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00:00:00,000 --> 00:00:07,000

You know what, I've been around for a while.

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00:00:07,000 --> 00:00:13,000

I've traveled the world, met some interesting people, done some crazy things.

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00:00:13,000 --> 00:00:17,000

So you might just think there's not much that could take me by surprise.

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00:00:17,000 --> 00:00:21,000

You'd be wrong.

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00:00:21,000 --> 00:00:27,000

The world is full of stories and science and things that amaze and confound me every single day.

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00:00:27,000 --> 00:00:30,000

Incredible mysteries that keep me awake at night.

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00:00:30,000 --> 00:00:32,000

Some I can answer.

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00:00:32,000 --> 00:00:37,000

Others justify logic.

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00:00:37,000 --> 00:00:40,000

Does the brain have the power to kill?

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00:00:40,000 --> 00:00:44,000

Can the mind become our most powerful weapon?

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00:00:44,000 --> 00:00:47,000

The US Army investigates the paranormal,

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00:00:47,000 --> 00:00:53,000

asking if future conflicts could be fought using mind control.

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00:00:53,000 --> 00:00:58,000

Or the boy who loses his thumb in a horrific accident, only to have it grow back

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00:00:58,000 --> 00:01:02,000

thanks to a mysterious magical powder.

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00:01:02,000 --> 00:01:06,000

Can we really regenerate our limbs?

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00:01:06,000 --> 00:01:10,000

And in Indonesia, an incredible archaeological find

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00:01:10,000 --> 00:01:15,000

did humans once share the Earth with a race of hobbits?

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00:01:15,000 --> 00:01:17,000

Yep.

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00:01:17,000 --> 00:01:21,000

It's a weird world.

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00:01:21,000 --> 00:01:24,000

And I love it.

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00:01:39,000 --> 00:01:44,000

Throughout time, magicians, psychics and mentalists have claimed that they can move or lift objects,

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00:01:44,000 --> 00:01:49,000

walk through walls, and affect the outcome of events.

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00:01:49,000 --> 00:01:53,000

Or even cause bodily harm using only the power of thought.

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00:01:53,000 --> 00:01:56,000

But do these paranormal powers actually exist?

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00:01:56,000 --> 00:01:59,000

Can humans really use their mind to affect matter?

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00:01:59,000 --> 00:02:01,000

But come on.

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00:02:01,000 --> 00:02:03,000

I hear you say psychic power?

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00:02:03,000 --> 00:02:07,000

For real? What level-headed person would possibly take such a crazy idea?

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00:02:07,000 --> 00:02:10,000

Seriously?

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00:02:10,000 --> 00:02:14,000

Well, how about the United States Army?

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00:02:15,000 --> 00:02:21,000

In the late 1970s, the U.S. military did something extraordinary.

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A group of top soldiers started to investigate whether the mind could be used as a weapon.

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Among them was retired U.S. Army colonel John Alexander.

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We had been blindsided by the Soviets on several occasions.

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00:02:35,000 --> 00:02:41,000

And so we had some senior leaders who were willing to explore very unique areas.

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And paranormal phenomena was one of those.

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The Army set up a top secret operation called the Stargate Project,

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00:02:49,000 --> 00:02:53,000

its mission to harness paranormal powers for military use.

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00:02:53,000 --> 00:03:01,000

Some soldiers felt they had experienced the paranormal while advancing through enemy territory in

the jungles of Vietnam.

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00:03:01,000 --> 00:03:04,000

They called it Point Man Syndrome.

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00:03:04,000 --> 00:03:08,000

When certain people are on point, they sense things like,

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00:03:08,000 --> 00:03:11,000

we're minds, we're ambushes and whatnot.

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00:03:11,000 --> 00:03:15,000

Other people don't have that. Why? Don't know.

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00:03:15,000 --> 00:03:21,000

John Alexander investigated psychokinesis, the ability to move objects just by thinking.

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00:03:21,000 --> 00:03:26,000

His experimentation started with spoon bending.

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00:03:26,000 --> 00:03:35,000

We had a session at my house, General Stubblebine, who was the head of INSCOM at the time, was present.

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00:03:35,000 --> 00:03:41,000

And we had a truly phenomenal event occur directly in front of us.

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00:03:41,000 --> 00:03:47,000

At this top secret session, a psychic was asked to demonstrate the power of the mind.

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00:03:47,000 --> 00:03:52,000

The guy held up a fork and this thing just dropped over 90 degrees.

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00:03:52,000 --> 00:03:59,000

And we saw that and we said, wow, need to look into how you can do that sort of thing.

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00:03:59,000 --> 00:04:04,000

And so that led to the process. And we set up a program to do that.

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00:04:04,000 --> 00:04:12,000

I ended up being able to teach this. And we used that not because bending cutlery makes any sense at all.

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00:04:12,000 --> 00:04:19,000

It was to get mindset. It was how do you convince people not to think within the box, if you will.

