Episode 103: Potatoes for St. Patrick

**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 potatoes for St. Patrick's day.

**Mark:** What a cliche.

**Aven:** Yes. Well, we wouldn't want to be anything but predictable,

So very quickly to start off with, we have some new patrons to thank. We have a very big thank you to say to Mark Kotlarewsky. Thank you, Mark. Thanks Mark. And also to Daniel Zdilla, which may or may not be, or Zdilla. I'm not sure if I pronounced that right. Sorry if I didn't. Thank you to both of you for your support, we really appreciate it.

**Mark:** woohoo!

**Aven:** It would feel wrong if you didn't give us a woo-hoo at this point. So now I think that's all, we can turn to our cocktails indeed. [00:01:00] So this is our St Patrick's day episode. So of course we had to do something Irish sort of,

**Mark:** but our topic is actually about the potato. So I also wanted to get the potato theme in there somehow.

**Aven:** And I'm sorry to say, but most St Patrick's day themed cocktails go for green over taste and are there for kind of not appealing. So we have settled on two different cocktails. So I'll start with mine is the Irish themed one, it's called an Irish maid and it has Irish whiskey elderflower liqueur honey syrup, lemon juice and muddled cucumber slices, which does, I will admit mean it's sort of a muddy green color,

**Mark:** mine isn't green at all. It's called Old Potato and contrary to expectation. It is not made with any potato-based spirit. You might imagine. Oh, well, you know, it'll be potato vodka or something. And it's not it is [00:02:00] made with Irish whiskey, dry vermouth, and apple brandy, or applejack, applejack is what it called for, but we didn't have applejack specifically, so we used a Calvados

**Aven:** and that's an Old Potato, apparently. We did see some recipes that had actual potato in them.

But they were terrifying. So we didn't go with those. All right. Well, I can tell you that mine is quite tasty.

 It is nice. And you cucumbery lightly cucumbery and otherwise it's just elderflower and sweet and a bit of whiskey in the background and I quite like it.

**Mark:** And mine is, I mean, it's very much the, the whiskey, that's the largest ingredient. But I, I like that it's not overly sweet.

**Aven:** So do you want to taste mine?

That is I'm sure too sweet for you. No, I don't want to taste yours. I know. I mean, I know what Irish whiskey and dry vermouthare and, they are not my favorite things. Irish whiskey is fine, dry vermouth isn't to my tastes very much.

**Mark:** Yeah. I skeptical about the thought of sweet and cucumber but [00:03:00] it's not bad.

**Aven:** Yeah, I think it's perfectly tasty. All right. Well, so those are our drinks. So to continue then with the Irish theme, we're going to be talking about a video about potatoes, but before we get to that, why don't you give us a little bit of a thumbnail sketch of St. Patrick? Just because if we're going to do a St Patrick's day podcast, I feel like we have a little bit of history to cover there. Yes.

**Mark:** And since our wheelhouses are respectively the ancient world and the middle ages, it seems the obvious thing to talk about St. Patrick, who kind of bridges those periods.

So St Patrick was more or less a fifth century figure. He was born around 385 and died around well, March 17th 461. He was born in Roman Britain. So in the fourth, century this is the time when Britain was a province of Rome.

But at age 16, according to [00:04:00] his own account he was captured by Irish pirates and enslaved in Ireland. He was held at least according to one version of the story by a king Miliucc of Antrim about whom we know basically nothing except for what Patrick himself tells us. At least according to one version.

So there's different manuscript versions of this and not everyone accepts this part of the story as legit. Now I say king but of course, king is something of an overstatement to refer to someone like this in the period. He was presumably some kind of local chieftain of probably a group of either cattle, ranchers or cattle wrestlers, or most likely both

**Aven:** cattle rustlers, rustlers, cattle wrestlers maybe too, because I think Irish myth in fact does have some cattle wrestling, but yes, I don't think you could separate cattle, ranchers and cattle.

I can't say any of these words, cattle rustlers and cattle ranchers. [00:05:00] Yes. Well, in the pre-modern period anywhere, to be honest

**Mark:** and the great Irish epic The Táin is about cattle rustling. So his father was of course a Roman citizen. And in fact he was a Decurion which is what, a local magistrate? A local magistrate, tax collector, most likely.

And I guess that would be of the senatorial class technically, or

**Aven:** probably it gets complicated out in the provinces and in the late, late periods. So I'm not totally certain, but yeah, he'd be the local elite. Yeah. That's the important point.

**Mark:** And also a deacon. So in terms of religious terms. So Patrick himself was nominally Christian, therefore but he tells us that he was not particularly religious in his youth.

but his time in captivity brought about a kind of conversion experience in which he became pious.

So after six years of enslavement, he had a kind of a come to Jesus moment. Yeah. He heard a voice telling him that he was going home.

And so he ran away from [00:06:00] his captors and got to the coast and got himself aboard a ship bound for Britain through a certain amount of wrangling and convincing. And when they make landfall, they find the land deserted. Now it's not entirely clear in the text whether this place was in Gaul or in Britain, because it took him longer to actually get home. So he stopped in someplace, different people interpret this in different ways. But perhaps you could interpret this as having something to do with Germanic raids. So either in Gaul with the incursion of Germanic peoples there, or this could be, the Saxons in Britain, if it's Britain.

Okay. Though. There's no clear evidence that either of those is, true. Okay. In any case, they wander around for 28 days. So, you know, they find nothing. Okay. So it's this big deserted area. Eventually he does make it home to his family. Because of his ordeal, [00:07:00] he missed much of the education that he would have had as the son of a Roman elite.

Right. So as a result, his Latin is actually rather poor by educated Roman standards. His native language was presumably British by which, I mean, an early form of essentially Welsh. Though he would have presumably learned some Irish while he was enslaved. Right. He, after returning home to his family had another vision a man named Victoricus gave him a letter with the heading Vox Hibernionacum or voice of the Irish. And at that moment he heard voices calling him back to Ireland. So he eventually travels to Gaul to receive a religious education and becomes ordained.

At which point he then takes up a mission to the Irish. Okay. So Patrick was quite [00:08:00] possibly one of the very first missionaries to go beyond the Greco-Roman world. And so he is often referred to as the apostle to the Irish and considered on the same status as the early apostles, but of course, all the early apostles with the exception, perhaps if you believe the tradition here of St. Thomas who was meant to have got to India,

**Aven:** right.

**Mark:** Yes. But with the exception of that, all the apostles, they just went around the, Greco-Roman world. So this was kind of new going to a completely different culture to, to preach. So during his time in Ireland as a missionary the Irish were pacified in a sense that there was Lowering in the level, at least of violence.

And he converted many of the Irish to Christianity. And during that time, the practice of slavery was ended in Ireland, which is a kind of significant thing given that he himself was.

**Aven:** Yeah. And given that Christianity was in fact in [00:09:00] no way ending slavery anywhere else in the Greco-Roman world.

So that's interesting.

**Mark:** Patrick and so this is one of the other bits of text that we have that is written by him. We've got his, something called his confession that I'll talk about later. But one of the things that he wrote was an open letter to the Christians of Britain complaining of the British piracy and slave trade that kidnapped Irish Christians under king Coroticus.

who was basically a British warlord who came to power in the wake of the Roman abandonment of of Britain. And so, you know, he is noted for speaking out against slavery in his writing. One of the first basically to do so, because say it wasn't happening in other parts

**Aven:** of things.

And that wasn't part of any kind of Christian movement really.

**Mark:** Now there is some kind of scandal about his life that we don't really know the details because we only know about him through his own writing and he doesn't tell us including a [00:10:00] story of him having made a confession about something that he doesn't tell us, you know, the details about, but just before his ordination.

