**Mark:** [00:00:00] Welcome to the Endless Knot podcast

**Aven:** where the more we know

**Mark:** the more we want to find out

**Aven:** Tracing serendipitous connections through our lives

**Mark:** and across disciplines.

**Aven:** Hi, I'm Aven.

**Mark:** And I'm Mark.

**Aven:** And today we're talking about music.

**Mark:** [sings 'doo de doo']

**Aven:** I'm cutting that out

So really we're gonna jump right into it pretty soon. We're gonna be talking about one of Mark's videos about music and the origin of the word, but we should talk about cocktails quickly, before we get to that, I was shocked, at how hard it was to find a cocktail that was about music. Maybe there are ones that I just don't know, but I couldn't find anything other than like the American Woman shot and things like that.

You know, some rock and roll themed things that weren't quite what I wanted. So I've settled on one called The Monks [00:01:00] Muse, and it will become obvious, I think, why that's an appropriate cocktail. It's from an online, the Gastronom blog and I think it was sort of made on the spot. I don't think it's a traditional cocktail. I think it's a one off, but we'll see what we think. So let's try some and then I'll tell you what's in it.

 That's quite

**Mark:** sweet. It is.

**Aven:** Well, so it's supposedly, I mean, it is, I put it in, I know what's in there. Gin, vermouth blanc, I used that bianco style vermouth, Chartreuse, pear nectar, which was basically pear syrup that I made earlier today, honey simple syrup, and lemon juice. It was supposed to have camomile bidders. I don't have any, I put some pear bitters in and egg white.

Okay. What do you

**Mark:** think? Yeah, the, the two syrups makes it quite sweet.

**Aven:** I mean, they said pear nectar, maybe I should have made it with less or no sugar, but when I looked up pear nectar recipes, they all were basically a, a simple syrup with pear. Right. [00:02:00] Yeah, I think it's too sweet and I don't think the other flavors, I don't think the shirts come through as much as it should.

 It's okay. Not great. Not worth the amount of effort I put into making the pear nectar and the honey simple syrup and all the rest of it. Oh, well sometimes, sometimes they're great. Sometimes they ain't .

Oh, well, okay. Well, moving on from that. Let's try to make the rest of the episode less of a disappointment, shall we? So do you wanna just tell us briefly about this video? Yes.

**Mark:** First of all, it should be said that this was a, a collab video . Between our channel and 12 Tone.

**Aven:** do you want to explain 12 tone?

Yeah. For those that don't know them.

**Mark:** Yeah. So, 12 Tone is a music theory channel. And Cory, who is the creator behind this channel does either videos on sort of interesting theoretical concepts musical theory [00:03:00] concepts. And once a month they do a song analysis of a pop song. Yeah. Some kind of popular music.

**Aven:** It's very good channel, obviously we think it is.

**Mark:** It's one of my favorite channels.

And Cory is a good friend and it's a very popular channel. So if you're interested in music and you don't know about this YouTube channel, go and check it out. I highly recommend it. And so we talked about the idea of doing a collab, because that's a very popular thing to do in the YouTube world, and this was the idea that we came up with.

And so it's about the intersection between music and language and that intersection is kind of focused on the brain and how, music is a product of the brain in your video in particular, in my video in particular. And also about how music is written down.

**Aven:** And talked about. And so Cory's video on their channel. has bits from you and is [00:04:00] about the development of the notation system, notation system to a larger extent. So we'll put a link obviously to their channel, Yeah, to their video as well. The other thing we should say just before we start, in case we forget to later, is that Cory did, not at the time, but does now have a podcast Yes.

Along with another creator, Polyphonic.

**Mark:** Who is another YouTuber. And the podcast is called Ghost Notes, and again, it's about music in sort of a often a more big picture way. I guess. Yeah.

**Aven:** They don't really talk, I mean, they'll talk about individual songs as examples, but their topics are more general questions about music and how it works and How we think about it and what people do with it.

**Mark:** Yeah. So, again, highly recommended. if you're a music fan,

**Aven:** I enjoy it. And I do not have, I will say that 12 tone's videos are very good, but they are above ,they, they're outta my, They're very technical. Yeah. They're outta my understanding of music theory and I don't have the brain space to learn.

Like I could learn from their channel for sure. But I just, [00:05:00] it's not on my list of things to learn right now, but I listen to their podcast and I don't have problems with it. it's not beyond my understanding in the same way because it's not as technical and it's more sort of philosophical and I enjoy it very much.

Okay. So with that preamble, shall we just listen to the video now? Sure.

**Mark:** Music has always had a close connection to language. The word music, as well as its theoretical study in the Western tradition, goes back to Ancient Greece. It comes to English through French musique and Latin musica, from Greek mousikos “of the Muses”. The Muses, Greek Mousai, are the nine Greek goddesses of inspiration in the arts and sciences, each responsible for a particular endeavour, ranging from lyric poetry to dance to astronomy. The sense shift of the word music was already beginning in Greek, from referring to the Muses, to poetry sung to music, and finally to the music itself. If we go back further music and Muses have been traced back to the Proto-Indo-European root \*men- “to think”, also the source of the words mind [00:06:00] and mental, as well as, through Sanskrit, the word mantra, a word or phrase chanted or sung as part of prayer or meditation, one of the many ways music can influence the mind.

**Cory:** European music theory can be traced back to the Greek philosopher and mathematician Pythagoras, who seems to have been the first person to figure out the mathematics at the heart of musical sound, realizing that the pitch of a note is inversely proportional to the length of the string that produces it and that intervals between harmonious notes form simple ratios of string length, such as 2:1 for an octave, 3:2 for a perfect fifth, and 4:3 for a perfect fourth. And since the motions of the heavenly bodies were also seen to involve numerical ratios, Pythagoras proposed the notion of the Music of the Spheres, later known as musica universalis, in which those ratios implied a kind of heavenly music that surrounded us at all times, even if we couldn’t directly hear it.

**Mark:** Another Greek philosopher, Aristotle, who advanced the notion of the geocentric model of the universe with the sun, moon and planets circling the earth, though accepting that mathematical ratios were at the heart of both music and the heavens, nevertheless took the idea more metaphorically, with no actual sound produced. These and other Greek music theorists were [00:07:00] summarized and transmitted to western Europe by the late Roman writers Boethius and Martianus Capella. Boethius, the early 6th century philosopher most well known for his Consolation of philosophy, wrote De insitutione musica, heavily based on Greek music theory, classified music into several categories, musica mundana, a version of Pythagoras’s music of the spheres, and wrote about the important influence of music on character and morals. As for the 5th century Martianus Capella, he was responsible for the development of the seven liberal arts: the trivium, or verbal arts, of grammar, rhetoric, and logic, and the quadrivium, or mathematical arts, of arithmetic, geometry, astronomy, and music. He wrote what is essentially a textbook of these liberal arts called De nuptiis Philologiae et Mercurii or About the marriage of Philology and Mercury, actually a metaphorical work in which the subjects of the seven liberal arts are laid out as speeches made by the bridesmaids at the wedding, with the musical content drawn from a variety of Greek sources. And it’s the work of Martianus Capella and Boethius that lies at the heart of the European medieval educational system.

Another educational word we get from the Mousai, [00:08:00] the Muses, is museum. Originally a museum, or mouseion in Greek, was a temple dedicated to the Muses, often filled with offerings relevant to the artistic and scientific domains of the Muses themselves, the most famous of which was the Musaeum of Alexandria. That association lingered in some of the earliest modern museums, such as the famous 18th century Freemasons’ lodge in Paris, Les Neuf Soeurs, “The Nine Sisters” in reference to the Muses, which supported various academic endeavours, as well the American Revolution, making it in a sense a modern iteration of the Musaeum of Alexandria. Les Neuf Soeurs counted among its members such Enlightenment free thinking bigwigs as Voltaire, Benjamin Franklin, and one Joseph-Ignace Guillotin, whose name is most associated with the guillotine. In fact, not only did he not invent the contraption [that was the work of surgeon Antoine Louis], he was against capital punishment, but short of the abolition of the practice he also advocated for a more humane method of execution, and so his name has since been associated with this particular terror of the French Revolution. Another important historical footnote [00:09:00] about Guillotin is that he was appointed, along with fellow member of Les Neuf Soeurs Benjamin Franklin, to look into the claims of 18th century German doctor Franz Mesmer about what he called “animal magnetism”, an invisible natural force shared by all living things. Mesmer believed this force could affect people, for instance healing them. This animal magnetism also came to be known as mesmerism, a practice that eventually led to what we know today as hypnotism.