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00:04:19,000 --> 00:04:25,000

Alexander focused his unit's time and resources into learning this psychokinesis.

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00:04:25,000 --> 00:04:30,000

Amazingly, it wasn't long before he started to get results.

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00:04:30,000 --> 00:04:35,000

This particular one was Lieutenant Colonel. He was holding these forks just like this.

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00:04:35,000 --> 00:04:42,000

They used to be matched. This thing dropped over a full 90 degrees.

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00:04:42,000 --> 00:04:48,000

With all of us watching came back up and went to where it is now.

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00:04:48,000 --> 00:04:54,000

And you can see that however you look at it, those are dramatically different.

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00:04:54,000 --> 00:04:57,000

Absolutely no physical force involved.

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00:04:57,000 --> 00:05:08,000

Encouraged by their success, Alexander and General Stubblebine started programs to train soldiers to use other paranormal powers like remote viewing.

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Remote viewing is a means of data acquisition. I guess you'd colloquially call it psych-espionage.

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00:05:14,000 --> 00:05:21,000

You had an individual who was in a chamber in that case, usually at Fort Mead.

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00:05:21,000 --> 00:05:30,000

They were given specific targets, although they knew nothing about the target and said, tell us about what's going on at that location.

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The Russians had built a huge concrete structure on the White Sea in the Arctic Circle, but US intelligence had no idea what it was for.

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Alexander asked remote viewer number one, Joe McMoneagle, to use his psychic powers to see inside.

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00:05:46,000 --> 00:05:56,000

And he described the building. All they gave him initially, by the way, were coordinates, described the building, then went inside, looked and said, there's a big submarine in there.

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00:05:56,000 --> 00:05:59,000

And he described it and says it's double hulled.

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00:05:59,000 --> 00:06:04,000

Most interesting is that the missiles are forward of the sail.

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00:06:04,000 --> 00:06:13,000

Before that all of them had been behind and a number of other technologies to which our boat builders said, you can't do that.

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00:06:13,000 --> 00:06:17,000

If you build a submarine that big, it would go to depth and crush and whatnot.

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00:06:17,000 --> 00:06:21,000

Well, guess what? It became known as the Typhoon Class Submarine.

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00:06:21,000 --> 00:06:28,000

Again, our intelligence community had totally missed it because we had not heard that there were changes coming.

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00:06:28,000 --> 00:06:36,000

We also did not believe this cerebral centrism that anybody else could do it.

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00:06:36,000 --> 00:06:46,000

Unknown to the US, the Russians had developed a new ultra-secret class of submarine, the largest in the world, with multiple titanium pressure hulls.

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00:06:46,000 --> 00:06:55,000

And now, thanks to the supposed paranormal power of a US Army soldier, the Russians' secret was out.

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Was this result an incredible stroke of luck, a coincidence, or had the military application of remote viewing psychic espionage?

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Actually paid off.

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00:07:08,000 --> 00:07:14,000

There's usually a pretty simple explanation for what seems to be an extraordinary event.

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00:07:14,000 --> 00:07:20,000

Jim Underdown has devoted his life to testing the claims of paranormal powers.

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And we take it upon ourselves to use science to explain why some people hold some of these beliefs.

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00:07:26,000 --> 00:07:32,000

We do test people who make paranormal claims, so it depends on what the nature of their claim is.

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00:07:32,000 --> 00:07:39,000

The Center for Inquiry invites people to prove their powers in a scientifically acceptable testing environment.

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00:07:39,000 --> 00:07:49,000

While we had a woman who claimed to look inside the human body and tell if a kidney was missing or not, she failed her test.

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00:07:49,000 --> 00:07:56,000

We had people who claimed to be able to send words from one person to another.

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00:07:56,000 --> 00:08:02,000

He failed. So lots of people come forward with these claims. Zero are successful.

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00:08:02,000 --> 00:08:09,000

In fact, Underdown thinks their claimed powers have more to do with magic than with the supernatural.

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00:08:09,000 --> 00:08:16,000

Magicians are helpful in making inquiries into some of these claims because we suspect fraud sometimes.

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00:08:16,000 --> 00:08:24,000

And sometimes the simplest parlor magic trick is employed in the guise of supernatural power.

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00:08:24,000 --> 00:08:29,000

Skeptic investigator and magician Mark Edward knows how spoon bending is done.

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00:08:29,000 --> 00:08:34,000

He feels it has nothing to do with paranormal powers.

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00:08:34,000 --> 00:08:40,000

A lot of people are interested in spoon bending, so I'm going to just show you how easy it really is if you focus your mind.

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00:08:40,000 --> 00:08:45,000

So focus on Ben. Think of Ben.

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00:08:45,000 --> 00:08:53,000

Yes, I can feel it starting to loosen. Yes, slightly, a little more. Keep concentrating.

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00:08:53,000 --> 00:08:56,000

There we go. Yes.

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00:08:56,000 --> 00:09:01,000

A lot of psychic energy in the room. And let's just try and get this part. This is really good.