And it was something that he did when he was a teenager when he was 15, before he was abducted. There also seems to be some suggestion of accusations of some kind of malfeasance taking money for baptism and ordination taking up his mission in Ireland for personal gain rather than, so there were, his contemporaries were criticizing him, who knows if it's right.

what foundation there is for those accusations. But but it caused him a certain amount of problems. Okay. And some people even doubted that he was actually abducted to Ireland so that he may have made up that story. And there is one modern scholarly suggestion that he may actually have disappeared to get out of having to serve on the Curia.

Which is, I guess, local, local town council, basically. Yeah. Which presumably was a job that[00:11:00] was of little interest to him. And so he just sort of disappeared for a few years.

**Aven:** I wouldn't be surprised if he had to use his own money. That's how sort of Roman magistracies usually cost you money. They didn't make you, I mean, they sometimes did, but they also cost you money, especially at the local level.

So

**Mark:** that could have been the case rather than abduction. Hmm. According to this one scholarly theory anyways. So there seems to have been some sort of trial to which his confession is a defense against. But of course the confession doesn't entirely make clear what the details of the problem were, it mainly gives us some autobiographical background.

Right. The thing that, most people today associate with St. Patrick is the various legends famous legends about him. And few of these can really be authenticated in any kind of way. Like even in terms of whether these were contemporary, so he doesn't, he doesn't mention them.

Right. And no one else does until a long time later. Right. So there's no contemporary evidence that Patrick used the Shamrock to teach the concept of the Trinity. That story doesn't [00:12:00] appear in writing until the 18th century. Just a little later. Yeah. And the visual depiction of Patrick with a Shamrock appears on a coin only in the 1680's.

And that could have been nothing more than just associated with that

**Aven:** because the Shamrock is definitely a symbol of Ireland. Yeah. But yes,

**Mark:** also he obviously didn't banish the snakes from Ireland. Of course, we can tell from paleontological evidence that there were no snakes in post-glacial Ireland.

And in fact, the absence of snakes in Ireland had been noted from as early as the third century. So, well before Patrick's birth, people are already saying, oh, there's no snakes here.

**Aven:** Isn't that weird.

**Mark:** And in fact, the first story of an Irish Saint banishing snakes refers to another Saint entirely, Saint Columba.

And that was in an account written in the late seventh or early eighth century. Right. So it probably just got borrowed from that. And they

**Aven:** just applied it because [00:13:00] he was this, he was the big Saint. Yeah.

**Mark:** And so only in the 13th century is the story connected in any way to, Patrick. And at that point only with skepticism you know, someone saying, well, some people have, connected Patrick to this the snake thing, but I don't think it's true.

Right. So so it looks like neither of those are really anything to, to worry about. Right? So that's, that's a basic rundown of Patrick.

**Aven:** And the important point here is he's the patron Saint of Ireland. He's the patron Saint of Ireland. That would be why there's,

**Mark:** I mean, it, it seems certain that whether or not he was abducted into Ireland, he certainly did go and preach to the Irish. So that certainly is, is true. And and so the, the great Christian tradition in Ireland you know, does come from his

**Aven:** work and that's important. Yeah, yeah. Yeah. Okay. Well then I think that's our nod to the specifics of the holiday.

He didn't drink green [00:14:00] beer also. That's important. Nor

**Mark:** did he eat potatoes?

**Aven:** Well, no, no, he did not. Yes. Potatoes for the record. Not a thing yet in Ireland. Okay. Well then let's turn to said potatoes and oddly enough batteries, but you'll see, I suppose we could have kind of gone for electric cocktails.

And then come back and talk some more. I will not be talking about potatoes when we come back because I have nothing to say about potatoes, because again, potatoes, not a thing in Europe during the period I know anything about, but I have some related stuff to talk about. Alright. So let us listen to potatoes.

**Mark:** Consider the potato battery, that staple of science fairs and classrooms--and a number of experiments being run by our edutuber friends! It turns out that in addition to teaching us about how electricity is generated, the humble potato battery can show us a lot about history. [00:15:00] Let’s start with the history of the potato battery itself.

While we don’t know who first came up with the idea, there is a persistent story floating around the internet that it was one William A Borst who, when helping his stepdaughter come up with a science fair experiment in 1983, remembered a classroom experiment involving using a potato as a battery, and thus came up with the idea for a potato powered clock. So perhaps Borst’s own teacher came up with the potato battery idea? We may never know.

But the invention of the battery itself is rather more well known. Luigi Galvani [from whom we get the word galvanism] had been experimenting in 1786 with what he called “animal electricity”, after noticing that touching a frog’s leg with a piece of metal caused its muscles to twitch and thus reasoning, incorrectly, that animals were the source of the electricity. However, another scientist, Alessandro Volta [from whom we get the word volt] figured out he was wrong and that the electricity was produced by an interaction between two different types of metal in Galvani’s apparatus, and went on in 1800 to construct the first battery, [00:16:00] by making a pile of alternating slices of copper and zinc submerged in some slightly acidic liquid creating a continuous flow of electricity. Funny thing is, the word battery with reference to electricity was coined over fifty years before this in 1748 by Benjamin Franklin. He had been experimenting with Leyden jars [named after the Dutch city Leiden where they were invented], basically an apparatus for storing a static charge of electricity [rather than the continuous current of electricity produced by Volta’s pile]. Connecting up a series of these Leyden jars and then discharging them all at once was called a battery, by way of analogy to the use of the word battery to refer to the discharge of artillery, essentially a series of cannon being discharged and thus bombarding or in other words battering an enemy target. So the progression is from the verb “to batter” or strike, to a unit of artillery or cannons, to the sudden discharge of static electricity. The word battery was then later used to refer to the voltaic pile which could deliver a continuous current.

So the battery wasn’t originally a [00:17:00] battery, and funnily enough the potato wasn’t originally a potato.

It was in fact the sweet potato. It seems that Europeans encountered the sweet potato first in the Caribbean. It was called batata in the Caribbean Taino language, and it’s from this word that English through Spanish gets the word potato, though at least one dictionary posits that the word potato is a blend of the Taino word batata, and the word papa, which is the non-sweet potato in Quechua, the language of the people of the Andes such as the Inca. Well I suppose it’s not too surprising that the potato and the sweet potato were confused with one another by Europeans. What did they know about these exotic starchy tuberous roots that were arriving aboard ships from the so-called New World? Attempts by the English botanist John Gerard to clear up the whole naming fiasco only served to further confuse things, by adding such qualifiers as “common potato” for the sweet potato, and “Virginia potato” for the white potato, under the mistaken assumption that that’s where they came from, and also introducing the terms [00:18:00] “Spanish potato” and “bastard potato”, with the implication that the white potato was initially less important than the sweet potato. Other European languages went different routes, such as the German word Kartoffel, derived from the Italian tartufolo meaning “truffle” [well I suppose that makes some sense], French pomme de terre “earth apple” and Swedish jordpäron “earth pear”. The nickname spud comes from the name of a kind of small poor knife, later a type of gardening implement or spade in the 1660s, being first applied to the potato itself in New Zealand English in 1845.

The actual potato comes from the Andean mountains where it was probably domesticated by farmers around 10,000 BCE. You see grains don’t grow well in the Andean plateau known as the altiplano. Potatoes, on the other hand, are easy to grow in that region. However, there’s the problem of storage. You may perhaps know that civilization in the middle east was kicked off by grain agriculture and the development of clay jars to store the grain and keep it dry, and the development of [00:19:00] writing to keep track of it all. Well the Andean civilizations had their own technological breakthrough. They figured out a way of freeze drying the potatoes by leaving them out overnight in the cold of those high mountains, and then treading on them to express the water out. This chuño, as the result is called, could then be kept frozen in underground storage chambers. And this preservation technique therefore allowed for taxation, an inevitable consequence of surplus, which in turn led to the sorts of things that a complex civilization can engage in such as waging war, building roads, and developing other types of infrastructure. And thus we have the Inca empire. So we could say that the potato powered the Inca empire.