But as we’ll see, hypnotism isn’t the only mind-related thing to grow out of an early pseudoscience—and here’s where we come back to language and, eventually, music. Because one of those early hypnotists who tried to harness hypnotism for legitimate scientific purposes, was French physician Paul Broca. You see Broca experimented with using hypnotism as a form of surgical anaesthesia. But what Broca is most known for is discovering Broca’s area, the region of the brain that is responsible for speech production, and thus pioneering the modern scientific idea of the localization of brain functions. And this is where the pseudoscience comes in, because the first theories about certain parts of the brain having specific functions came from the [00:10:00] phrenologists, who measured skulls and attributed characteristics and behaviours to skull shape. The theory was first proposed by Franz Joseph Gall. It was Gall’s follower and sometime research partner, before they had a falling out, Johann Spurtzheim who gave the name phrenology to the study. Gall accused Spurzheim of plagiarizing and perverting his work, but it was through the efforts of Spurtzheim, who travelled and lectured around Europe, that phrenology gained its popularity and notoriety. It was on one such lecture tour in America that Spurtzheim suddenly died. He was given an elaborate funeral by his American followers, and his funeral oration was delivered by German-born pedagogue and unitarian minister Charles Follen. Follen had been something of a German nationalist, which frequently got him into trouble, being accused of revolutionary activities and even assassination. As a result, Follen was often on the move teaching a variety of subjects in a variety of locations before relocating to the United States where he got work as a professor of German at Harvard. One of the ideas he brought with him from Germany to the US was the practice of gymnastics, which he had picked up from Friedrich Ludwig Jahn, often considered the father of modern gymnastics. Gymnastics, of [00:11:00] course, can also be traced back to ancient Greece, and the word gymnos “naked” because the Greeks exercised in the nude. It was considered an important part of the ancient Greek educational system, along with poetry and playing the lyre—the word that gives us lyric, originally meaning a poem sung to the music of a lyre. For Jahn, who was also a German nationalist and something of a xenophobe, gymnastics was part of his nationalist programme to prepare the German youth for the troubles that would lie ahead and he would lecture his gymnastics classes about German national heritage. Some have even called Jahn the spiritual founder of Nazism. Well Follen took this interest in gymnastics and founded the first gymnastics club in the US in Boston in 1826 as well as the first college gymnasium at Harvard. But the outcome of the gymnastic craze in the US was rather different, because American branches of the YMCA started to house their own gymnasiums. The YMCA, founded in London in 1844, began as an effort to provide low-cost housing and a safe Christian environment, away from all the evils of the city. But gradually they have evolved into places of [00:12:00] education for both the body and mind [you can even take music lessons there], I suppose living up to the old Latin phrase from Juvenal mens sana in corpore sano “a healthy mind in a healthy body” — mens by the way comes from that same root that gives us mind and music.

But getting back to brain regions and Broca, he entered into the debate about phrenology and instead started looking under the skull for evidence of the localization of brain functions. It was Broca’s studies of people suffering from aphasia, impairment of language, that led him to discover that if a patient had damage to a particular region of the brain that we now call Broca’s area, they would have difficulties with speech production. Later on, following in Broca’s footsteps, Carl Wernicke identified a region in the brain we now call Wernicke’s area that was implicated in speech comprehension, and since then neuroscientists have been exploring the various areas of the brain, mapping out their responsibilities. But what goes along with the localization of brain functions, as we’ve been discovering more and more in recent years, is the importance of brain plasticity. Other areas of the brain, with much training, can sometimes pick up the slack [00:13:00] from damaged areas. And this lies behind the notion of what’s called Melodic Intonation Therapy which uses music, to finally return to our main topic, the connection between music and language, to help those suffering from Broca’s aphasia, that is, trouble producing speech due to damage to Broca’s area from head trauma or stroke.

**Cory:** The idea of music as therapy goes back a long way, and even our old friend Aristotle believed that music could be used to heal the soul and purify the emotions. But Melodic Intonation Therapy, or MIT, is a bit more scientific: it takes advantage of the localization of brain functions and the plasticity of our neurons to help restore speech. Broca’s area is located in the left hemisphere of the brain, but singing seems to be more focused in the right. Practitioners of MIT try to harness the part of the right hemisphere that corresponds to Broca’s area by having their patients sing melodic lines in order to learn to speak again. There have been cases of individuals losing their ability to speak but still being able to sing words which lends credence to this approach, although it should be noted that there's ongoing debate about the efficacy of this form of therapy, and neither Mark nor I are experts in the field.

**Mark:** But there might be something even deeper [00:14:00] going on in terms of the connection between music and language.

In fact, linguists talk about pitch or tone in language all the time. A great many languages of the world use tone to make grammatical or lexical distinctions, that is to indicate the grammatical function of a word in a sentence or to distinguish between one word and another, and we call these tonal languages. Even English uses tone to a lesser degree to convey meaning, such as when we raise the tone at the end of a question. To be clear, these aren’t absolute pitches that make these sorts of distinction, but relative changes in pitch, higher or lower. But can tone alone convey meaning? In other words, can music be language? The answer to this is a qualified yes. The clearest example is whistle languages, which can be found independently in a number of places around the world. In a whistle language the complete meaning of an utterance is conveyed through whistle alone. Whistle languages don’t exist independently of a regular spoken language, though, but are built on top of the spoken variety of the language. They are particularly common with spoken languages that already use tone to convey meaning, [00:15:00] as those tones are readily expressed through the pitches of the whistled form of the language. Whistle languages arise in places where communicating across difficult terrain is advantageous, for instance when hunting. One such group that has a whistle language are the Piraha, located in the Amazon. Not only do they have a whistle language, but also a hummed version of their language, which is used exclusively between mothers and their children. When the boys grow old enough to engage in hunting, they leave behind the hummed version of the Piraha language and instead begin to use the whistled version when hunting in the dense rainforest.

But the links between music and language may go back even further. Both are human universals — all human cultures known today have developed both language and music, and anthropologists have speculated about how far back these two quintessentially human activities go, with musical instruments having been uncovered that are 40,000 years old, and both seem to serve crucial social functions, which is perhaps the most defining feature of the human species, their intense and complex social behaviours. And in fact some researchers think that music may be connected to our ability to use language. [00:16:00] Music and language have many similar elements, such as phrasing, the use of acoustic articulation, and tone. Furthermore music is something of a problem for evolutionary scientists, when one considers what actually is the evolutionary benefit of music, and it turns out that this might be connected with language. Charles Darwin held humans’ musical ability to be “amongst the most mysterious with which he is endowed” and proposed that music might have served as a kind of protolanguage. Although Steven Pinker has dismissed music as “auditory cheesecake”, an evolutionary byproduct that serves no adaptive function, many evolutionary scientists have picked up on this notion, and come up with their own versions of the musical protolanguage theory. For instance, Steven Brown terms this a musilanguage, an early hominid behaviour which was the common ancestor of both language and music. Similarly it has been suggested that language developed through mimicry of natural sounds, tool-use sounds, and the sound of locomotion, as no doubt bipedalism would have led to rhythms which could be imitated. And from a developmental standpoint, music and language are not nearly so differentiated from [00:17:00] one another in early infancy, and it’s been suggested that cooing and other pre-verbal vocal interaction between baby and mother, with mothers engaging in sing-songy motherese and babies particularly paying attention to the melodic and rhythmic aspects of their mothers’ vocalizations, may have developed from early hominid behaviours resulting from the need to put the baby down, an evolutionary necessity caused by bipedalism as human babies, unlike other primates, were unable to cling to their mothers allowing them to have their hands free for foraging.

But before we wrap up, let’s return to where we started, with the Muses. Because the mother of the Muses in Greek mythology was Mnemosyne, Titaness and personification of memory. Her name can also be traced back to that same Proto-Indo-European root \*men-, and is thus related to the English word mnemonic, something that “aids the memory”. No doubt all cultures have developed and used mnemonic tools over the millennia, including our old friends Aristotle in Greece and Martianus Capella in Rome.

**Cory:** any college student can tell you the value of good mnemonics, and trust me, musicians are no different. one famous example is the [00:18:00] Guidonian Hand, a tool used by medieval musicians where different notes were assigned to different parts of the hand in order to help remember the structures of their scales. another more recent mnemonic is the Circle of Fifths, which is still to this day saving the grades of music majors all around the world. it works by putting all the notes in a circle, with each clockwise step representing the interval of a perfect fifth, and going around the circle tells you how many sharps or flats each key should have which, trust me, is a pretty big deal.

but probably the most important mnemonics of all are ones we mostly take for granted: the note names themselves. calling this specific frequency a G helps me remember its relationship to this one, an E. it helps me identify its similarity to this, which is the same note on a different instrument. it even helps me remember how to sing it, although for that we have an even better system called Solfege. this is that Do-Re-Mi stuff Julie Andrews was singing about, and it assigns each note a single syllable so that they're all easy to sing. there's a couple different kinds of Solfege, depending on where you studied and what you're trying to do, but certain versions even help you identify similar relationships between notes, even in different keys.

**Mark:** And there’s in fact quite a [00:19:00] fascinating story behind those note names, and the Solfege system -- which Cory will tell you all about in his video, so click on the card or the link in the description to head on over to 12Tone and hear that!

 So I first wanna go into a little bit more detail about the stuff about note names.

first I'll actually start off with talking about the Boethian notation system. And in fact I'll talk a little bit about Boethius himself a little bit more cuz I didn't give a lot of detail about who he was. Yeah, sure. So Boethius's life illustrates the central ideas of probably his most famous work, more famous than his music treatise

**Aven:** Yeah. Famous. We're using Famous in the way that we always use famous, like I talk about famous Latin poets. What we mean is famous among people who know anything about medieval literature famous.

**Mark:** Even people who know nothing about medieval literature will know about one thing that comes out of his most famous work.

So the most famous [00:20:00] work is the Consolation of Philosophy. And it is in this work that we hear about the Wheel of Fortune.

**Aven:** I think you're overstating it that most people will know about the Wheel of Fortune.

**Mark:** Well, they know the game show, so they know .

**Aven:** Yeah. But I dunno how many of them think that that comes from something medieval.

No,

**Mark:** no. Well, that's what I'm saying. They don't know where it comes from, but they know the idea that it's chance. Random chance. You spin a wheel and who knows it will happen. Yes. Right. . So Boethius himself was born just after the Gothic leader Odoacer deposed the last Roman emperor.

**Aven:** Romulus Augustulus!

Yes. His name always has to be said .

