

You're listening to Imaginary Worlds, a show about how we create them and why we suspend our disbelief. I'm Eric Molinsky.

So last year, I did an episode about Dungeons & Dragons - - which I had never played before. Now I'm more of a sci-fi guy, but D&D became my gateway drug into the fantasy genre. And I read more and more fantasy books, I keep thinking about something Lev Grossman, the novelist, said that episode.

LG: When Gandalf wanted to do a spell, he had a staff, waved it around, something exciting happened, but you never had an orderly system. Dungeons & Dragons rationalized all that in radical way, suddenly these questions had answers, if you want to cast spell, what level are you? What materials do you have to have on hand? Are you talking? Are you waiving your arms? It was very specific in the way that novelists describe things, especially the way novelists describe things, especially the way novelist describe things now.

Patrick Rothfuss is also a fantasy novelist. He's best known for The Kingkiller Chronicles. He doesn't give D&D ALL the credit for changing the fantasy genre, but he does agree, casting a spell was much simpler in Tolkien's world.

PR: His magic isn't explained, it's not part of a system you can explore but that's fair because Tolkien's world is, but that's kind of fair because Tolkien's world -- it's kind of painted in broad impressionistic strokes a lot of the time.

Since Tolkien died in the early '70s, the fantasy genre has expanded and divided into many different subgenres. And each fantasy author has a chance to invent a brand new universe with its own rules of magic. Writers, critics and fans are often sizing up these magic systems, praising the ones that they think are original -- poking holes in the ones that they think have faulty internal logic.

Now I find this fascinating because magic is inherently illogical. Unlike science fiction, it's based on pure imagination, and there's no reason why magic couldn't solve any problem. But that's why magic is so challenging for storytellers, because how do you strike a balance between the unlimited potential of magic, and the need for a story to have a conflict?

Patrick Rothfuss says you can separate all these different magic systems into two basic categories. He calls the Tolkien school of magic, poetic magic. Its opposite would be scientific magic. That's similar to Brandon Sanderson's magic systems, which you may have heard of – although he sorts everything into soft magic or hard magic.

PR: The joy of one of those systems is you get to understand how everything fits together and because you know how it fits together if somebody's clever in that system, you get to appreciate their cleverness. You never look at something Gandalf does and think oh wow, he really thought his way out of that one. He just did something cool. And that's the price you pay, either something's wondrous and magical on the poetic end of the spectrum, or it's very clever on the scientific end of the spectrum. I like both. They're both very useful in their own way.

Marty Cahill writes about fantasy on Tor dot com. And he really admires Patrick Rothfuss as a novelist because he created a universe where scientific magic and poetic magic can coexist.

MC: You have the scientific magic of that world is known as sympathy, and it's this very scientific approach to the forces of universe, so there are rules, there are laws, there are texts you can read, there are histories, you have professors, you have this magic school.

The main character Kvothe starts with the hard magic but then discovers this other mystical type of magic called "naming."

MC: It's not a matter of manipulating two iron pennies or manipulating the heat of fire to transfer to another object, you're talking about manipulating the very wind itself, you're manipulating the very fire itself, you're talking about wrangling with these larger aspects of universe. A lot of the fun of the main characters comes from this main character Kvothe because he has a very scientific mind, every teacher who is trying to teach him naming is knocking him on the head saying, no, no, you need to stop that. This is not that, this is different, and deeper process.

PR: And a lot of people really enjoy that because a lot of geeks work in engineering because they know the basics of chemistry or thermodynamics work so they read the books and they're like oh wow that makes total sense. There is a tradeoff though because a lot of people if they do understand how the world fits together they can start to question that system or what gets done and they're like well what about entropy? What about angular momentum? And they start asking those questions and you have to work for that.

Beyond poetic and scientific magic, you can break those systems into different subgenres based on the questions the authors have to ask themselves. Is magic a secret in this world or does everyone know about it? Is magic hereditary, or is it something anyone can learn?