It was also a crucial power source for the Spanish, when they arrived in South America. You see they were after all the silver that could be mined there, and they fed their conscripted work force on the potatoes, making Spain quite wealthy. Of course the influx of silver into Europe, fuelled by these potatoes, led to inflation and destabilization worldwide.

We don’t know exactly when and how the potato [00:20:00] made it to Europe, though presumably they were taken on board Spanish ships and formed part of the ships’ stores for the homeward journey, with the remnants dumped on arrival, thus spreading the plant.

But in fact, the spread and adoption of the potato through Europe was relatively slow. There was an initial distrust of the potato, related as it was to the deadly nightshade. It also came up against established field routines, with specific crop rotations, that allowed the fields to go fallow to maintain soil nutrients. Initially therefore it was more commonly used as an ornamental plant than as a food source. It was also believed to be an aphrodisiac, a fact which could work both for and against its reputation; it was sometimes denounced as wicked, but on the other hand Shakespeare has his lecherous character Falstaff exclaim “Let the sky rain potatoes!”

The French Enlightenment encyclopedist Denis Diderot slagged off the humble spud, writing “no matter how you prepare it, the root is tasteless and starchy”, further stating that “it cannot be regarded as an enjoyable food, but it provides [00:21:00] abundant, reasonably healthy food for men who want nothing but sustenance”. He also blamed the potato for its “windiness”, but added “what is windiness to the strong bodies of peasant and labourers?” So I suppose he did at least sniff out its potential for powering the workers of the industrial revolution.

And indeed that’s one of the ways the potato changed the world, according to historian William H. McNeill. Because the potato caused a kind of feedback loop in Europe, which came to have worldwide implications. Potatoes are a very energy-dense food. Their calories per acre required to grow them is two to four times higher than grain, but they’re also quite labour intensive to grow. Remember the crop rotation system? Allowing some of your fields to go fallow and then ploughing them early in the season is also a good way to control weeds with relatively little effort. Now, however, you could grow potatoes in the fallow fields since they wouldn’t deplete the soil, but this meant that the fields had to be carefully weeded by hand, so you needed a bigger work force. But since [00:22:00] not only is the potato crop more energy dense than grain, since you grow the potatoes in fields left to fallow anyway, you don’t have to decrease the grain supply. One and one make three. And the population boom that results provides all the labour you need, so a literal feedback loop! What’s more because of the population density in Europe, that overflow population impacted the urban centres as well, thus supplying a workforce to drive the industrial revolution that was happening at the time. And so the combined population growth and industrialization allowed for the northern European ascendancy and worldwide colonization. It was a perfect storm as they say.

The second way the potato changed the world according to McNeill has to do with its utility in war. You see in a sense it reduced the knock-on destructiveness during war. One of the big problems with marshaling a large army is feeding that army. An army would tend to deplete the food sources within an area, leading to local food shortages, but the potato could provide a cushion against this. And what’s more, the population boom meant [00:23:00] more men to enlist in armies and navies. So there was a sort of 18th and 19th century military-agricultural complex, or perhaps with the industrial revolution going on at the time too we should say military-agro-industrial complex.

And so it’s perhaps not surprising that it was a French army doctor, one Antoine-Augustin Parmentier, who got all hot for the potato, after seeing its benefits in the Seven Years War. He became a sort of spokesman for the spud, and began a multi-pronged PR campaign to promote it, which led the potato to become more widely accepted and eaten. For instance he staged publicity stunts like hiring armed guards for his potato patch to give the impression they were valuable, and then instructed his guards to accept bribes from those thus persuaded to distribute the potatoes. And this is where our friend and battery coiner Benjamin Franklin comes back into the story. Because Franklin and Parmentier cooked up the idea of holding a potato party dinner for promotion and invited various celebrities to the do. Nothing like a celebrity [00:24:00] endorsement! Parmentier even got King Louis XVI and Marie Antoinette to wear promotional potato blossoms, kicking off a brief vogue for the decorative vegetable.

But before we go, there’s one last thing to say about potatoes and the military. Because the potato cannon, that other stalwart of potato-based DIY experiments, was in effect invented during WWII. It was originally designed as the Holman projector to fire small projectiles like grenades several hundred feet using only compressed air. Apparently when it was first demonstrated for Winston Churchill, as there was accidentally no actual ammunition available, they used bottles of beer--to the delight of the Prime Minister! There are possibly apocryphal stories of the cannons being used to fire potatoes at low flying German aircraft, but one way or the other the Holman Projector gained the nickname potato cannon.

So this story of the potato has taken us from the potato battery in the electrical sense to the potato

battery in the literal cannon sense, and along the way has shown us how the humble [00:25:00] potato has been a power source in more ways than one.

As was mentioned there with a reference to EDU tubers, which I think is a good phrase to use of an educational video about potatoes

**Aven:** The amount of snickering over your own puns you did while listening to that is slightly disturbing, but yes,

**Mark:** Well, that's a reference to the fact that this video was originally made as a group collaboration with a bunch of other educational YouTube creators

**Aven:** from the WCE, which is a group we're a part of, WeCreateEdu

**Mark:** We create EDU.

 and it, just came out of nowhere. Like, it wasn't a planned thing. We, we were just sort of talking online about potatoes and mentioning some potato facts. And suddenly everyone said, Hey, I could make a video about potatoes too. And so a bunch of us just made videos about

**Aven:** potato various forms, mostly science stuff, but yeah.

**Mark:** So, I guess given our Saint Patrick's day theme theme for [00:26:00] today the obvious question is, how did the potato make its way to Ireland and become so associated and become so associated with Ireland? So according to one story, probably apocryphal the potato first made it to Britain when sir, Francis Drake bartered for potatoes in Chile, on his circumnavigation of the globe from 1577 to 1580, bringing them the long way around across the Pacific and around Africa, back to England.

**Aven:** So a long way to bring potatoes on a damp boat.

**Mark:** So yes, it' unlikely that they would have lasted that whole journey. Even if he had got potatoes on board, they would have been consumed in the first part of that, that journey. Cause he

**Aven:** presumably re provisioned multiple times on that journey.

**Mark:** Alternatively, he might've picked them up later in an act of potato piracy when he sacked Cartagena in 1586. [00:27:00] Another story is that the potato was brought to England by Sir Walter Raleigh from the Caribbean in 1588 or from the settlement at Roanoke Island. Though that is somewhat problematic since potatoes weren't grown there at that time as far as we know.

Or alternatively that Raleigh got them from Drake. Right. In any case, the story goes that Raleigh had the gardener at his Irish estate plant them, but when his cook served the toxic berries at dinner, he had them all pulled up and disposed of, but his poor Irish tenants rescued the sustaining tubers from the trash.

**Aven:** All of this has the air of a completely made up story. Yes. Both the association of it with either Raleigh or Drake, because that's just a, like everything new and exciting, they all get associated with those two. And second, that story [00:28:00] is such. Like stupid rich man, oppresses poor clever people, which, I mean, it's certainly not an impossible story, but yeah, it has.

It's too good by half to sound real.

**Mark:** So a more likely route from Spain to Ireland was in the ship stores of Basque fishermen who were on their way home from fishing in the Grand Banks off Newfoundland. And they would stop off in Ireland to dry their catch. And so if they had potatoes with them still leftover

**Aven:** from their stores.

Yeah.

**Mark:** And I like the fact that the story includes the Basque because

**Aven:** the Basque should be in more stories, plus it includes Newfoundland. Yeah. True. Who also later, very fond of a potato because of course, of the Irish connection yes.