**Mark:** The Boy Emperor. And Odoacer declared himself King of Italy. And so Boethius held various administrative positions in this new regime such as Senator and Consul under Odoacer's successor, Theoderic, the great. And he considered it his greatest [00:21:00] achievement to have his two sons serve as Co-Consuls together.

But his high status and, cushy jobs and everything didn't last

**Aven:** because of that there Wheel of Fortune. Yes. Yeah.

**Mark:** So he fell out of royal favor and was accused of treasonous activities by his political rivals. He was imprisoned and eventually executed. So how the mighty have fallen.

That's the image of the, that's the wheel of fortune, right? While he was imprisoned, he wrote the Consolation of Philosophy which is a dialogue between himself and the personified Lady Philosophy. Which in,

**Aven:** but not, god forbid, a lady philosopher.

**Mark:** No, No , no. Lady Philosophy. And this work investigated such questions as why there is evil in a universe governed by a just God, why bad things happen to good people and good things happen to bad people, and whether things are predestined or do people have free will, one of the [00:22:00] biggest questions in all of philosophy ever. Yes.

And he concludes that worldly fortune is fickle and true happiness comes from within. And I guess if you want to hear more about Boethius and all of this stuff about predestination and free will, We do have a video on that.

We haven't done it as a podcast yet, but it will eventually happen as a podcast. On future, right? On future, yeah.

So this book was one of the most influential philosophical treatises of the middle Ages. And it made famous, that image of the Wheel of Fortune forever being turned by the blindfolded Lady Fortuna. So again, another personification of an abstract concept. They're always women because, partly because of the way Latin works, the, the sort of all of abstract nouns are feminine, feminine

**Aven:** gender.

I think that's a very large part of it. Yes. probably,

**Mark:** but yes. So they're always sort of personified as women. . And so that, image signifies the fickleness of fate, right? She's blind to any,

**Aven:** you know. Well, and the, [00:23:00] impermanence of worldly, of everything in the world.

**Mark:** Of everything in the world. So the wheel is always turning. If you're down, I mean, that's good because it means you could go up. But if you're up, then, you know, eventually it'll come down. Don't expect that it will stay. Yeah. Everything changes. And the fact that she's blindfolded demonstrates that, you know, she doesn't pay attention to your worth.

It has nothing to do with what you deserve, what you deserve. It's, simply just the, the nature of existence to be changeable. So , we talked about that Boethian notation system in which notes are given names. The Boethian system is the one with the letter names. I'll talk about solfage, that other one, the do re mi one, right in a minute.

Okay. But the Boethian system used letter names, specifically the, first bunch of letters in the Latin alphabet. So A, B, C, D, E, F G H I K L M N O covering two Octaves, right? [00:24:00] And no J of course. No J because J did not exist yet. Until the modern period. Yeah, until the modern period. Now this system of two Octaves was later simplified to just one Octave, therefore only requiring the letters A through G. And what they would do to indicate the second octave would be, you would use the lower case letters to indicate, higher pitch. Okay.

And you could then use double lower case letters if you wanted a third Octave. Okay. Now, for various complicated reasons that I'm not gonna get into though, if you watch the 12 tone video, it's all explained there. To get a note lower than that, uppercase A. Right? I mean, you would go to G but there's no, nothing bigger than an upper case A. So what they did was they'd go to the Greek G, otherwise known as gamma. Right? Right. And so that's why we have the word gamut.

To run the gamut.

**Aven:** Right. To go all the way.

**Mark:** To go all the way through the range. Yeah. And so in musical terms, what that [00:25:00] meant is all the notes in the scale, Right. From gamma to the next bunch of notes.

And I'll explain that in a second. Okay. . So that was one system. There was also a, another kind of system for writing kind of notes down. It was mainly used for singing, singing chant. So if you think Gregorian chant right. . And this was called neumatic notations. The notes were neums, the little figures

**Aven:** Spell that because it's not obvious.

Yes. So

**Mark:** n e u m, neum or neumatic.

**Aven:** Yeah. So not pneumatic with a P N. Not with a P N,

**Mark:** Yeah. Now, originally these neums were just sort of squiggles, written above the words to show roughly the contour of the melody if it goes up, if it goes down. they didn't indicate specific pitches

**Aven:** or even specific relations between the pitches.

No. Yeah.

**Mark:** Yeah. So it was just a way of kind of showing the shape of the melody. Later on, these NUMs developed into more specific [00:26:00] shapes, various different kinds of shapes. And they were written on a four line staff and therefore gained more precise note values.

**Aven:** Again though relative note values, right?

Neums were always about like, Pick a starting pitch and now you can tell what the intervals are. Yeah. But it's not telling you what starting pitch. So that's a difference. . .

**Mark:** Right. Though it's obviously from that, that it develops then

**Aven:** specific pitches. When you look back at early chant, it is not telling you what note to start on.

It's telling you what intervals to take. Yeah.

**Mark:** Because of course, you don't need to know what the note is to sing it. It only becomes necessary to have an idea of specific pitches when you're working with an instrument. which, you know, you have to press a specific pitch.

**Aven:** You have to choose some note to

**Mark:** start with, start with a certain number of holes covered in the winds instrument or whatever. But it's from this four line staff that the later fifth line was added, you know, to get the, the staff that we know today.

 Now, we mentioned this guy, [00:27:00] Guido Doreo, who came up with the Guidonian hand mnemonic for learning your notes and so forth. And so a little bit of information about Guido himself. He was one of the most important figures in the history of Western notation. While Boethias's work was revered for its highly theoretical and mathematical fundamentals of music, he was studying music as a science.

Right, Right. Yeah. And remember, music was one, or harmony really, was one of the scientific subjects of those liberal arts. Liberal arts. So the first three were the, more humanities ones. They were all language stuff you know, rhetoric and grammar. Grammar and so forth.

The, the scientific ones like mathematics and astronomy included music or harmony really. And so that's what Boethius's work was really kind of getting at. But Guido was more interested in trying to solve practical musical problems, performance, you know, how how do we get the choir to sing right and all that kind of thing. Right. So he wrote a very popular treatise [00:28:00] called Micrologus. And in it he wrote about how to compose polyphony, and described his method for teaching children to learn composition by having them improvise melodies following a set of rules, such as having the vowels, A E I O and U, correspond to particular notes.

So they're just little exercises. Right. And then as you sort of progressed, the rules become gradually freer and freer until, you could

**Aven:** actually write a, a

**Mark:** new melody. A new melody. Yeah. . Guido also developed the staff notation as we know it today, with successive lines indicating the interval of a third, and so here it becomes more specific to, to notes. And this replaced that old neumatic notation, which didn't indicate specific pitches. Also ascribed to him though there isn't an image of it in any of his extant writings is that Guidonian hand, which as we said, was a mnemonic device in which all the notes of the gamut, and so that was [00:29:00] the original sense of the word gamut, to refer to all the notes, were assigned to a joint on the fingertip, making it easy to visualize where the steps and half steps come. That's why it's really useful, making sight singing and memorization of music much easier. And it is also due to Guido that we have the solfage system of note names, right?

So those of you who know, even very basics about music, will, will probably know that sometimes we talk about notes as, A, B, C. Sometimes we talk about them as do re mi, right? So why do we have these two systems? Well, they, they kind of do different things. But they also come from two different sources.

So Boethius gave us the abc. Guido gives us the do re mi. So first of all, he invented the Hexachord, which is kind of a scale, basically it's the first six notes of the major scale. Okay? And he named them after the syllables in a hymn to St. John the Baptist called Ut [00:30:00] Queant Laxis. The words were written by Paul the Deacon.

Each line in the hymn begins on the next scale degree, so each note's name was the syllable sung at the pitch in the hymn. Okay. So I'll read it out in Latin. And you'll, get the idea. And this is where the ut in gamut comes from, because the first word in this hymn

**Aven:** is ut, which means so as to or as,

**Mark:** So Ut queant laxīs resonāre fibrīs, Mīra gestōrum famulī tuōrum, Solve pollūtī labiī reātum, Sancte Iohannēs. Right. So I tried to emphasize that. Yeah,

the

**Aven:** Ut Re Me

**Mark:** Fa So La. Those are the, the six notes. And just in case you're interested, a translation: "so that your servants may, with loosened voices, resound the wonders [00:31:00] of your deeds, clean the guilt from our stained lips. Oh, Saint John."

**Aven:** Right. So the notes were appropriate, so that's why he chose it. But also it's about singing. So that was must have been a nice piece too.

**Mark:** And so each of those first syllables, , that's starts on one step, one note higher, Yeah. So first of all, you'll notice it starts with ut, not do.

Well, the reason that was changed is because it's not easy to sing ut. It's called a closed syllable, right? Yeah. It

**Aven:** ends in a consonant, You can't

**Mark:** sustain it. Yeah, you can't, you can't sustain a closed syllable cuz it ends it in a consonant. So this was changed to the more singable, open syllable do, that happened in the 17th century at the suggestion of musicologist Giovanni Battista Doni and his name gives the clue as to why it was do. His name was Doni, so he named it after himself. And you'll also note, since it only goes to six notes, they needed the seventh to have the full, major scale. So he added the si as the syllable for the seventh note.