And then even when it comes to casting a spell, does the character need to say the right certain words in the right order? Or do you need to find the right ingredients?

Is your magic neutral? Or is there light magic and dark magic that's forbidden? As I'm ticking off all these questions, I bet you're thinking of different movies or books or TV shows that embody every one of those subgenres.

But Marty says one trope that runs through almost all magic systems is the mentor who can explain the rules and push the main character towards mastering the system, figuring out what magic can and can NOT do in that world.

MC: I think we go back to mentor, mentee or wise old man trope or magic school because they're very easy way to introduce your world, and your characters to the reader. And when they're learning, you're leaning learning, you're learning, and so when they level up, you level up. That's when you can see how they've changed as a character.

And there's one big famous example of that.

CLIP: HARRY POTTER

It turns out a lot of fantasy writers and critics don't like JK Rowling's magic system. That surprised me because I thought she laid everything out very thoroughly. In fact, when I was reading the books, I felt like there was too attention on the rules and laws. When Harry finally faced down Voldemort in the seventh book, he had to present a thesis dissertation on the appropriation of wands, and the legal loopholes around the intension of their owners to prove that he's outmaneuvered the Dark Lord.

PR: It kind of looks like it should be over on the scientific end of the spectrum where you have to turn your wrist or you have to say levio-sa not levio-so, but the system itself is very inconsistent. The perfect example is the time turner. If you have a time turner in the world, you would use that to solve all sorts of problems and Dumbledore doesn't?

It's funny, these things never occur to me when I read fantasy novels. Then again logistics is not exactly my strong suit in life. More on that later.

Patrick says when he takes on the challenge of designing a magic system, he is breaking the rules of reality, as we know it, so he feels compelled to chase down every implication -- every unintended consequence. So he's very careful about how many rules of reality he breaks.

PR: Whereas in HP you have things like teleportation and the fact that the world is not significantly different because of that – that bugs me.

It bugs Marty Cahill (KAY-hill) too – and he's a lifelong Harry Potter fan.

MC: My biggest bugaboo is that you have wand and you have wand cores and you have types of wood that go into wand and now that JK Rowling has started to write about other cultures some don't even use wands, so how does that work? And you have these Latin words thrown around but you have intrinsic poetic things like love shield as a kid, that threw away the Dark Lord, but getting magic from? Is it inside of them? Is it in their blood? Is it genetic? Is there some kind of magical heart at center of world? Is there an external source? You know, she raises these questions and then never answers them and it drives me crazy I want to know, I'm the kind of nerd who said a love shield was actually, who wasn't it how used here?

Which makes me wonder, what is the source of all these different systems? Not poetically, but psychologically?

I mean ultimately, are magic stories ultimately about wish fulfillment? How many times have we thought, if only I had a magic *whatever* that would totally solve all my problems?

But Marty says, a good magic system should disprove that wish.

MC: Yeah, life could be easier open a portal to my apartment back in Queens but unchecked, the consequences of that magic could be dire.

Because if you have magic, they have magic too.

MC: Exactly! I teleported into my job on time, well my boss has future seeing powers and he already gave me too much to do. Argh!

Yeah, exactly. Do you feel that the best – well, this is my bias – don't you agree that the best magic systems a price to pay needs to be paid or a sacrifice needs to be made to make the magic work?

MC: I agree, I think you can put those \$20 away, I'm saying this own free will, I agree I think magic is hard, and magic asks a lot of people, and if you're going to do it, if you're going to put yourself out there, then it's going to tax you and toll you beyond recognition, you're going to change or way people see you is going to change or the way you interact with world is going to change. Magic can hurt you.

Patrick Rothfuss did not go for my theory. He thinks this idea that magic comes with a heavy price has become a cliché.