**Mark:** In any case the potato certainly became a crucial staple crop of Ireland. And this of course led to a boom in the Irish population but also therefore great poverty with a growing [00:29:00] population and no employment.

So the failure of English plans for grain farming in Ireland had led instead to commercial beef grazing which made the English landowners very wealthy, but left little for the Irish people because they couldn't afford beef. Right. So they're growing, they're producing all this food for export, for export.

And so when the potato came, that was a source of sustenance, but when the potato blight a disease that killed off all the potatoes hit Ireland in 1845, a great famine ensued because they were so dependent on this one crop to, to feed them.

**Aven:** Because they were not, they'd had no land or time to raise any other crops, because potatoes, you could have some potatoes basically in your garden.

Yeah. And they're pretty easy

**Mark:** to grow

**Aven:** comparatively speaking. And as you say, very like, you don't need very much space to grow them.

**Mark:** And so the country was depopulated because of this famine and then further depopulated [00:30:00] by a great diaspora of the Irish around the world who were trying to escape the famine and find a way to not die.

And so many of them would go on to work in the factories, feeding into the whole industrial revolution and so forth.

**Aven:** And of course it is that diaspora, which produced St Patrick's day as a holiday, really, because while it is a holy day in Ireland, it's not a history, its history as a festival is very strongly tied to New York.

Yeah. And reimportation back to Ireland rather than New York. And I guess probably Boston. Yeah. Boston, sorry. Both of those. Yes. You're right. Boston is important there, but to the States, in other words,

**Mark:** The potato didn't just have an impact on European civilization. But also on the places that these European traders visited. So it could even be argued that this Columbian exchange helped to bring down two Chinese dynasties.[00:31:00] You see what the Spanish really wanted was the Chinese silk That's, one of the things that really led to colonialism and all of this sailing around the world is silk and spices. Yeah. And so the silk, they were able to purchase with all of that south American, silver mined by the potato powered workers. So the silver was just a temporary step along the way to get the silk.

Right. And so that silver, all that silver was initially the answer to hyperinflation in the Chinese paper currency. And so China came to rely heavily on that Spanish silver brought from South America. And when that supply of silver was eventually cut off due to shifting trade policies, there was an economic collapse that contributed to the fall of the Ming dynasty in the 17th century.

So lots of knock on effects here. Yeah.

**Aven:** It's almost like the whole world is interconnected.

**Mark:** Yeah. And perhaps there's a problem with [00:32:00] this global

**Aven:** economy. Well, I mean, it, it's a fact, the world is interconnected. The problem is when you do not take that into account. Yeah.

**Mark:** But the Chinese were also quick to adopt the sweet potato which they called fanshu and I'm probably not pronouncing that with the right tones.

Nope,

**Aven:** no way you're pronouncing it with the right tones, I can say that right

**Mark:** now. But it, literally means something like foreign tuber which is actually a bit of a botanical misnomer since the sweet potato. Isn't actually a tuber, but a modified root, unlike the actual potato, which is a tuber.

And so this sweet potato was able to solve the food shortage issues that they were having. So sweet potatoes could be easily grown in the mountainous areas of China, but unfortunately this led to excessive land clearing for farming, which meant that the soil could no longer hold the rain water and the soil nutrients washed away, leaving the land depleted.

So more land had to be cleared. [00:33:00] So again, a feedback loop which in this case, devastated the countryside and also led to flooding of the more low lying arable land. And this was a contributing factor to the fall of the Ching dynasty in the early 20th century.

**Aven:** a lot of knock

**Mark:** knock on effects from this, simple root food sources. And so even today it's interesting to note that China is the leading producer of sweet potatoes.

**Aven:** That is interesting to note. And of course we're talking sweet potatoes, not yams because yams are,.

**Mark:** I'll get to that in a minute! But before we move on to those other topics would you like to talk about the problems of famine and

**Aven:** sure. So, as I said, I can't talk about potatoes because I don't have enough knowledge about any of the periods in which potatoes are relevant to contribute.

But I can talk a little bit about famines because you kind of glossed over it the whole, I mean, [00:34:00] we obviously don't want to go into great detail about the Irish potato famine because it's horrifying.

But one of the important things you didn't mention is it was not simply a natural phenomenon. I mean, it was to some degree, but as you touched on the reliance on potatoes was a factor, a politically motivated problem caused by landlords trying to maximize profit. And then the other piece of it is that the government did not provide feminine relief in any meaningful way.

Right? So the English government, which at the time was in charge, not only didn't change their systems to allow the Irish to grow more grain and help themselves. But they also didn't, they provided almost literally almost no relief of any sort. Like there was a little bit of sending some grain and some food to Ireland, but they continued to force food to be exported.

So while the Irish were starving, food was being exported out of Ireland, [00:35:00] And that is where I want to pick up one piece by the way, is that there were a group of several native American groups who sent famine relief funds to Ireland. Wow. Pretty sure the Navajo specifically, but I might be wrong, but I'm pretty sure it's the Navajo specifically.

 A quick correction. It was the Choctaw nation, not the Navajo who donated during the famine. However Irish people donated to the Navajo and Hopi nations recently as they faced COVID outbreaks as a return gesture for that donation during the famine. I have linked to an article about that story in the show notes.

And interesting simply because of the whole not that the Navajo in any way were responsible for potato blight, but, you know, interesting given the Columbian exchange that's sort of at the background of all of this, you know, two peoples who were in their own way harmed by this process having this connection.

But what I wanted to pick up from that was governmental responses to famine essentially. [00:36:00] And just the process of famine in itself in connection to Rome, because that's what I know the most about. So, in the Roman world grain supply, and while the books that I used to use all call it corn, and it took me way too long to realize that they didn't mean corn, grain in this case means wheat, mostly, though the Romans certainly ate millet and barley and other grains as well. They always preferred wheat. And when we talk about the grain supply of Rome, we're basically talking about wheat. So the grain supply at Rome was a constant preoccupation of the Roman government from the early to mid Republic onward, specifically on the grain supply to Rome itself, to the city.

Now in the early to mid Republic, that's all there was. But later on, even as the empire grew, it was the grain supply for Rome that mattered because that's where the government was. And that's what always mattered. In the early Republic, we already have mentions of in our annals, which are sort of these very short historical [00:37:00] documents.

That kind of say this happened in this year. And this happened that year, there's frequent mentions of famine or grain supply issues. There's a fair amount of scholarly discussion about how accurate those are and also how drastic these grain supplies problems were. But the sort of ongoing problems often linked with disease as well, with illness or pestilence.

And we, as early as the mid fifth century BCE onwards, we have evidence of intermittent and increasing importation of grain from Sicily and then from beyond. So Rome is already not able to necessarily feed itself from its outlying areas. And we see gifts of grain from foreign powers that start to be one of the things that people do is they send, so various Sicilian Kings or tyrants when Sicily is not yet, a province, are sending grain to Rome as a gift to the Roman people. In the process of the late, mid to late Republic as various, you know, as the urban population [00:38:00] became bigger and there were fewer and fewer people, where it was harder and harder to keep everyone fed the grain dole is institutionalized.

So by the Gracchi, anyway, this becomes a thing. And what the grain dole is, is at first it's subsidized amounts of grain for a certain number of citizens at Rome who are enrolled as, being below a certain income level, property level and are qualified for the grain dole, they have to be citizens.

And then after a, while it gets transformed into free grain. And so it's free grain and naturally free grain and wine. Those are the things you get because those are the staples. Those are the things you need to live.

**Mark:** And you, you know, to be honest, if I had bread and wind, I'd be, reasonably contented.

**Aven:** And its importance, this grain becomes more and more important. And to the point that grain supply is often used in our sources or by scholars as a shorthand for grain to supply the grain dole.