And si is an abbreviation of the [00:32:00] last line of the Hymn, Sancte Johannes. So s i, Right. And notice again, no j, it's the i. Johannes, John. But but of course,

**Aven:** well, everybody knows that, from Indiana Jones and the Last Crusade, there was no J in Latin. Yep. Anyway,

**Mark:** And so that gives us the full, you know .

do through si,

**Aven:** which of course is not how I know it. So I presume you're gonna get to that.

**Mark:** Yes. So how did si become ti? Some places, some places. So this is particularly in Anglophone places, Anglophone countries si was changed to ti by an English music teacher Sarah, Glover in the 19th century, so as not to be confused with "c", which is also a note name. Right. And so it could become confusing. Yeah. But also so that each syllable might begin with a different letter just to make them very distinctive. I mean, it's a mnemonic, right? So you wanna make it as useful and easy as possible, right? And so that's, why [00:33:00] we have the ti and that's why tea is a drink that goes well with goes jam and Bread.

Bread. Yeah. Now Corey referred to briefly different kinds of solfage, one of which is useful for knowing specific pitches, and one of which is useful for knowing the relationship between intervals and so forth in any key, and that's technically referred to as fixed do and movable do.

Right? So in fixed do, do is always the note C. Okay. So that gives you specific pitches,

**Aven:** but it's less useful then because we already have note names.

**Mark:** Yeah. it's redundant in that sense, if you've got note names. Moveable Do, Do represents the tonic, the first note of a scale, whatever key, So if it's G then Do represents G.

 If it's in the key of E flat, then Do represents E flat. Right. And so, each of those note names, do re mi, is

**Aven:** the third and the fifth and the first. Yeah.

**Mark:** Yeah. And so you can therefore get all your intervals [00:34:00] easily, do to mi is a third and it's always a third. And so it's the, tonic and the major third above it, if you're in a major key. And so that's useful in knowing your intervals that make up a major scale or a minor scale, whatever. And so it's useful for that purpose. .

And finally some last little developments in this whole notation kind of system. So the flat, sharp, and natural symbols they come from different styles of writing the letter b. As in the note name B. Right, right. Okay. Because for various other complicated reasons that I won't get into, you could have two different types of b in your scale depending on which mode you're in.

So sometimes it's the, the B that is just a semi-tone down from the tonic, and sometimes you have the B flat, which is a whole tone down from the tonic. Okay. And so they wrote B in either a round, soft way that became the flat, [00:35:00] or they wrote it in a kind of hard way, hard angular way. And that became the natural symbol and also the sharp symbol.

Eventually they both come from the same thing. Right.

**Aven:** Okay. That's not confusing at all.

**Mark:** So they're all the letter B. The word clef. Or clefs, you know, on a staff, right? The word clef came from French clef, meaning key. So like English key, right? The key of a song from Latin clavis, meaning key, though only in the literal sense of the thing for opening locks, opening the door. Ultimately from the proto Indo European root \*klau- meaning hook. And so what the clefs are in music is they are basically stylized letters, again. So yeah, I mean, they're stylized letters that you write on a staff to indicate what the value of a certain line on that staff has. Okay. So the G clef is what we think of as the treble clef now.

It marks [00:36:00] the second line up as the note G. Right. And that's where the, the little thing over we start it. Yeah. Yeah. The F clef is the bass clef and so between the two little dots on the bass clef, that's the

**Aven:** F

**Mark:** Right. There's also a C clef, which marks middle C, and it could be put in different places, So you've got the tenor clef and the alto clef

**Aven:** which is very rarely used, but for certain instruments. Right. Certain instruments

**Mark:** it's used. And so you can position that clef in a number of different places depending on which one you want it to be. Right. But it's marking middle C basically. Right. Okay. And the middle C is in the middle of that C.

Okay. Essentially that C shape. By the way, the English word key is not related. It comes from old English cæg meaning key. It's of unknown origins. It might be related to middle low German, I suppose this would be pronounced " keie", I'm not positive about my middle, low German pronunciation. key-yeh.

[00:37:00] Which is a word that means lance or spear on the notion of a tool to cleave with, what you do with a lance or a spear from proto Germanic \*ki- meaning to cleave or split.

**Aven:** So then cleft would be related to key, but not to clef. Yes. Etymology is dumb sometimes

**Mark:** Or it might be from a different root, from a root \*kai-, which meant crooked or bent or twisted, which

**Aven:** would make sense for key for early keys or like that key. Yeah.

**Mark:** So with the original meaning in proto-Germanic \*kaig-jo- meaning something like a pin with a twisted end, which is basically what a key

**Aven:** is, right.

Especially early ones. Yeah.

**Mark:** Now the other thing that the video talked about was the relationship between music and language. And the overlaps between the two. So many ancient cultures believed in the idea of the language of the birds. A kind [00:38:00] of mystical or divine language that birds use to communicate with one another and which select humans can join in.

And so there're a number of works that talk about this, this music of the birds. So this is coming out of sort of ancient ideas, and I'm gonna come back to it later when we talk about evolution. Okay. But also in, ancient writings there have been numerous ancient and, and medieval there have been numerous philosophical discussions about whether music itself can be described as a language.

From a certain perspective, music, and indeed all art can be described as a language insofar as it is a tool of communication. Right? It's communicating

**Aven:** emotion.

**Mark:** So whether or not you think of it as a language per se, or more broadly as a communication system.

**Aven:** Yeah. Yeah, I mean language that, that gets into a whole other question about how you define a language. Yes. But many people define language in a little more specific ways. Yeah, yeah.

**Mark:** And of course there's also the sort of representational programmatic [00:39:00] music .

Which for instance, Beethoven's Sixth Symphony is the, the one that is always used as an example for this. It's the pastoral symphony. .

where

**Aven:** he makes like bird sounds and actual representational sounds. Yeah. So it, or the toy symphony, right. That, that some, I don't remember who that's by, but where they were like, sounds that sound like literal toys.

**Mark:** Yeah. So there's a kind of narrative progression in Beethoven's Sixth Symphony sort of describing a walk through the countryside or whatever. Yeah. But most music doesn't do that. Most music doesn't. It's certainly not requisite for music to do that. It can do that, but it doesn't have to. So then the question is, can music alone without reference to a spoken language, be used to convey referential meaning?

Well, some have tried, and this takes us into the world of constructed languages or con langs as they're referred to. In 1827, Musician Jean-François Sudre devised a system of using the Do re mi note [00:40:00] names to construct an artificial language called Solresol, which are the notes, right? Sol re sol three notes.

In addition to making up words from those do er mi syllables, you would actually just like Solresol, you'd pronounce the very syllables to make words, those words could be expressed purely musical through the tones they represent. Right now, what's the one problem with that?

**Aven:** There aren't very many tones.

and, Well, there aren't

**Mark:** very many syllables either, but you can do it.

**Aven:** It's still referring back to language, to English or something? Well, not necessarily

**Mark:** English. I mean, it's its own language. So it constructed its own vocabulary. Right. Just on those things. But why would it be difficult to use?

**Aven:** You'd have to be able to be good at pitch?

**Mark:** You'd have to have perfect pitch. Right? Both to produce and to recognize.

Yeah. Yeah. I mean, you can do it with the syllables, but to do it with just the notes, you'd have to have perfect pitch to be able to interpret or very good, good pitch. Or very good pitch.

Yeah. You'd have to check it against, you'd have to carry around like a [00:41:00] tuning fork or something. Right? So you could check it against something. So, you know, not necessarily the, the most practical language except for those with perfect pitch. Those syllables, note names, whatever could also be represented by colors and so a different color assigned to each.

And he also came up with special glyphs that represented right. Each, you know, like letters basically.

**Aven:** This, this did come up in a Murdoch, right? Did it? I feel like it did. Am I just making that up? Did I have a fever dream once where I thought about I feel like this, I think you're right. Yeah. I feel like this idea of the musical language came up because I think George spent a whole long time trying to learning it to learn it.

Yeah. Yeah, yeah. I think you're right.

Murdoch Mysteries.

**Mark:** We'll have to figure out which episode. Put it in the . Sorry. Please continue. .

So, yes, the other problem is it has a restricted phenology, only seven syllables. But there are other languages that have fairly restricted phenology that's not necessarily impossible.

One of the advantages, one of the cool [00:42:00] things about it is that the semantic categories could be determined by the first syllable of the word. That's how he set it up. So as soon as you hear the first syllable, you know what broad semantic category it belonged to. Okay. The gender and number was decided by accent and the length of the last syllable.

And he had it so that reversing syllables would negate. .

**Aven:** Yeah. I mean, one could imagine setting up a whole system where the rhythm was also a, salient feature. Right. Yeah. And so that you had combination of pitch and rhythm would give you a much wider phenology. Yeah.

And that's

**Mark:** the neat thing about music. It's got all these other features that

**Aven:** you could have loudness for some stuff. Anyway. However, we've done quite well with, you know, language. So one wonders what the need for such a thing is.

**Mark:** Well, here's one of the, the extra useful things about the system. To transmit messages over long distances, right?

At at a time when, you know, they didn't have telephones or whatever. Sudre [00:43:00] envisioned a kind of musical foghorn to play notes very loudly.

**Aven:** excuse me, you have broken me. Go on .

**Mark:** And he called this contraption, which he never built, but he, you know, Proposed it. He called this contraption a telephone,

**Aven:** right? Cuz it makes noise over a long distance. Long

**Mark:** distance. Yeah. From the Greek roots tele, meaning far and phone, meaning voice or sound. So Sudre coined the word telephone decades before Alexander Graham Bell invented the telephone as we know it in 1876.

 I love that fact. , the word telephone is older than the telephone

Now su dra wasn't alone in this idea of making a musical language. In 1916, in his 1916 novel Voyage to Faremido, the Hungarian author, and I'm gonna try and actually do his name in reasonably close Hungarian pronunciation. I look this up. So [00:44:00] Frigyes Karinthy is his name. I hope that's close, vaguely close to Hungarian.

