Yeah, the other constellation is Coma Berenice, which we haven't covered yet, but is named after Queen Berenice II, the ruler of Ptolemaic Egypt between 246 and 222. For his part, King

John's major accomplishment or claim to fame was fending off attacks from the Ottoman Empire, which led to him being called the Savior of Western Christendom by Pope Innocent IX.

Jordan: Man, they love it when you fend off attacks.

First Impressions and Where to Find It (02:15)

Kit: This is actually a relatively small constellation, coming in at only 109 square degrees.

Jordan: Pretty small, yeah. It's 84th in size out of the 88 constellations recognized.

Kit: All right. Let's, uh, move on to our first impressions. What did this constellation look like to you, Jordan?

Jordan: Kit, I don't know a lot about, uh, ancient shields.

Kit: [laughs]

Jordan: But I imagine this is what they would look like. I mean, to me it looks like a diamond or, um, but something that you would use to protect yourself. I felt like this was an easy one. I got what Hevelius was doing here. It read as a, as a shield to me, although, you know, in my head sometimes I think of shields as more round. But what about you, Kit? What did it look like to you?

Kit: [laughs] Yeah. Yeah, I definitely saw a kite. It's more in that, like, sort of maybe bigger shield. I don't know what shields were like in the 17th century either, but certainly shield, kite-like, I th- uh, I think that's fair to say.

Jordan: Getting a bit more technical, as we love to do, the constellation has a declination of negative 10 degrees and a right ascension around 19 hours.

Kit: It's north of the teapot asterism of Sagittarius, and it's also neighbored by Aquila the eagle and Serpens Cauda.

Jordan: For more on Serpens Cauda, we also did an episode about that earlier this season.

Kit: But this constellation is very faint and, as we said, small, but is technically visible from latitudes positive 75 to negative 90.

Jordan: And if you're looking for it in the night sky, your best chance is to try looking for it during nights in August.

Brightest Star (03:56)

Kit: Now that we know what it looks like and where to find it and when to see it, let's talk more about the brightest star in this constellation.

Jordan: Well, unfortunately, our guy Bayer, Johannes 1.0, our first Johannes, you know, the one that lives forever in our hearts, died in 1625. So about, what, 60 years before Hevelius comes along. So these designations won't come from Bayer, for better or for worse.

Kit: So the brightest star in Scutum actually has historically had two designations. So the first one was 1 Aquilae when it was considered as being part of the constellation Aquila the eagle, but then eventually it became Alpha Scuti.

Jordan: All right. So someone did-

Kit: [laughs]

Jordan: ... get it right the, the second time at least, but there's some back and forth here. Uh, do we know who actually did these designations?

Kit: So it's not completely clear to me, like, I couldn't get a clear answer on this. It seems that maybe a person called Johann Bode was involved either in the original or subsequent designations of the constellation Scutum.

Jordan: All right. Another Johann B?

Kit: [laughs] Yeah, I know. Yeah, very popular name. Johann Bode, uh, was a German astronomer, lived from 1747 to 1826, had a very, uh, successful, illustrious career, uh, helped to discover and name the planet Uranus, um, and helped to determine its orbit.

Jordan: Shout out to this guy if he's who we have to thank for Uranus.

Kit: [laughs] So it seems.

Jordan: It's a lot to think about.

Kit: Alpha Scuti doesn't actually have an official alternative name, but it is a fourth magnitude star with a visible magnitude of 3.85. It's an orange giant. It's 1.3 times the mass of our sun with a radius of 20 times that of the sun. It might be a variable star, but it's not clear, and it's located 175 light years from us. I should also note here that Pioneer 11 is actually headed in the direction of this constellation, though its battery will not survive to reach our friend Alpha Scuti, which is the closest star to us in this constellation of Scutum. And honestly, that's all I could find out about our brightest star, Alpha Scuti.

Bayer's Variable Star (06:25)

Jordan: All in all, a solid giant star. At least Bode got this one right. All right, Kit, let's move to our next segment, which is Bayer's Variable Star. This segment is about following the Greek alphabet to explore other designated stars, generally Bayer-designated stars, in our constellation of the month.