Right. So when we talk about shortages and grain supply, it's often meant. Sometimes it means, they just didn't have enough grain to feed the city, but [00:39:00] it often that's what they really mean is this grain dole. But even beyond that, because if there's a shortage of grain, it could drive up the prices.

If the prices are driven up, it can cause pretty devastating effects because the estimates are that grain provided up to 75% of the calories for most Romans, you know, other than the top rich people in, by the mid to late Republic, at least 75% of that, which is a higher relay reliance on grain than pretty much anywhere.

**Mark:** Now, I mean, I guess grain is a very calorie dense form of

**Aven:** oil is more calorie dense. And if you can get oil fats, that helps a lot. But yeah, so, but so it means that if you have a shortage in it or it becomes expensive, right, you're in trouble. So similar problem as the Irish problem. If you rely on one source of calories. Yeah, that's an issue. However, there's a book that I'll link in the description, about famines. And he argues, this author Guernsey argues that there's [00:40:00] actually a distinction that's important between shortages of grain in which fluctuations in harvest from year to year affect prices.

And he says those were very common in the ancient world, all through the Mediterranean local fluctuations, because the rain supply is always very dodgy. And so a late frost or dry summer or whatever could, could lead to shorter. And there's a difference between that and famines, which only happened when crops fail for successive years and across wide areas.

And he says, those were very rare in antiquity. He actually comes up with only a handful across the entirety of the Roman period and the Greek period. And because the Mediterranean is so variable, like if there's no rain in one area, there's probably rain in another area. And so as long as you had systems of supply and I'll get to those later, I think in this discussion you could mitigate now.

I mean, yes, it would be expensive. And so some people might starve, but [00:41:00] the majority of the population wouldn't starve because there was actually access to grain. So this is from the book "famine and food supply in the Greco-Roman world responses to risk and crisis" from 1989.

So the interesting thing is this grain dole is a really important piece of Roman civic life. Once it gets instituted, you can't take it away and it becomes really important, but Garnsey argues, and I, I think he's correct from what I know of it, that outside of Rome, there's really very little institutional response to famines or to shortages. Individual local elite might give some grain or buy up some grain or subsidize the costs from time to time if they had, self-interested motives to do so.

But he doesn't sort of see ever an institutional system to fix it. And in fact, a lot of the time, so shortages could often be caused by hoarding or by speculation. So people would buy up the grain when [00:42:00] it was cheap. And then store it and drive the prices up and then sell it. And paradoxically, what happened often when there were shortages either because of the speculation or because there was a worst harvest unusual.

And so the speculation you know, the people had stores of grain, but there was also a worse harvest so that the price has got really high. These same people who'd been storing up, the grain could release some of that grain into the populace, give up some of their stores and be hailed as heroes for saving the people when it was their hoarding of grain in the first place that had caused at least part of the problem.

**Mark:** But what they got out of that was political advantage.

**Aven:** They got political advantage. Exactly. And so that's sort of how a lot of these are shortages where yes. I mean, they could cause severe hardship, but you're not having thousands of people dying from it or anything because these are short-lived. But even at Rome, even the emperors didn't have a lot of power.

Now, they were very concerned [00:43:00] with the grain supply and particularly the grain dole, because if the people at Rome got unhappy, it caused rioting and rioting could lead to deposition of emperors emperors could be gotten rid of because people were unhappy, but they didn't ever have a system for appropriating and using the grain supply.

So for instance, there was a shortage problem under the emperor Claudius, but as far as we can tell, he tried to help it, but the best he could do was offer incentives to merchants, to make their ships available for use for importing grain. And he doesn't seem to have been able or thought himself able to intervene more actively by for instance, buying up a bunch of grain and distributing it or something.

Basically the attempts at dealing with shortages that we see from administration have to do with preventing hoarding. Right? So passing laws about that, encouraging importation and distribution and limiting maximum prices. So we do have like Diocletian's edict to limit maximum prices of various [00:44:00] types and at other points as well.

Because profiteering was a real problem grain was lucrative, but it was a low margin good unless you, unless you drove up the prices artificially.

**Mark:** now I, I sort of understood that at, around the time of the transition from the public to Imperial period, the control of Egypt as a province was a really key thing, right?

**Aven:** So that's securing the grain, supply the grain supply but that is securing that there will be grain that will come to Rome, but it wasn't the emperor buying that grain and distributing it. If you see what I mean, now they were buying some of it. They were buying the grain dole. So yes,

**Mark:** And Egypt was under the direct control of Augustus as opposed to.

**Aven:** Yes, though later he, put it under other people's control, but what it was was it was never a senatorial province. He only allowed people of equestrian rank to take Egypt over because they [00:45:00] couldn't become an emperor. They were too low ranking because any Senator who was in control of Egypt could choke the grain supply and maybe take over.

That was at least in theory though, Garnsey says that he's not sure that Egypt was quite as crucial as, but, you know, the perception was that it was crucial. So yes, there was, manipulation or control of grain and it was a very high level of concern, but it was a level of concern for sort of managing it on an ongoing basis.

So what if we're talking about, how did they deal with famine or shortages? They didn't seem to have, the emperors didn't maintain grain stores that they could tap if there was a bad year, for instance, right. If there was a bad year, they were in as much trouble as anybody else. I mean, they could pay for stuff, but in terms of getting the grain that they could distribute to the people, if there wasn't enough grain, there wasn't enough grain.

So they didn't have a sort of system for mitigating that. And the interesting thing is we look back at the grain dole and see it as a sort of basic form of the [00:46:00] welfare state, right?

As a basic form of governmental concern for the people. But the Roman authors we have, who of course were all rich basically tend to portray the grain dole and help of any sort to mitigate grain prices like any kind of governmental aid to people who couldn't buy grain very negatively.

They portrayed it as buying votes, as bribing the populace, placating the populace, think of Juvenal's "bread and circuses", right? When Juvenal says the Roman people don't care about politics anymore, they're all happy with their bread and circuses. He means specifically grain dole and chariot races, specifically.

He does not mean juggling clowns. That's another piece that always, you know, is confusing. But panem et circensis, that's scorn. He's not saying isn't it great that the Roman people are, you know, kept fed by their generous government. He saying all they care about is food and this is just a way of buying them off.

So they [00:47:00] don't take part in political, you know elements anymore. Which is of course all evidence of the elite voices that control the information we get. But I think it's interesting to see that on the one hand, Rome does seem to have had some mechanisms for dealing with famine and food shortages, not great ones, but they do seem to have at least at Rome, which of course it was a very small portion of the whole Roman empire.

But at Rome they were concerned like people starving in the street was a problem. They didn't want it to happen. So we do see on the one hand governmental concern. On the other hand, though, it's portrayed as a very negative thing as a sop to the, mob rather than as the empathetic or compassionate act that we might see it as, as famine relief. And we also see, for instance, in time of shortages, large landowners still shipping their food off to where they could get better prices for it. Right? So that same mechanism of people might be starving or at least [00:48:00] having real trouble accessing food.

But we see, and we see this because the emperors were sometimes and other people were trying to control it a little bit. So they were trying to act against it. But we see that people were going for profit and perfectly happy to ship grain to another province while the people within their own province are starving.

So unfortunately we see that this is an ongoing problem. Though the Roman world does seem to have actually dealt with it better. A large part of that is probably because they never did develop those monocultures, right, in the same way .They had a distribut farming network without sort of meaning to, and so that's going back to that original idea that there were shortages, but not famines very often because whether they did so intentionally or not, farmers tended to sort of diversify their crops and have very local climatic conditions and things like that, so that you rarely had problems that spanned large distances.