That's the best I could, do just sort of looking it up. Yep. Whose other claim to fame was to advance the notion of the six degree of separation, which is, kind of a favorite thing of us here at the Endless Knot. in his book, he escribed a similar language made up of the note names with all the syllables intoned at the correct pitch.

Oh, okay. Karinthy's novel was in fact intended as a sort of continuation of Jonathan Swift's Gulliver's Travels. Ah, right. Okay. So you can see this kind of fits in particularly in I think, book three of Gulliver's Travels, where we have all these crazy languages. Yeah. You know, ideas. So

so Gulliver's Travels. In that book, Gulliver travels the world. In case you don't know the book very well. He travels to the world encountering strange foreign cultures and comparing them to his own as Swiss way of satirizing European society.[00:45:00] Now Swift was the premier Satirist of his age. In England anyways.

 And at the center of London literary circles in the early 18th century, rubbing elbows with other such notable figures as Alexander Pope and Daniel Defoe, and was also well known for his satirical pamphlet, A Modest Proposal, that criticized England's appalling treatment of Ireland by using the metaphor of the English, literally eating the flesh of the Irish and treating them as livestock.

 Fellow Pamphleteer Defoe also engaged in political arguments and got himself in a bit of trouble for one called The Shortest Way with Dissenters, which attacked Tory treatment of the religious dissenters by, again, satirically, suggesting that they should all be exterminated. Now, the problem with using these kind of very dramatic.

Metaphors, satirical metaphors is that they aren't always taken well. So [00:46:00] unfortunately, his pamphlet was taken literally at first, and he was fined, pilloried, and imprisoned, leading many such as Swift himself to shun him from polite company. Right.

**Aven:** Because they thought he'd actually advocated for Yeah. He didn't take it far enough Yeah.

To make it ridiculous. Yeah. Which, which speaks of course, to the depths of violence that were occurring, that people were like, Oh, it's reasonable that somebody would actually suggest Exterminating, murdering them all as a way of getting rid of them. Whereas nobody thought that Swift was actually advocating for eating babies.

Yes. Because that was so far. So he may have thought he was proposing something so extreme that no one would, would take him seriously, but he misjudged the tenor. Yeah. Which is unfortunate.

**Mark:** Now an earlier friend of Defoe, this is going somewhere, I promise , an earlier friend of Defoe, Francis Lodwick, was an early pioneer of constructed artificial languages, as it turns out, creating his own universal alphabet and continuing the work on [00:47:00] clergymen and natural philosopher John Wilkins' proposal for a universal language.

Sounds a lot like Esperanto, doesn't it? Well, not surprising then. As Lodwick's work inspired a Polish medical doctor, Ludwik Lejzer Zamenhof, who even seems to have gone to the length of switching from using the name Lejzer to Ludwik in honor of Francis Lodwick.

**Aven:** I can't keep, I can't keep track. I can't. So

**Mark:** this guy Zamenhoff, adds to his name, Ludwick as a tribute to Lodwick because he admired his artificial language idea. Okay. To put it another way. And it is Zamenhoff who invents Esperanto.

**Aven:** Right. I think I have followed you.

It's rather Ludwicus. No wait, Ludicus? No, I can't do it.

**Mark:** Now I want to talk very briefly. I mean, I could [00:48:00] talk about these topics for like hours and, and still not scratch the surface. So I'm not gonna do that, obviously. I'm gonna try and just say enough that, that all of this makes sense about the evolution stuff that we talked about in the video.

So First of all, music evolution. So I mentioned this idea of auditory cheesecake that Pinker mentioned comes up with. So let me explain how this works.

The idea is music has no evolutionary advantage in and of itself, but overlaps with things that do have an advantage

**Aven:** In other words, uses the same brain features and physical features that created something else.

**Mark:** Specifically, it triggers certain senses that are important for other things.

Okay. So language, the connection between music and language is, there's certainly some kind of connection there. Language is useful, evolutionarily speaking, and since music kind of does some similar things to, language, it kind of makes us happy. Right. Okay. Because we like [00:49:00] language and therefore we also like music.

Okay. Similarly auditory scene analysis. So in other words we, it, it's useful for us to have the ability to analyze complex, the complex auditory world in which we live. We've gotta hear different animals and,

**Aven:** and figure out what, what goes together and doesn't Yeah. Cut out the stuff that's not important and that sort of

**Mark:** stuff.

 So since we developed that ability, well, music also uses that, so, Right. Emotional calls, right? We might growl or hooray or whatever. Scream or scream. And so again, that's the, music kind of mirrors that sort of emotional sound. Habitat selection. So we're used to finding certain sounds worrying and another is pleasant and others pleasant running water or, Yeah.

So music sounds safe because it's nice and harmonious, therefore it's like that sugar hit of a cheesecake.

**Aven:** I can see so many problems with this in terms of cultural assumptions about what music sounds [00:50:00] like. Yes. But anyway, go on.

**Mark:** Yes. I'm giving Pinker his, his fair shake here before I disagree.

Say what I really think about him. And motor control. So the rhythm

**Aven:** aspect. Well, and the ability to make sounds with your mouth and all the rest of it. Yeah.

**Mark:** Now again, the sort of countering to this is that, if you look at the fact that there are similarities between music and say bird song or other kinds of animal vocalizations which do have evolutionary purposes, Bird song is, very important for a number of things, most significantly, I suppose, attracting a mate,

**Aven:** communication.

**Mark:** Communication in general Right. Can do various things. So I think Pinker, wants to disclude all those animal kinds of music as real music.

Right. Okay. But I don't know if that really flies, flies. But speaking of this, sort of attracting a mate, well that could be a possible evolutionary advantage of music. Maybe we use music to attract

**Aven:** mates. Right. This is the lead guitarist theory [00:51:00] of music . Exactly.

**Mark:** Yeah. The musicians get the chicks,

**Aven:** some of the musicians.

Wow. .

**Mark:** Not the drummers. Not the drummers .

**Aven:** I'm not, I'm not even part of the, the rock music scene. And I've, I've absorbed, you know, violas and drummers, ,

**Mark:** but bass players also get the short end of the stick there. But anyway, the problem with that theory is you would expect to see sexual dimorphism, Right? Right.

Yeah. Male birds use song to attract female birds. But human males and females do music equivalently. Right, Right. There's

**Aven:** no, Or well, there's no pattern to, They may be differences, but there's no pattern to how they, especially across cultures. Yeah.

**Mark:** And they certainly have the ability both to do equally well.

So so that's not terribly helpful. That's not terribly helpful. And you can also say, Well, also, should it mean that we do music more when we are sexually fertile? Well,

**Aven:** that's the lead guitarist approach to life too. But the thing [00:52:00] is, we, but no, we don't, and no, I, it, it is so much more universal and, and, and all-encompassing than that.

We

**Mark:** use music for all kinds of non sexual things too. Like, you know, singing to babies is a very natural thing, so there's a problem with that. Right. Social bonding is another theory about why music evolved. Yeah. And certainly social bonding is extremely important from an evolutionary standpoint with humans.

One idea is that it's a replacement for grooming.

**Aven:** Once we didn't have the hair to need

**Mark:** grooming. Well, didn't have the hair to need grooming. And also when our group sizes became bigger than, you know. Right. So

**Aven:** you couldn't have one on one interactions like that as a way of bonding. You can't groom

**Mark:** everyone in your 100 member grouping.

You would be spending all your time grooming .

**Aven:** Right. But you can sing, but you can see or, do rhythm or whatever, something else. And this also presumably overlaps with theories about where dancing comes from. Yes. Because that's, I know that, that the idea that people dance together and, and synchronize their movements .

is an important, People suggest that that's very important for bonding.

**Mark:** And there have been some [00:53:00] studies to suggest that although there certainly are other things that we do for social bonding that music is faster than other social activities. So you can get the same effect and over time it, it evens out.

Right. Okay. But in these various experiments, they've shown that people develop that social bonding much quicker with music than they do with other types of, other types of communal activities. Right. Okay. And so therefore it might be useful specifically for social transitions. And so if you think about something like a wedding. Right, right, right. Where, most cultures will have some kind of musical component to those sorts of things. It's a good way of bringing two family groups together, for instance. Right, Right. And all of this leads to the connection with language and language evolution, which of course

**Aven:** is strongly tied to bonding and, group dynamics.

**Mark:** And so again, I'm just gonna add a few little details that I didn't get into with language evolution. I don't wanna go too much into it because it is a controversial topic,

**Aven:** right. There's no, [00:54:00] there is no consensus on this. Right? Nobody knows where they come

**Mark:** from. Yeah. Well, and even just the question of language evolution on its own Yeah. Is a hugely controversial topic and

**Aven:** absolutely no consensus. No

**Mark:** consensus. Yeah. It was such a controversial topic with, you know, little direct empirical evidence obviously, cuz you can't hear the music of, our early ancestors that it was banned by the Linguistic Society of Paris in 1866. No one could talk about it from then on and indeed no one did talk about language evolution for most of the 20th century. It's only recently that it came back,

**Aven:** which is really interesting because, I mean, evolution has been the hot topic since the term was coined.

**Mark:** But you know, the language side was not talked about much. Right. So basically there are kind of two broad groupings that language evolutionary theories kind of fall into: there's the continuity theories in which language is situated in a kind of [00:55:00] spectrum with pre linguistic communication systems.