Kit: Last month we learned about Theta Lupi, so we should be on Iota Scutum.

Jordan: We should be, but Johann Bayer shows us the way, and the way is sometimes we gotta make up our own rules because, Kit, there is no Iota Scuti.

Kit: Oh, so, so what are the bylaws here on how to proceed?

Jordan: I mean, I think you just have to find another star of interest, although not necessarily a variable star, but I mean, what else can you do? There's no Iota Scuti to work with.

Kit: Yeah. Sometimes, you know, you gotta be flexible.

Jordan: Well, it's great. I mean, because our bylaws, uh, you know, they're so flexible that they might just be something that, like, we just totally made up for each other. I mean, some people could say that, but other people know that yes, they're very, very rigid.

Kit: And real.

Jordan: And real. I've chosen, per these very real bylaws, to talk about the star UY Scuti. So before anyone gets the wrong idea, I mean the star UY Scuti, not Young Thug's 2025 album of the same name.

Kit: I, I don't know, one, who Young Thug is, or two, that, uh, Young Thug was an astronomy fan.

Jordan: Kit, everyone's an astronomy fan. I don't know why you'd be surprised. Young Thug knows what's up. Anyway, UY Scuti the star is a red supergiant or a hypergiant star.

Kit: On our good friend, the HR diagram.

Jordan: Okay, Hertzsprung-Russell.

Kit: Mmhmm. I mean, the Hertzsprung-Russell, the HR diagram, is always welcome here. Both the hypergiants and supergiants live toward the top of the figure, and they have between a negative 15 and negative 10 absolute magnitude. They range in spectral type from B to M. Hypergiants live slightly above the supergiants, and they're just more luminous than the supergiants are.

Jordan: And stars like UY Scuti are sometimes termed red hypergiants, which is more to describe those M-type red supergiants that are extra inflated and somewhat unstable. UY Scuti, for example, has a radius of 909 solar radii, which is 4.23 AUs in radius, or around 393 million miles.

Kit: Yeah. So, so by way of reminder, right, the sun's radius is about 435,000 miles. The Earth's radius, by contrast, is around 4,000 miles.

Jordan: UY Scuti, pretty large. If you plopped it, you know, into our solar system in place of the sun, it would go past Mercury, past Venus, past us, past Mars.

Kit: Yeah, watch out, asteroid belt. Jupiter coming for you.

Jordan: Not, it's not small. UY Scuti was first cataloged in 1860 as part of the Bonner Durchmusterung Stellar Catalog by astronomers at the Bonn Observatory in Germany. UY Scuti will likely, when its time comes, experience a Type II supernova.

Kit: Yeah. So there are basically two general types of supernovae, though our guy Fritz Zwicky-

Jordan: Zwicky in the house

Kit: ... yep, proposed some additional types which haven't seemed to be fully adopt-- Type II supernovae and its various subtypes are generally found among these very supermassive stars

whose cores collapse. Um, and, uh, the subtypes that exist basically describe the novas that we observe afterwards, how bright they are.

Jordan: Let's take a quick break, and when we come back, we can find out, Kit, what won your gold star this month.

Gold Star (10:59)

Jordan: [upbeat music] Welcome back. This segment is called Gold Star. In this segment, we alternate picking the star or space object in our constellation of the month that captures our mind, our hearts, perhaps even our soul. It's up to you this month. Where'd you decide to go with this one, Kit?

Kit: As always, a couple of honorable mentions in Scutum. First, we have six open clusters that are relatively close together, known as RSGC 1 through 6, which stands for Red Supergiant Cluster 1 through 6.

Jordan: They really pulled out all the stops in the creative department here.

Kit: Yeah. Some of them have alternative names, you know, Stephenson 2 or things like this, but, uh, none of them are particularly, uh, intriguing names, I wouldn't say.

Jordan: So I can understand why maybe these weren't gonna be your first choice, but why did these open clusters stand out to you, Kit?