And while they had problems with plant [00:49:00] pests, they never seem to have had, you know, one of those really devastating things like the potato blight. Right. So anyway, that's just some comparative discussion of famines in the Roman period.

**Mark:** Well the other thing that I, I kind of want to pick up on from that video is, I actually began with not potato itself, but the potato battery. And so there's, I think more to say about the battery. Okay. And so I specifically was talking about Alessandro Volta's pile, which was the world's first battery by the meaning of the word battery that we have today.

**Aven:** I cannot help, but think of piles every time you talk about the battery pile, like the unfortunate affliction on the nether regions.

**Mark:** No, it's literally a pile of stuff

**Aven:** I know, but every time you talk about his pile, I keep expecting there to be an S on the end of your word.

**Mark:** Well, it could also be argued that another invention of [00:50:00] Volta lies behind the video's ending point with the potato cannon.

Right. So he also invented a glass pistol-like device which used an electric spark to ignite flammable gas. Okay. And so this is called Volta's pistol, or Volta's pop gun would perhaps be an even better word for it. So it came about from a device called a eudiometer, which was designed by Joseph Priestley for testing the quality of air.

In other words, it's oxygen content, right.

**Aven:** Because Priestly's all about the oxygen. Yeah.

**Mark:** And so if it ignites,, if it burns there's oxygen, cause you have to have oxygen for burning. So Volta's pistol, his pistol version of this essentially works on the same principle. But it made the device more portable, in the form of a glass pistol. And so Volta used it to ignite swamp gas, what we know as methane. So when the gas in the glass [00:51:00] pistol ignited, it would blow a cork out of the end. So it was basically a court gunner pump, but, you know, as a scientific instrument. Right. And so the principle of expanding gases firing a projectile also lies behind the potato cannon.

I mean, it's the same bit of physics, right? As a side note the scientist who worked out the role of oxygen in combustion was Antoine Lavoisier. And He was also influenced by Priestley's work with flammable air. And he also happens to have been one of the notable figures invited to that potato PR man Parmentier's potato dinner.

Now the various words that we have for battery, as you say pile and so forth. So let's, get all of this kind of sorted out a little bit. So Volta's pile though in English, the word pile has now been commonly replaced by battery. We refer to it as battery, even though it's kind of an [00:52:00] inaccurate name.

But it was originally called the pile and in French, a battery is still called pile. In English, a battery is also referred to as a cell. So that's another term. And the word cell comes from the Latin word cella, meaning a small room and by way of analogy to the monastic cells the small rooms in which monks lived in medieval monasteries, other concepts came to be referred to as cells, sort of a figurative language and metaphor including biological cells, brain cells, battery cells essentially, a battery cell is, like a compartment that contains the anode and the cathode suspended in an acidic electrolyte.

Right. So it's just a little container. So the term battery cell contains therefore two metaphors, the artillery metaphor of the battery and the medieval monastery.

**Aven:** Very nice.

**Mark:** Now galvanism is another

**Aven:** old fashioned term. We don't [00:53:00] use that.

**Mark:** and another

**Aven:** concept about galvanize

**Mark:** galvanize but it's another term from the early days of experimenting with electricity.

**Aven:** And a nice eponym.

**Mark:** So I said that Volta was inspired to create the battery because of Galvani's experiments with animal electricity. Well, experiments in galvanism were also the, one of the sources at least of inspiration for Mary Shelley's novel Frankenstein. She mentions this in, it's unclear whether it was her that actually wrote the, the preface or whether it was Shelley, Percy Shelley.

Right. But in any case, reference is made to this, this kind of experiment

**Aven:** that she had witnessed.

**Mark:** So those experiments in making animal muscles twitch, using electricity, suggested the notion of bringing a creature back to life, like the monster in the novel. And that brings us back to the potato powered industrial revolution because one of the ways Frankenstein is interpreted by literary [00:54:00] scholars is as a response to industrialization, right?

So Romantic writers like Mary Shelley and the various poets that she was, connected to. They were often very critical of the industrial revolution. The Romantic poets were great nature lovers and therefore they were somewhat suspicious of the way that industrialization and urbanization were transforming the countryside of Europe.

They wanted to go wandering around the countryside undisturbed by factories

**Aven:** with the lovely shepherds and nothing else, yeah. For which if you want to see more, your monster video goes into that in some detail.

**Mark:** Furthermore industrialization was seen as a perversion of the natural order figured in the novel as Victor Frankenstein meddling with the natural forces of creation.

Right. And finally there was the worry that the industrial worker would be de-humanized or even replaced by scientific contrivances. Now, speaking of industrialization in the light of the rapid transformation [00:55:00] of the so-called Western world through industrialization, particularly we mean England and these fears are not surprising but the novel Frankenstein still resonates today only the way we apply its warning about the dangers of science is somewhat different.

Today we fear the rapid development of say genetically modified foods, which we sometimes refer to as frankenfoods in reference to the novel. Each era has its own preoccupations and fears about rapid progress, right. And so we can take this back to the potato once again. Which is one of the genetically modified organisms that have been developed, varieties of which have been designed so as not to bruise and become discolored and, you know, these various things that turn people off buying, they better produce

**Aven:** no. When you say genetically modified, do you just mean bred? Because that's the genetic modification that we've been using for millennia?

**Mark:** Well, and that's the thing, do you do it through [00:56:00] gene

**Aven:** splicing or through intensive crossbreeding?

Yeah.

**Mark:** But there have also been potatoes or are at least, I don't know if they've been, presumably they've been successful at this point, but they, they certainly worked on potatoes that were resistant to the potato blight disease. So as to avoid situations like the Irish famine.

Now you earlier mentioned the existence of other tubers or other tuberous vegetables, like the potatoes. And so first, so let's deal with the whole potato confusion here. I mean, I mentioned two different unrelated plants that are referred to as potato's, but yes, the yam is another one. So that early global tuber trade led to the mixing up of those two similar vegetables, the potato and the sweet potato, but there is another tuber that similarly gets thrown into the mix, the yam, which also is not related and does not come from the same part of the world. So properly speaking, a [00:57:00] yam is an African derived tuberous vegetable in the genus Dioscorea, but in some parts of North America anyways the word yam is sometimes applied to the sweet potato specifically. Yes. But the word yam actually comes through Portuguese from the Portuguese word inhame, ultimately from a west African root, which means to eat.

And so there is for instance, the Fulani word nyami, to eat. Right. And so it

**Aven:** shows how important it was as a staple. Yeah. Yeah. Yeah.

**Mark:** So that is where the, word yam comes from. So these are three completely unrelated vegetables that came from

**Aven:** different parts of the world,

**Mark:** pretty different parts of the world, pretty different growing conditions and so

**Aven:** forth.

But in each case it became incredibly important staples in their parts of the world and then around the world, because yams have also become important elsewhere too.

**Mark:** Yeah. And one of the things I think the sweet [00:58:00] potato was picked up by enslaved or formerly enslaved west Africans.

**Aven:** It's being similar to similar. Yeah. Since they didn't have access to yams, they had access to sweet potatoes. Hence the importance of the sweet potato in Southern cooking, cooking, Southern US cooking, for instance. Yeah.

**Mark:** And so all of this brings up the idea of the globalization of food. And so the potato is just one example of that, but I've touched on that before. So for instance our podcast episode number 24, Talking Turkey, talks about the the Turkey, the bird which also has a similar species confusion and again, with a, west African bird.

And we also talked about globalization of food in our episode on condiments, that's episode 35 Season to Taste, right. So for Europe, this globalization of food, and particularly the potato allowed for the escape from the so-called [00:59:00] Malthusian trap, the idea that population growth and rising standard of living could not continue unabated due to lack of resources which are obviously finite.