So it evolved gradually from something that wasn't language into something that

**Aven:** was. So types of anamalian communication like whistles and cries and Grunts and meows and like those kinds of things are communication, and nobody denies that. So that there's a spectrum that it moves from that kind of communication to Yeah, more systematic. Yeah. Communication and representational.

**Mark:** And then there's the discontinuity theories, Right. In which language is completely unique and appeared fairly suddenly outta nowhere. Right. And According to those sorts of theories, language is innate and genetically encoded.

 And whereas, you know, the other idea as opposed to that genetic idea, is that language is a sort of cultural system that can be learned through social interaction. And so that it's not purely evolutionary, but

**Aven:** also and draws on a bunch of evolutionary developments. A suite of evolutionary developments that each individually was probably for [00:56:00] some other purpose .

or developed in tandem with something else. Yeah. So that's the

**Mark:** other way to divide up, language theories. Are they, are they genetic, purely genetic, or are they at least some degree cultural? Right. . And so Noam Chomsky, probably the most famous linguist of the 20th century argues for a discontinuity theory that language emerged from a chance genetic mutation.

Pinker is also in that group , to the point where, Geneticists have discovered a so-called language gene. I think a lot more is made of this than is really true. But I'm not a geneticist. So yeah. There's only so much I can say. I, grant that this particular gene is important for producing vocalization.

Right. But language is more than just producing vocalization. But a specific mutation occurred in this gene, it's been sequenced and all of that at a particular, and they can kind of estimate when that mutation would've happened and that that allowed language to suddenly spring into being fully formed.[00:57:00]

that's literally what Chomsky and Pinker argue for. That it just, bam, it was

**Aven:** perfect. One day. One day somebody was born speaking who was able to speak and they, their parents couldn't. Yeah.

**Mark:** And I find that hard to accept, to be honest. At the very furthest end from Chomsky, you have people like Dan Everett .

Who has his argument for his sort of cultural tool theory, in this book, which I'm holding up to the microphone, because this is a podcast, and you can see the book clearly through the microphone it's called Language, The Cultural Tool by Daniel L. Everett. And it's an interesting read.

So, he compares the development of language to the development of a stone knife. Right. And how it, kind

**Aven:** of starts in Yeah, as very basic and then you, yeah, and it

**Mark:** develops. So early theories of language evolution, there were all kinds of different ideas what the source might be for language. Imitation of natural sounds, so imitating the sounds of animals or wind or whatever that's known as [00:58:00] the bow wow theory. Or they could come from emotional injections, like screams or grunts or whatever. That's the poo poo theory. And there is the idea that it's somehow tied to rhythmic labor, you know, people working together and so you make a sound to aid in that synchronization. And that's the yo hi ho theory. I just mentioned that cuz I like those. It was a later person who classified them with these little.

**Aven:** You mean that isn't the official?

**Mark:** No. And then another theory, one last, there are many, many more theories, but one last theory that I'm gonna mention that I kind of find intriguing is the gestural theory.

And so certainly people have been able to draw connections between gesture and speech. We still use gesture when we speak. It's actually kind of hard to talk without

**Aven:** gesturing. And there are entire

**Mark:** languages, gestural languages. And so according to this theory language moved from gesture to speech to free up the hands for other tool using for, for other tool, using and to allow [00:59:00] communication without visibility.

So you don't have to see the person to communicate.

**Aven:** Gestural languages don't work well at night or when you're hunting and separated and yeah. Yeah.

**Mark:** So those are some of the broad, some of the broad categories that they fall into. There are many other names and people and it's a very interesting topic, but I can't go

**Aven:** into it.

No, no. Very complicated.

**Mark:** So the other thing that we talked in the video was about the museum,

**Aven:** right. So, shall I talk a little bit about this? So if you can remember back to when the video was on, we talked, the word Music, of course, comes from the Muses. So I have two things to talk about that are linked and so maybe actually I will start with the Muses themselves. You mentioned them briefly in the video. I think they're fairly well known and fairly famous.

I think probably most people have heard of Muses, at least in

**Mark:** how many people know their names.

**Aven:** Nobody, nobody knows their names. I can never, never remember all of them, for instance, too many, there are nine of them. They are [01:00:00] first named very early in Greek literature because they turn up in the Theogony by Hesiod, which is one of our earliest surviving pieces of literature.

And in fact, they are right at the beginning because he starts the Theogony by invoking the Muses. Because in fact that is how epic and didactic in particular, but most poetry, conventionally oral poetry in particular starts with invocations of Muses. Not the very, very first lines, but almost first lines of the poem are "from the Heliconian Muses let us begin to sing, who hold the great and holy mount of Helicon and dance on soft feet about the deep blue spring and the altar of the Almighty son of Cronos, Zeus. And when they have washed their tender bodies in Permessus or in the Horse's Spring or Olmeius, make their fair lovely dances upon highest Helicon and move with vigorous feet. Thence, they arise and go abroad by night, veiled in thick mist, and utter their song with lovely voice."

So from the very, very beginning of their appearance in Greek literature, they're associated with dance, actually dance more than music, but dance and [01:01:00] music. The first whole, first part of the, the agony is about the Muses and about the gods. So it goes back and forth between the Muses and Zeus and the Olympian gods.

then it comes back to where the Muses came from. So Hesiod's version is, you mentioned Mnemosyne, their mother, "Them in Pieria did Mnemosyne, Memory, who reigns over the hills of Eleuther, bear of Union with the father of the son of Cronos." So it's Zeus and Mnemosyne, "a forgetting of ills and of rest from sorrow." So the Muses are also always connected with this idea of rest and and pleasure. " For nine nights did wise Zeus lie with her entering her Holy Bed remote from the immortals, and when a year was passed and the seasons came round, she born nine daughters. All of one mind, whose hearts are set up on song and whose spirit is free from care." And then later on he names them: "These things, then, the Muses sang who dwell on Olympus, nine daughters begotten by great Zeus, Cleio and Euterpe, Thalia, Melpomene and Terpsichore, and [01:02:00] Erato and Polyhymnia and Urania and Calliope, who is the chiefest of them all." Calliope

**Mark:** Also the music in a circus.

**Aven:** Well I know because it's named after the Muse. "For she attends on Worshipful princes, whoever have nourished princes, the daughters of Great Zeus honor and be hold at his birth, they pour sweet dew upon his tongue and from his lips flow gracious words." So the Muses don't only give music, they give speech. And of course this is important for poets and kings. And then it goes on to talk about how anyone's blessed by the Muses become people who can give good judgments and are considered wise because people trust their words. And so that you can't be a king without the Muses.

A poet would say that of course. "For it is through the Muses and far shooting Apollo, that there are singers and Harpers upon the earth, but princes are of Zeus and happy is he whom the Muses love. Sweet flows speech from his mouth." Of course the Muses turn up all the way through Greek literature afterwards, and there [01:03:00] are slight differences in their origin stories, but basically it doesn't change that much.

 Their names are all speaking names, they're clearly not names that come from the deepest depths of pre- Greek culture, like some of the Olympian names where... the Greeks found etymologies for all the names of the gods, but they often had to find etymologies because these are like Aphrodite or something like that, where they come up with names, but they're not Greek words or they're not obvious Greek words.

So they're not sure. That's not the Muses' names. The Muses's names are basically Greek words. Right. So they're, and they're all to do with essentially music,

**Mark:** so they're kind of more personifications.

**Aven:** Yeah. Yeah. So, yes, exactly. So Cleo, for instance, is kleos, Glory. So she's the muse of, history.

Calliope is beautiful mouth, kalos ops. Ourania is heavenly. Melpomene is sweet, sweet sounds. So they're all connected. Calliope [01:04:00] who he says is the chiefest of them all is the most frequently named by Greek poets in subsequent literature, at least what survives, that is the muses are talked about a lot.

A Muse is often talked about, but when a muse is actually named, Calliope is by far the most often named. Now that might be because she's the muse of Epic and what do we have a lot of? Epic or stuff that talks about epic. Yeah. So that may be a relic of survival bias rather than their importance

**Mark:** we don't have a surviving thing of dance.

**Aven:** Yeah, yeah, exactly. In Hesiod their divisions are not explicit, so he doesn't say, what each of them is the muse of.

He doesn't give that, but you can kind of guess by the names, I guess. Well indeed. So an article that I am not going to talk about in great detail, but I feel like is one that you would like is an Etymologizing The Muses,by Philip Hardie. The standard account is that the first explicit linkage of the individual Muses with distinct spheres comes in Plato.[01:05:00]

And that's the first time it's sort of mentioned, but not, not systematically. And then it's only elaborated and finalized in the Hellistic and Imperial periods. So it's really in these Alexandrian library as we'll get to, and, and after that you get like a hard and fast linkages. Right. And those final assignments are Calliope for Epic, Cleo for history, Uraniia for astronomy, Thalia for comedy, Melpomene for tragedy, Polyhymnia for religious hymns, Erato for erotic poetry, Euterpe for lyric poetry, and Terpsichore for choral song. But Hardie suggests that already in Hesiod you can see that etymological link being activated. Cuz he actually, and I'm not gonna go into details, but in the descriptive passage that comes before their names, the one where he talks about like right at the beginning where they dance on soft feet about the spring and the altar and all of that.