Kit: So I think the reason is really in the name. It's because they have a lot of red giant members, and so astronomers believe that these open clusters are at the intersection of the long arm of the Milky Way and the inner portion of the Scutum-Centaurus Arm.

Jordan: Kit, that's actually really interesting 'cause we know that's one of the two major spiral arms of our galaxy. The other being, of course, called the Perseus Arm.

Kit: Yeah, Perseus. Mm. But what makes these open clusters interesting is that they're extremely massive. So we're talking about 30 to 50,000 solar masses in each of these open clusters, in part because, again, they have these massive supergiants in them. So Stephenson 2, for example, has 26 confirmed red supergiants. The RCSG C-1 has 14, and the others have between seven and 16 of these red supergiant members.

Jordan: For some context, the Pleiades, which is a very famous open cluster in Taurus, has over 1,000 stars, but it's primarily made of hot OB stars and has a mass of around 800 solar masses. So you can learn more about the astronomy and mythology of the Pleiades in our back catalog, too.

Kit: Yeah, a lot in the back catalog. But yeah, I think helps to highlight just how massive these open clusters are in Scutum, so definitely worthy of an honorable mention. Uh, my second honorable mention has a more unique name. It's called the Wild Duck Cluster.

Jordan: All right. Wild Duck Cluster. That's at least more interesting than Red Supergiant Cluster 1 through 6, Stephenson 2, Alicante et cetera.

Kit: Yeah. So this is also known as Messier 11, and in some images, it kind of looks like a V shape of the commuting geese, which is how it's got its name. Um, it's actually another open cluster, but it was discovered by the German astronomer Gottfried Kirch in 1681, and it's essentially unique because you can see it with your naked eye and it contains more than 2,900 stars, making it one of the most densely populated open clusters, uh, astronomers have discovered so far.

Jordan: All right. So it's incredibly densely populated, but I'm guessing it's not as massive as the red giant superclusters, though?

Kit: Yeah, exactly. So despite this being densely clustered, the estimated mass is between around 3,700 and 11,000 solar masses.

Jordan: Kit, so we have some dense open clusters. We have some pretty impressive honorable mentions. So if these weren't enough to win your gold star, what did?

Kit: So my gold star can be found in the globular cluster NGC 6712, which is-- which was discovered in 1749 by French astro- a French astronomer with so many names that I feel overwhelmed just looking at it. So, uh, he's most often known as Guillaume Le Gentil.

Jordan: All right. So this guy's got seven names. I'm not sure if I can get it all out in one breath, but I will try. Guillaume Joseph Hyacinthe Jean-Baptiste Le Gentil de la Galissière.

Kit: A lot of names. Uh, I'll be sure to post all of those names on our socials later if you wanna try yourself. But anyways, the globular cluster itself is beautiful, but my specific gold star is a

pulsar within this globular cust- cluster, which is called PSR J1853-0842A. And this pulsar is something that is known as a black widow-type pulsar.

Jordan: Black widow pulsar, that's like something out of science fiction. That's an all-timer.

Kit: I was very intrigued.

Jordan: Highly, yes. But all right, so what's that mean to be a black widow pulsar?

Kit: Okay. So it's a pulsar, obviously, with a cloud of material around it, which astronomers have discovered, uh, is, is present because the pulsar's radiation and particle wind have been eroding off parts of the companion over time. So the companion ends up being a low-mass star or a brown dwarf. So it's a pulsar that has this, like, detritus essentially from its companion that it is eating.

Jordan: They actually nailed this. I mean, it's orbiting and then eating its companion.

Kit: Yeah. So you gotta give a black widow pulsar a wide berth.

Jordan: As far as gold stars go, Kit, I am happy to give a warm welcome to J1853-0842A, AKA the black widow pulsar, maybe one of the coolest ones we've done yet. Happy to add them to the gold stars of the month. This brings us to the end of our exploration of the cosmic background of our constellations of this month's Scutum. Join us next week as we learn and ret-constellation the myth of the month with.

Outro (17:42)

Kit: This has been Kit.

Jordan: And Jordan.

Kit: With your host stars of the month.

Jordan: And that's it.