In other words, population growth should outstrip the resources leading to shortage and starvation, according to Malthus. But the agricultural revolution that was made possible in part due to the potato, along with the accompanying industrial revolution, took the limits off that resource growth and allowed it to keep up with the population, boom, and are until something like potato famine happens, obviously, or climate change or yeah.

 And so our various technological advances, including things like artificial fertilizers, and now genetically modified crops allows us to continue to stay ahead of that Malthusian trap, at least for now. But as you say, climate change may put a hard limit

**Aven:** on that. Yeah. In fact, it's, you could then say that we can blame if you want to be an eco fascist [01:00:00] about it, you can blame the potato for the climate crisis.

Yes. Because had we not been able to, and the Columbian exchange and various other things, because had we not been able to surpass those, you know, the, the myth of continuous growth, which the industrial revolution really kicked into gear, the idea that not only you can grow continuously, but that you must grow continuously for an economy to be stable.

It has been a serious problem and we are seeing, we are reaping that whirlwind right now and we are going to continue to do so. So yeah. So it's all the potato's fault. Yes, but it's so tasty.

So just one note that kind of follows up on when I was talking about Roman food shortages, I'd mentioned that one of the important ways that the Greco-Roman world seems to have avoided famine was by having networks of trade.

We think of the past, everything was harder, but the Mediterranean was very interconnected and there was a lot of trade from the earliest periods that we have any [01:01:00] records for. And it's partly because there's an ocean, but not too, too, too dangerous ocean, though the Mediterranean could certainly be dangerous enough.

 And there's a tool for thinking about travel and trade in the ancient world that I want to share with you even though, as a podcast, we can't look at the visuals and they are really, really cool. And I'm pretty sure I've mentioned it before on the podcast, because it's just such an amazing site. I really, really enjoy it.

So I will have a link to it in the show notes, but it's called Orbis, which just means the world. And it's Stanford. So orbis.stanford.edu will get you to it. And what this is, it's a website, which has basically a map of the Mediterranean and allows you to plug in any two cities. You have to use the Roman names, which can confuse you slightly, but any two cities in the Roman world.

And it will tell you, and then you can sort of change some variables, it'll tell you how long it would take to go from one place to another. You can choose different modes of conveyance, and it will tell you how [01:02:00] expensive it would have been to carry a kilogram of wheat, basically, by various different methods of conveyance. You can choose whether it's during the summer or during the winter or the fall or the spring, you can choose whether you want to know the fastest, the shortest or the cheapest journey.

And then it'll, it'll map it for you. It'll tell you what the route would have been and how long it would take and how expensive it would be. And it's just super fun to play with, first of all, if you have a few minutes, just go off and play with it. As I said, I'm pretty sure I've mentioned this before.

But it's worth mentioning again because it's just so good, but also it' interesting to me in particula, because it really emphasizes a couple of things. First of all, how much faster and cheaper sea travel was compared to land travel, even though, you know, the Romans had these amazing roads and we hear about their roads and how important they were, they were useful for military maneuvers sure.

And important, but they still, Overland was always [01:03:00] really much, I'll give you some comparisons in a minute, much slower and much more expensive. And also it reminds us of how really it matters what season it is and how dangerous and difficult travel could be. Because in spite of the fact that just said they had a really good trade system it was very vulnerable.

It was vulnerable to pirates. And then once those had been mostly dealt with in the Roman empire you know, never stopped being vulnerable to storms and the other kinds of accidents. And you talked about this in the insurance elements and this is definitely true in the ancient world as well.

So you had to balance this, you know, the sea was much faster and cheaper, but much more dangerous, right, as well. So, depending on what you're trying to do. Now grain, for instance will sprout if you keep it too long, for instance, it's so speed, you know, if you keep it dry it's okay. But if you don't and putting it on a ship tends to make it harder to keep it dry, things like

**Mark:** that.

So [01:04:00] if you did have a potato in the ancient world, which obviously you couldn't, it too wouldn't

**Aven:** last forever. Yeah. Yeah. So these things, you know, these sorts of things matter, whereas maybe spices can travel for long periods, or silk or whatever. Yeah. You know, it can go a long way without going bad. Yeah. Yeah, exactly.

So different things. So just to give you a couple of examples of these calculations on numbers that might make sense to some people. For instance, if you wanted to go from Rome to Egypt, there's really only a sea route. I mean, obviously no one's going to go around by land.

So this isn't one where you see a really drastic difference, but just to give you an idea of what our timing is, the fastest journey from Rome to Alexandria in the summer was 14 days, two weeks, 2,332 kilometers. And it would cost per kilogram of wheat, 1.45 denari. Let's not worry too much about what that means.

Just keep those numbers in mind to compare. So 1.45 per kilogram. [01:05:00] They also give you a passenger costs, but I'm going to leave that out because that's a little different issue. That's the fastest journey, in July. In January, it takes a day longer and a little bit expensive. Depends basically which side of Sicily and Crete you take, depending on where the winds are blowing.

So that's the only real difference. Compare that to say, going from Rome to Constantinople. So from Rome to Constantinople, the fastest journey in the summer was 21.3 days. And per kilogram of wheat, it was 4.93 denari. So remember to Alexandria was 1.45 for 14 days. So this is only one week longer, but it's almost five denarii so quite a bit more expensive right.

Now, that's the fastest journey. And basically you go down, you sail, you go around Greece and across to the coast of Asia minor. And then up the coast of Asia, minor to Constantinople. That's 2,724 kilometers. The shortest [01:06:00] journey, however, from Rome to Constantinople, which is more than a thousand kilometers shorter, so shorter by distance, more than a thousand kilometers shorter would take instead of 21 days, 52 days.

So more than double, even though it's a thousand kilometers shorter and would cost instead of 4.93 per kilogram of wheat, 42.8 denarii. So literally 10 times almost as much. And that is because you are taking a land route. So you go buy land down to Brundisium, by sea, across to Dyrrhachium. And But then you go up by land all the way across and around sort of to the north all the way to Constantinople. And it's technically shorter, but no one would take that route if they could avoid it. And then you get a similar kind of thing.

If you talk about Rome to London, right? So Rome to Londinium. Yeah. And this one is particularly.

**Mark:** So, this covers The Roman empire, the Imperial

**Aven:** period, the Roman [01:07:00] empire as far as it ever reached, basically. Right. Okay. So London is interesting because of course there's a couple of different ways you can get across to it.

So the fastest journey from Rome to London in the summer, was 27 days. and it's almost 3000 kilometers. and it's 6.85 denarii per kilogram of wheat. So, you know, it's more expensive than going to Constantinople. It takes longer than going to Constantinople, but this is the fastest journey.

And what you do is you go by sea across from Rome to Narbonne, actually. So basically straight across to the Mediterranean coast of France, right? Then you take river or road to the west coast of France. So you cross across France, but as much by river as possible. Cause river boats are still faster. And then you go by sea up along the coast and across the channel and then up the English coast and up the estuary to London.

**Mark:** Right? So you would go Thames rather than Overland even in Britain.

**Aven:** Yes, so you wouldn't, you wouldn't come up to Dover or whatever, and then go over land [01:08:00] to London. You would go all the way up by sea, around the coast, through the channel.

And then, and then up the Thames.

**Mark:** And either way you're facing a crossing of the channel, which is kind of a

**Aven:** treacherous. So this is in July. So this is important. That's the fastest journey. Okay. The cheapest journey. however, takes 39 days instead of 27. So it's longer, it's cheaper because you don't do all of that crossing France You essentially take no land route whatsoever, right? You instead of 3000 kilometers, it's 5,400 kilometers. So it's, quite a lot longer. But it's cheaper. It's half the price. And what you do is you go entirely by sea. So you go across from Italy to France, then you go along the coast down through the Straits of Gibraltar and up the coast of Portugal and Spain and France and across to England and up the coast.