He goes through and he points out that each of their names appears in a common noun as it were. Like there's a [01:06:00] word that is almost the same as their name or an adjective in that passage, so that like their names are already there, so for instance

Thale thaliai, which is a word for festivals, turns up in that passage. And Thalia is the goddess of dramatic performance, comedy, which to us might not sound like festivals, but of course comedies were put on at dramatic festivals. So so he, he kind of goes into quite a lot of detail, and I'm not going to do so, but about whether or not Hesiod knew a tradition that already linked them to specific genres or that the tradition developed out of Hesiod's etymologizing and that that kind of provided the hint that later people picked up on and right.

And it, but that it was already kind of linked there. Anyway, it's, an interesting discussion and certainly the names are all, as I said, speaking names, they're all meaningful. So they become associated with these individual things, but they always turn up as also just the Muses. And there [01:07:00] are a lot of unnamed Muses.

Right. Help me O Muse to sing of, Right? that's The muse is in, in Homer are unnamed muses for

**Mark:** presumably they're all referring to

**Aven:** Calliope

well, maybe or epic, right? Yeah. If, if there was a music, I mean, that's the question, right? Like, does Homer know of these divisions? Is there a particular muse of Epic or Are Muse is just connected to, the key function of the muse is to help you remember, because that the Daughters of memory, right?

So when an Epic poet says, Muse help me sing of the deeds of past men, that's the basic function of the In the same way that Epic is the fount of all other poetry, Right. , if you see what I mean. So anyway, so that's the Muses. Now, as you say in the video, a Mouseion, or a Musaeum, is shrine of the Muses.

And there were, I mean they're Divinities, so there were shrines of the Muses all through Greece. And as you point out, the most famous of them, the one we know is the Musaion in Alexandria. And [01:08:00] the museum in Alexandria is also linked to the Library of Alexandria. They are not the same, but they are connected.

So I'm just gonna talk a little bit about that because it is very famous and you skip over pretty quickly. So now surprisingly, they're very famous, but our evidence and knowledge about it is extremely poor. We actually don't know very much at all about them. Given how famous some of the scholars who worked there were, Probably the Mousaion was founded by the first Ptolemy, the general of Alexander, unless it was founded by the second Ptolemy, because it's not clear. If it was founded by the first, it was expanded and became what it was under the second Ptolemy, either way. So sometime between 300 and 250 BCE, probably, is when it was established. Okay. It was a community of scholars that was both academic and religious.

So it was religious because it was centered on a shrine to the Muses and each of the nine Muses had their own shrine within it. But it had scholars who worked on science and literature, science [01:09:00] being a very capacious term at the time, as you know, and literature, they in particular were concerned with editing and correcting and canonizing literary works by classical authors.

They studied and they taught, they were maintained at the king's expense. So they were paid a salary and they were fed and housed. We know very little about most of the people who worked there. There are some very famous names. I'm not gonna actually go over those now, but very famous names, Callimachus being probably one of the most famous, but we don't know about the majority of them.

We do have a list of librarians that covers, head, librarians, that covers a fair amount of the time. But the museum, we know very little about. The museum was part of the larger palace complex in Alexandria, so it was sort of built into the large, very large palace in Alexandria. And probably the library was as well.

The first good informative account that gives us any like really detailed understanding of what the museum looks like is by Strabo, which is 20 BCE. So a[01:10:00] long time after its foundation. We know that it was functioning, but we don't get like anyone describing what it looked like or how it worked.

The model for the museum was almost certainly Aristotle's Lyceum which is, it was his school had a shrine of the Muses and a library and it focused on community of scholars. Right. And so that actually brings up the question of why it was founded, because, while there were lots of shrines of Muses, this particular thing didn't really exist before, not in this function. Partly there had been a custom of kings and tyrants, and I mean by that, the, technical term in Greek, single man rule, not bad people, to be patrons of individual intellectuals. But that tended to focus usually on poets and people who could, do something that glorified the king

Right. Which librarians are less likely to do. But that sort of idea is probably partly there, partly in the post Alexander period, the Hellenistic period as it's known, there's this Hellenistic [01:11:00] culture of royal monumentalism, of building and creating monumental or important things for prestige, for being part of the community of, Hellenistic monarchs.

But another article I read by Andrew Erskine argues that a lot of it had to do with Ptolemaic ideology and the need for legitimization after the death of Alexander. So this is because he says that Ptolemy, who seized Egypt, had no claim to it. Right. Alexander had conquered Egypt as part of his conquest.

When Alexander died, he had no heir, so everything was up for grabs. Ptolemy took Egypt, but he had no, as did the other general. Oh, yeah. And so the other generals did various other things to legitimate themselves. Right. Like, but we're not talking about that. But importantly, for instance, the Egyptians presumably didn't care what other people were doing in other parts of Alexander's empire.

Right now, Egypt had been part of the Persian empire before Alexander took it over. That's why he took it over. So it's not like Egypt had been independent, but [01:12:00] still Ptolemy's claim was not founded on anything. he had nothing. So one of the main things he did was he emphasized his link to Alexander himself because Alexander had the legitimacy of conquest and being this greater than human figure.

he did that in a bunch of ways, but one of the ways was to connect his court to the court of Alexander. And what did the court of Alexander have? The court of Alexander had Aristotle. . Right. And Alexander himself had been a supporter of Aristotle, so established something in the school of Aristotle. on the model of the Lim with philosophers who followed Aristotelian philosophy was a way of acting like Alexander. And so that's what Erskin argues. He also argues that to have a center of Greek intellectualism specifically, cuz of course, everyone who worked at the, museum was Greek or Macedonian, but Greek mainly, to have a center of Greek intellectualism was a way to connect the Greek population of Alexandria and Egypt more broadly to their own Greek past or to an imagined version of it.

Because you've got this diaspora of Greeks, right? So how do [01:13:00] they kind of connect them, stay Greek and connect themselves to Greekness having this Greek intellectual tradition and there, in particular, the focus on the canonization of the Greek classical texts really comes to the fore. Right. So that's where the library is particularly important.

 It also becomes a sort of a Panhellenic type of institution because the Greeks and the Macedonians are in Egypt. They don't come from any one particular city state. Remember, there really isn't a Greece at this point. The, idea of Greece as a Semi coherent whole is really a Hellenistic thing.

It's one of the reasons we use that term then. And so you have this kind of Greek intellectual life rather than Athenian or Theban or Corinthian or Spartan or whatever. That allows for this kind of reconstitution of a, of a Greek community. And also the assertion of Greek culture and learning becomes a way to emphasize Egyptian subjugation and exclusion cuz Egyptians are not welcome in the library and [01:14:00] Egyptians are not part of the intellectual life and the Egyptian texts are not important. They, had a few things like that, but basically this was not about Egypt. And that was an important, part of maintenance of the hierarchy that Ptolemy was establishing was that Egyptians were excluded from important stuff. So one of the main projects of the library and the museum was the production of definitive editions of the canonical works, of the main classical authors, and also determining those canons.

this period is when we get the nine lyric poets and the list of what is and isn't a real Euripides play and what is and isn't the Sophocles plays and all of these, all of these lists, the whole idea of cannon really comes out of the Hellenistic period and out of the library.

**Mark:** Now, one thing I've heard about the library, I don't know if it's true or not, is that they had a rule that anyone who was passing through the city in possession of a book, had to lend it to the library so they could make a copy.

**Aven:** Yes. The story in fact, goes that any ship that docked was searched and every, copy of a book was [01:15:00] taken to the library, Copies were made and the copies were given back to the owners, and the originals were kept in the library.

Whether that's true or not is entirely unclear. The stories all come from, vastly later, but I think even if it's not actually true, I think it does reflect There did seem to be an insatiable desire, over time it built up that this library was gonna have all the books, all the books that existed.

When we say books, of course we mean scrolls. They didn't have books, but, Right. And to the extent that when Pergamum, for instance, Decided to follow suit and have its own library and get all fancy and have its own library. Alexandria was so mad at the idea that someone else could have some of the books that it ceased selling papyrus to Pergamum because Egypt of course produced all the papyrus and put an embargo on Pergamum, which led Pergamum to have to develop parchment.

Yes.

**Mark:** Now, which is that, that supposed etymology?

**Aven:** Yeah, Yeah. Which may or may not be true, and of course this story again sounds a little too good to be true, but maybe not. Who knows? [01:16:00] I think it reflects the importance of, the way that these things were thought about anyway.

Right. So really the entire project was very closely linked to power building and to the cultural concerns of the Ptolemies and the Greek community in Egypt. That's not to say that what was going on, that the individual scholars were focused on improving the Ptolemies' claim to Egypt, right? The work that went on in the libraries and the museums, certainly some of the poets wrote encomiums of the Ptolemies and, you know, nice court poetry and stuff.

But most of the work that went on went on for its own sake. But the reason it existed was for political reasons, which I think, frankly it could still be, I mean you'll get to this, but is absolutely certainly true of many national museums in the world today. You know, that's, there's a reason, there are reasons for it that go beyond the pure pursuit of knowledge, shall we say.

Now, the other main thing everybody knows about the Library of Alexandria is that it was destroyed. Yes. So, I'm moving a bit, there's a little slippage here between museum [01:17:00] and library. it's hard to distinguish them sometimes. However, it wasn't maybe, probably, We actually don't know if it was ever destroyed or when, if it was.

**Mark:** And the other thing, I think that more recent scholars have suggested that even if it was destroyed, the books weren't all there anymore anyways.

**Aven:** Well, so this is the thing. So we do know that in 48 bce, when Julius Caesar was besieged in the palace at Alexandria during his civil war, in the course of which he got involved in Egypt's civil War between Cleopatra and her brother and her sister, there was this internal struggle that ended with Cleopatra in charge.