PR: Well here's the thing. Does chemistry have a price? Oh you've meddled with the chemistry. Does plumbing have a price? That's kind of a stupid thought, you know, oh now I've exercised my craft of the plumbing, now there's a price. But that said, chemistry and plumbing absolutely have limitations. You can only solve so many problems with plumbing. You know, one of my writing teachers back in the day, Larry Watson, he wasn't much of a fantasy writer or much of a fantasy reader but I approached him and freaked out about writing my book and I said how do I know what's important to the story, because if I know if it's important to the story then I can take everything else out. And he said, well I read this book and it talked a lot about glove making because the main char of this tory made glove sand you learned a lot about making gloves in this story and a lot people were irritated by that they were like I don't want a lot of this time wasted learning how to make gloves, and kind of shrugged and laughed and said, I thought it was really interesting learning about the glove making. And that's true, we learn, if you read the Odyssey, Odysseus makes a freakin' boat and so the reader learns how to make a boat. If you read the Old Man in the Sea you learn about this person's life, and how he fishes. If you read Moby-Dick, you learn about whaling. And so if you learn about a young orphan boy who goes to a school about magic, then you learn about magic but that doesn't have much to do with the magic. That just has to do with how stories work.

But glove making and fishing are real. Magic only feels real to people with active imaginations. Or so I thought until I met a scientist who studies how our brains work and why magic makes sense to us. And it turns out; scientists have developed their own magic systems.

That's after the break.

>> BREAK <<

One of the reasons why I'm interested in magic is because as I've gotten older, I've realized that many decisions I make in life were made based on magical thinking. Like there were things that I wished for and I assumed would happen by now because I wished them to. There were also things that I didn't want to have happen, and I thought all I had to do was wish against them.

Also, sometimes I come across something in life that confuses me – and I have a feeling deep down that I'm not going like the answer -- so I come up with an explanation that feels better but really only makes sense if you believe in magic.

CN: Well, congratulations, you're human.

Carol Nemeroff is a professor of psychology at the University of Southern Maine.

CN: In terms of thinking it will happen if you wish it hard enough happens when you move a body part, you want to lift arm, boom you lift your arm that's mind over matter mind influencing matter is something we see in action every day the question is to what domain does it apply or not apply? If you apply wishing to whatever the outcome in a way that leads you to take different action, it will be effective, if you apply wishing in place of action ineffective.

Carol has done a lot of experiments to test magical thinking and the key ingredient is a dead cockroach – which sounds like the kind of thing a witch would tell you to find for her potion. But scientists like cockroaches because turns out “disgust” is a really simple and clear emotion to measure in a lab – especially when the dead cockroach has been thoroughly sterilized.

So in one experiment, Carol asked people what's their favorite juice is. She pours them a glass and drops in the cockroach.

CN: And then took it out, counted legs nothing fallen off in there, but also to attend to disgusting object, then rate again how they would like to drink the juice. Obviously most people say I don't want to drink the juice and give it a negative rating. Okay, so you pour

in new juice, would they like to drink the juice? No they wouldn't like to drink the juice. You pour juice again, wash thoroughly three times pouring new juice how much would they like to drink the juice.

So, she ruined their favorite juice through the power of association. And that follows one of the first rules of magical thinking: law of contagion.

CN: Which can be summarized as once in contact always in contact.

The second law is the law of similarity. That's how a lock of hair of Elvis Presley, you can auction that off for over \$100,000 because it supposedly contains his essence.

CN: Which can be summarized as the image, means the image means the object. So two bits of backstory there: these were pulled out, abstracted from 12-volume compendium of magical practices and superstitious beliefs worldwide by Sir James Frazer, the anthropologist, and he identified them as principles that underlie virtually all examples he could come up with or identify.

That's across cultures, across the world?

CN: But across cultures, you find the form of these things remains consistent, but the details get filled in by the culture, so an example here the principle of you are what you eat it says whatever you take into body you will manifest characteristics, we find that all over the place, so the question is what characteristics? If I eat bunny rabbit in some cultural context make me timid and I would want to avoid where as in other culture make me fertile want to, or it might make me fleet of foot, bunnies are fast, the principle remains consistent and the specific characteristics focused on, so there is creativity. That's gets into another area because magical thinking

Tell me more

CN: Eugene Sobotsky showing children and maybe adults clips from Harry Potter movies and he shows them clips involving magical scenes or mundane scenes and their scores on tests of creativity skyrocket in scenes that are magical as opposed to mundane.