So you never go by land. You go by sea the entire time. It takes you quite a lot longer, but it is cheaper [01:09:00] because it is so, so the thing is when you go over land, you are using animal power, right? So you have to pay animals, you've got feed them. You don't pay animals, you feed animals and you pay the, you feed the animals, you pay the people.

And it's just, it's very slow and it's very, and it's, labor intensive. Now that's in July and that's the cheapest journey. The shortest journey by distance. So fastest journey was 27 days. Cheapest journey is 39 days. The shortest journey is 63 days shortest by distance of course. Why would you want to do that?

Well, indeed. I mean, so these are the things, because now for us short means like less gas. Right, right. Like, so there's use, but this isn't necessarily true because this one doesn't, it goes entirely by road. You take, go up through Italy, by road, you go across around to Gaul, you go across Gaul to the channel across by boat and then by road, up to London.

[01:10:00] So that's the shortest as the crow flies, basically you would land at Dover. Yeah. Yeah. And so the only boat you take is the boat across the channel. Now it's still not literally as the crow flies because, well obviously because that would be going across the ocean, but also because you do have to follow where there were roads.

Right, right. This is not just, you are following actual Roman roads. And the, some of that may be by boat somewhat. Like you may be able to take some bits of riverboat along the way, And that costs 50 denari per kilogram of wheat. So that's like, no one would ever do it except maybe the military, because it can be more efficient for them rather than boats.

The other thing is these are civilian rates of speed. ORBIS allows you to put in military quick march, for instance, as a speed. And that's like, they went 20 kilometers a day sometimes on good roads, carrying all their stuff. And then just the interesting thing there. I know this is hard to follow without a map, so I won't do too much more, [01:11:00] but that was all in the summer, in July. In the winter, now the cheapest journey, which used to take 39 days and go all the way around by, by ocean all the way, right through the straits of Gibraltar and up the coast, in the winter, the cheapest journey now takes 90 days instead of 39 days because you now are going by boat across to two Marseille basically to just, just because you can't go across the Mediterranean anymore, it's not safe. So now you you go up along the coast to Marseille by boat, and then by river, u So you cross Gaul by river frozen river, presumably, and then across to the channel, because going up the west coast of Europe going up the Atlantic in the winter is suicide and you don't do it.

Right? So suddenly in the winter, it's completely different. Now the cheapest journey is 90 days, the fastest journey is now 41 days. So it's completely flipped sort of which [01:12:00] way is the best way to do because you can't take the boat anymore. So anyway, it's just it's a fun tool.

It's much more fun to play with than to listen to me describing numbers., I realize, and of course it's been put together by, you know, painstaking, incredible amounts of research of the geography and where the roads are and rivers are and combing through our sources for how fast things could go and thinking about how fast donkeys can walk and you know, all of this stuff.

And I'm very grateful to the people who put it together. Cause I couldn't begin to conceptualize how fast these things and how well they worked. But it really is just a lot of fun to think about. Some places are more closely connected than you think they are because they're connected by water.

Whereas if you have to go up into Germany or whatever, it's by road.

And so it's really far away, even though it's not that far.

**Mark:** So what I want to know is, and maybe someone can work this out using this tool for me is, let's say Saint Patrick miraculously got his hands on some potatoes [01:13:00] and wanted to bring them with him on a sort of pilgrimage to, I dunno, either Rome or the holy land or something, how would he do it?

What is his best

**Aven:** option? Let's see, Ireland's not on the map because Ireland's not part of the Roman empire, but it's all by boat man, all by boat,

**Mark:** Let's leave out him crossing from Ireland to Britain. So let's say he's in Britain.

**Aven:** He's definitely going to want to take a boat. It depends on the time of year though.

He could time his, yeah, he's going to go in the summer. He's going to want to take a boat leisurely down and around. Well, it's

the

**Mark:** time of pilgrimage actually is in the spring, right? So April.

**Aven:** Oh, I'd have to. I didn't do, I didn't do the shoulder season, so I'd have to. But the map does it. You'll just have to go and look yourself.

**Mark:** So the very last thing that I want to say in terms of potato facts is, well, it's about, let's face it, potato fun, fun things that have come from potatoes. And so yes, of course we have fun things we can do [01:14:00] with potatoes, like potato batteries in potato cannons. But also toys such as the Spud gun, which is a kind of mini version of the potato cannon, which uses compressed air to fire off small chunks of potatoes rather than a whole potato from a pistol reminiscent of Volta is electric pistol.

The Spud gun was surprisingly invented during the Great Depression, when you'd think they'd have thought better of wasting food in, such a frivolous manner,

**Aven:** I bet there was a lot of rotten potatoes.

**Mark:** So that's even worse, shooting rotten potato chunks that people, I don't know. But probably the most famous potato based toy is Mr. Potato Head. And so I, couldn't not mention Mr. Potato Head which was originally designed to use an actual

**Aven:** potato. My mother remembers using an actual potato, you just get all

**Mark:** the, facial features and the arms and legs and you'd stick it into an actual potato. But this was replaced with a plastic potato shaped base, eventually. Surprisingly it too was invented [01:15:00] during the 1940s around the time of food shortages caused by world war two and its rationing.

Hmm.

**Aven:** So, well, there all also shortages of other kinds of toys and materials to make those toys. And so if you just had to use one potato yeah.

**Mark:** But it goes against the whole idea of, your mother saying don't play with your food. And I, I will leave off on one last light-hearted potato note, the welcome potato, speaking of that YouTuber group educational YouTuber group WeCreateEDU. So there is a famous meme, and we'll include a picture of it in the, show notes

**Aven:** in the show notes, when you say famous, it's old, well it's old now.

**Mark:** Yes, it was famous. It probably may not be as familiar to younger listeners. But so it's a Photoshop image of a crowd of people welcoming the Pope.

And it's a crowd in south America in a Spanish speaking country. I don't know. I [01:16:00] don't know which particular,

**Aven:** no idea. I only know it as a meme, so I don't know anything about the actual picture.

**Mark:** But it demonstrates the dangers of the careless use of Google translate. Because this crowd is holding up a sign that was designed to say welcome to the Pope.

But it says welcome potato. So the word Papa in Spanish can mean potato borrowed from the Quetchua word for the vegetable that I mentioned earlier. But it can also refer to the Pope as a kind of word for father, papa, as in, holy father Pope.

**Aven:** Isn't that Pope means? Yes, yes.

The word pope means yes, father. Yeah.

**Mark:** And so although this Image is actually a Photoshop job and not actually a Google translate error. The image became a popular meme. Welcome potato. And so that's become a, little in joke in that group of YouTubers. The, the welcome

**Aven:** potato, when a new member joins in our slack group, they get emojis [01:17:00] of sweet potatoes.

Cause that's the only kind of potato with the emoji. So we always post little potatoes which is a particularly bizarre way to welcome new members.

Who of course, by being new members, can't possibly know that that's the reference and what the tradition is, but nonetheless, we do it anyway. So it's the welcome potato and yes,

**Mark:** but you can all decide for yourselves how welcome the potato is to world history, given all that we've talked about today.

**Aven:** So I hope that was a somewhat relevant episode for St. Patrick's day. I think the potato is always relevant to Ireland, frankly,

**Mark:** and, and you now, no doubt know more about potatoes than you ever thought you needed to,

**Aven:** and maybe more than you still think you need to, but now, you know, so cheers and happy St.

Patrick's day. Yes. And enjoy, or don't your potatoes. Thanks [01:18:00] for listening. Bye

**Mark:** bye.

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**Mark:** Bye!