And as part of that, he set fire to some ships in the harbor and the fire spread and part of the library and or museum did burn down

**Mark:** as depicted in the film Cleopatra,

**Aven:** Yes, indeed. But. It's not at all clear that all the books were destroyed. In fact, it's almost certain that they weren't, that some of them may have been, but maybe not.

It's not clear [01:18:00] because we do have, like years later, we have Seneca, for instance, quoting from Livy's History, which was written around 14 CE or finished around 14 CE saying that 40,000 scrolls were destroyed in the fire started by Caesar. Plutarch, a generation later mentions that the fire destroyed the Great library, and Dio Cassius mentions a warehouse of manuscripts being destroyed.

But in 20 BCE only 20 years after this supposed destruction, Strabo reports on the museum as a fully functioning institution, doesn't mention the library separately because it seems to have been considered part of the museum doesn't mention that anything was destroyed. Doesn't mention that there's any problems with it.

So while some number of scrolls may have been destroyed, it probably wasn't, wasn't a mass destruction. And we know that there was a separate second, the daughter library, the Serapeum, the backup library, the backup library, which did have copies. So maybe some originals were destroyed, but the copies [01:19:00] existed.

So it was not like a widespread loss of knowledge. Right. The way that it's always, Oh, you know, we lost all our knowledge when we lost. That doesn't seem to have happened. However were there other times when it was destroyed? Well, in 391 CE, so this is, 400 years later. As part of his attempt to wipe up Paganism, Emperoro Theodosius the first officially sanctioned the destruction of the Serapeum, which is that daughter library

**Mark:** as depicted in the film Agora.

**Aven:** Yes. It has been hypothesized that the daughter library of the museum located close to the temple and the Royal Library were also razed to the ground at this time. It's not clear though, we only hear that the Temple of Serapis was destroyed because it was a temple. But it's also not clear that the library or the museum even existed by 391 CE.

Not in their, I mean they may have existed, but that the books were still there or that there was really much left to destroy. There's a much later Christian story, and I mean much later that the Muslim conquerors of Alexandria burned the library in [01:20:00] 640 but there's no evidence the library still existed in 640, the library anyway.

There may have a library may have burned during the Quet of Alexandria, but the source that tells us that is 300 years later and hostile. Right. So like of course they're gonna say the Muslims came in and destroyed Greek learning because that's the sort of thing a Christian in 900 is going to say.

Right? But it probably, even if they did accidentally burn some stuff down, it wasn't the great library cuz the Great library would not have, didn't exist by 640

**Mark:** So what you're saying is that the library of Alexandria was burned three times and zero times.

**Aven:** Yeah. Most likely, the library and the museum gradually declined in the Roman period and the books were scattered and went different places and some of them just may have been destroyed.

Intermittent violence and warfare. Alexandria was a city famous for its riots from all through the, Ptolemaic period and the Roman period. And it was conquered and there was civil wars and stuff, so that probably contributed [01:21:00] to the decline, but there wasn't one catastrophic destruction. It just simply became less important And that makes sense, right?

Because if the whole point of the foundation was for Ptolemaic image building and legitimation, Well, once the Romans took over, it didn't have that function anymore. It didn't even really have much function as a center of Greek learning in that same way. I mean, obviously Greeks in Alexandria would've still felt,

there was definitely still a greekness and a concern for Greek culture, but Roman, you know, diffusion of that culture all around the Mediterranean. And, Alexandria lost its primary, Rome was now the center of learning. And Athens regained some of its stature that way as well because it became the university town for Romans.

And so it makes sense that the main impetus for it no longer existed and that therefore, they probably weren't gathering books as much as they were and people were probably taking the books away sometimes, and books disintegrate. And if you don't recopy your papyrus [01:22:00] know, your scrolls degrade and things like that. So as far as we can tell, That's probably what actually happened. It doesn't make nearly as good a story. It doesn't sound nearly as good about the vandal, Romans or the vandal Arabs or whatever. But it probably is true. The last recorded director of the library was Hypatia's father.

Right. Theon who died in 405 ce. So there was,

**Mark:** as depicted in the film Agora, which is about Hypatia.

**Aven:** Yeah. But it's not really clear what the library he was in charge of by that point constituted, you know, what did it have in it? What was going on there? so it's not nearly as good a story, but it seems like there was no major destruction of the Library of Alexandria and that we lost the books there the same way we lost all the other books in every other library and place that they were around the Roman world they don't survive.

And that's all I have to say. So you have some more though, I think about museums developing over time. Yeah.

**Mark:** About museums in the way that we think of [01:23:00] them today. And although the Musaion of ancient Greece is not really like what we would think of a museum today. The idea of a museum kind of goes back to the ancient world anyways.

Specifically there is a collection in Mesopotamia that has been compared to a museum. So specifically there was a collection of antiquities compiled by the Babylonian princess Ennigaldi in, Ur which is in modern day Iraq. Right. And this collection seemed to be intended for educational purposes and included artifacts from a variety of different periods, neatly arranged in rows with clay tablet labels for each written in three different

**Aven:** languages. Yeah. It really is pretty amazing. Yeah. and those labels make it clear that this is for display. Yeah. Right. this isn't just cataloging. This is people must have been coming and seeing them

**Mark:** and Yeah, and for [01:24:00] display to someone who doesn't know what they are. Right. Yeah. So not just the collector. Yeah. But you know, other people. Now I mean, it does sound like, like a modern museum, but the big difference is that with this and later iterations of the idea of a collection of antiquities, is that it was a private collection, not just open to the public to come in and learn. And as we move forward in time to more direct antecedents to the modern museum, in the early modern era, such private collections of artifacts, both cultural and natural, they were very popular and often known as cabinets of curiosities, if you've ever heard that phrase before. Though they were often much larger than a simple cabinet.

**Aven:** Cabinet could mean a room. A

**Mark:** room. It's probably in that sense. But again, they were private collections, right? Now one such cabinet of curiosities known as the Arc and collected by the Tradescant family contained a variety of antiquities [01:25:00] and oddities later further bolstered by the American artifacts and natural specimens collected by Botanist and Gardener John Tradescant the younger. Tradescant then either bequeathed to, or was swindled out of the family cabinet of curiosities by an antiquarian and early Freemason named Elias Ashmole and that name Ashmole may sound familiar. He then in turn bequeathed the collection along with his own collections of manuscripts to the Oxford University which then became the core of what became known as the Ashmolean Museum, which we've been to.

Yeah. And this was the world's first university museum and perhaps the first museum in Britain accessible to the public.

**Aven:** Okay. Right. So First Museum rather than collection in our thought. Yeah. Yeah.

**Mark:** Now the first Europe wide museum collection that was open to the public [01:26:00] are generally held to date back to Renaissance Italy, specifically the Capitaloline museums in Rome and the Vatican Museums. They were both kicked off by donations from Popes.

Right. And so, that predates the Ashmolean, right. Now perhaps one of the most famous museums is the British Museum. .

**Aven:** Famous, infamous, Yeah. Many things. . Little bit of both.

**Mark:** It was founded in 1753 after botanist and physician Hans Sloan bequeathed his collection to the nation. And indeed it's in the 18th century that many other countries started national collections that we would recognize as modern museums.

**Aven:** in the 18th century, did you say? Yes. You mean just about when the whole concept of nationalism was just about to kick off?

**Mark:** Yeah. And when, you know colonialism

**Aven:** was in full force, was in full force. So not at all parallel to the original Alexandrian Museum. No. [01:27:00] Completely not about all those same things that I just talked about.

Okay. I mean, obviously, as I said, not the same thing. Collecting of antiquities and curiosity's not the same as what they were doing, but the project, Yeah.

**Mark:** National project. By the way, Sloane's other claim to fame was perhaps inventing chocolate milk . Now there is some debate on this point. So Sloane picked up some Cocoa, Cacao beans.

I don't know exactly what they were. Okay. This is, I, I think part of the problem with the story Yeah. In Jamaica. But decided to mix it with milk rather than with water as was done. Right. Right.

**Aven:** Hence chocolate milk or cocoa or something. Anyway

**Mark:** As for the word museum itself, it continued for some time to refer to institutions of learning before eventually the modern sense of museum as a collection for public display became the more [01:28:00] common meaning.

 Okay. So that is a very brief

**Aven:** capsule history of museums. Right. Well, I think that, I mean, that's good. It takes us up to and we are just not going to wade into questions like what the British Museum should do with its things. I mean, obviously they should return them, but , other than that, I mean, yeah, there's a, a big discussion to be had about museums and their role and the ethics of museums and all sorts of things, and I don't think we're ready for that right now.

, but just to point out that we are aware of that. Screw you, British Museum

And I think that takes us to the end of what we wanted to talk about tonight. Indeed. All right, so your actionable items are to go watch 12tone's videos if you haven't already. Yes. And to go subscribe to Ghost Notes, their podcast, along with Polyphonic. if you're interested in music, you don't have to subscribe to it if you don't have any interest in music.

But really who doesn't have interest in music?

**Mark:** it's a universal, human [01:29:00] universal.

**Aven:** And I'll put links to all of that in the show notes. Of course.

**Mark:** Oh, and your other call to action is to not make this cocktail, I'm afraid. Yeah, don't,

**Aven:** unless you can make a better pear syrup.

Better pear syrup. And don't put the honey syrup in. I think. Yeah, it's far too sweet. . so I'll put the link in just so that you can know, not to make it. Anyway, on that note, , I think we're done. Good night.

**Mark:** Bye-bye.

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**Mark:** Bye