Now Carol likes J.K. Rowling's magic system because when Rowling almost always follows the psychological laws of magical thinking: the law of contagion –

CN: Once in contact, always in contact.

And the law of similarity.

CN: The image equals the object.

For example, the Polyjuice potion -- which Harry, Ron and Hermonie use to transform into other people so they can sneak around.

CN: You have to get a piece of person, you have to get piece of hair, I believe something goes wrong for Hermione turns out to be hair from cat.

CLIP: CHAMBER OF SECRETS

CN: So this is combination of contagion and similarities, doesn't turn you into them or link you to them but take on appearance of them.

Carol says there's only one example in the entire seven book series where Rowling invents something that breaks these two rules of magical thinking: The Horcrux.

In case you don't know, Voldemort has split his soul into several different objects, or Horcruxes.

CLIP: HALF-BLOOD PRINCE

CN: She uses the laws of magic, the two principles of magic, to get to given point of making the Horcrux and then she violates it because one of the interesting elements of mana it's always unitary, so if I get a lock of hair, all of important aspects of the source in that piece, we call it the holographic principle, so with Horcrux you're splitting person's mana you shouldn't be able to split it, you should be able to take bits of it all over the place, but each bit should be complete in itself.

It's funny, the Horcrux is actually my favorite invention of J.K. Rolling. Maybe that's because I like stories where magic takes a toll on you or carries a heavy price. Carol says that trope is based on a fear is that your essence or your mana can only be stretched so far.

CN: That's one core difference between magic and religion. In religion you're appealing to external sources although you can get soul online if you do things go badly or call

wrong external sources but in magic, you're doing it yourself, your own energy driving this basically.

Even though this thinking is illogical, it must serve an evolutionary purpose.

CN: There are many different ways to get here and some not linked to evolutionary functioning but I think that positive contagion because magical contagion can be positive as well as negative, I think that's related to bonding. Why is food from mom or dad's plate better? Why do girlfriend steal boyfriend sweater? It's because his stuff is in it, indication of bonding, and bonding is very useful.

It's funny talk about mother or boyfriend in HP books Dumbledore keeps explaining that love is most powerful magical spell and it trumps everything, love shield, so it sounds like love follows rules of magical thinking.

CN: The negative is probably more powerful simply because it's never as urgent to approach something with love as it is to get away from something dangerous, time course is different.

Either way, the emotions that motivate us on a core level – like disgust or love – have been essential in keeping the human race alive for hundreds of thousands of years.

I think if there's one thing that unites all these different magic systems, it's the power of our thinking. It's like the old saying that your life isn't defined by your circumstances but how you react to them.

And if there's one thing I've learned from reading fantasy novels. In mastering a magic system, you have to realize that your thoughts are essential to keeping you alive in times of danger. But seeing the world in new ways, can help you thrive.

Well, that's it for this week – but not it for Harry Potter. The next few episodes are going to be about J.K. Rowling's world, and the impact that it's had on a generation that aged with her characters.

Special thanks to Patrick Rothfuss, Carol Nemeroff and Marty Cahill (KAY-hill) -- who is a big Game of Thrones fan like me, but agrees the way Melisandre brought a certain character back from the dead was pretty lame bit of soft magic.

MC: She just walked over and she's like I would like Lord of Light to bring him back.

And give him a bath a sexy bath.

MC: The Lord of Light likes this.

The Lord of Light wants haircut too.

MC: The Lord of Light wants a shave

The man-bun will truly make you alive.

MC: Are you saying this, or is the Lord of Light making you say this?

That's pretty good. Do you do all characters?

MC: I can but not sober.

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