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00:09:01,000 --> 00:09:05,000

You'll see it just true.

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00:09:05,000 --> 00:09:11,000

Mark is a magician, so he can't reveal how the trick is done. But one version goes something like this.

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00:09:11,000 --> 00:09:16,000

The spoon is already bent, but Mark is hiding the handle behind his fingers.

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00:09:16,000 --> 00:09:21,000

Mark has a false handle, which he pinches to make it look like the spoon is straight.

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00:09:21,000 --> 00:09:27,000

Releasing his grip makes the false handle drop so it looks like the spoon is bending.

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00:09:27,000 --> 00:09:34,000

When Mark shows us the bent spoon, he's actually diverting attention away from the fact he's pocketing the false handle.

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00:09:34,000 --> 00:09:37,000

Try and get this part. This is really good.

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00:09:37,000 --> 00:09:45,000

I would say it's possible to make the mistake of thinking that your mental state could aid you in bending the spoon.

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00:09:45,000 --> 00:09:51,000

It is impossible to think that the spoon could bend on its own without cheating.

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00:09:51,000 --> 00:09:58,000

In order for the spoon to bend on its own, you have to cheat. There is no physical way to do that.

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00:09:58,000 --> 00:10:08,000

For Jim Underdown, most claims of paranormal ability, including the ones researched by the U.S.

Army, are a hoax.

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00:10:09,000 --> 00:10:16,000

So do the U.S. military waste millions of tax dollars on paranormal research after all it's all nonsense, right?

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00:10:16,000 --> 00:10:22,000

No, maybe not. You see, it's not just the Army that has taken such spookiness seriously.

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00:10:22,000 --> 00:10:30,000

Researchers at Stanford and Princeton universities studied phenomena like ESP and psychokinesis for 30 years.

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00:10:30,000 --> 00:10:39,000

And today, some scientists believe laboratory evidence for such psychic ability might actually exist.

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00:10:39,000 --> 00:10:44,000

This is an experiment looking at the relationship between mind and matter.

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00:10:44,000 --> 00:10:56,000

Brayden believes the human mind is capable of interacting with something far smaller than spoons, photons, the subatomic particles that make up light.

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00:10:56,000 --> 00:11:03,000

Lisa is asked to place her attention on an optical system, which has a laser beam in it.

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00:11:03,000 --> 00:11:12,000

Hidden from view, a laser shoots a beam of photons through two tiny slits etched in a slide to create an interference pattern.

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00:11:12,000 --> 00:11:19,000

She's at a distance. She's not able to see the beam itself, but she's asked to imagine that she could see the beam.

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00:11:19,000 --> 00:11:27,000

And so what we're checking is whether or not pure awareness alone is able to interact with the physical world.

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00:11:27,000 --> 00:11:37,000

According to his theory, if psychokinesis exists, the subject should be able to influence the nature of the interference pattern just by thinking about the photons.

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00:11:37,000 --> 00:11:42,000

This picture here is showing what the camera sees in the double slit system.

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00:11:42,000 --> 00:11:46,000

And here, we're measuring what's happening in her brain.

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00:11:46,000 --> 00:11:52,000

So we want to see, is there a relationship between the EEG and the interference pattern?

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00:11:52,000 --> 00:11:58,000

If we could show that the relationship exists, then that's showing a mind-matter interconnection.

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00:11:58,000 --> 00:12:00,000

The experiment begins.

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00:12:00,000 --> 00:12:04,000

Welcome to the double slit experiment. Please relax.

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00:12:04,000 --> 00:12:05,000

Okay.

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00:12:09,000 --> 00:12:14,000

The subject is asked to imagine, in her mind's eye, the interference pattern.

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00:12:17,000 --> 00:12:19,000

You may now relax.

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00:12:19,000 --> 00:12:23,000

Then she's told to ignore the pattern completely.

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00:12:25,000 --> 00:12:33,000

At the conclusion of the experiment, the images of the interference pattern are compared to the EEG readout.

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00:12:33,000 --> 00:12:39,000

These colors are showing the degree of correlation.

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00:12:39,000 --> 00:12:42,000

If it's positive, we get a redder color.

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00:12:42,000 --> 00:12:53,000

And so this is interesting. This suggests that when Lisa is paying attention to the optical system, we actually see a change in the optical system, even though she's doing it in her mind.

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00:12:53,000 --> 00:12:59,000

And when she's not paying attention to the optical system, you get a very different pattern of activity.

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00:12:59,000 --> 00:13:01,000

Could this just be coincidence?

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00:13:01,000 --> 00:13:04,000

If we see red, it means that there's a relationship.

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00:13:04,000 --> 00:13:09,000

If we see this kind of red, it means it's a highly significant relationship.

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00:13:09,000 --> 00:13:14,000

It's meaningful that the relationship that we're seeing is not chance. It's a real effect.

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00:13:15,000 --> 00:13:19,000

So can the mind affect matter after all?

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00:13:19,000 --> 00:13:27,000

Raiden's findings are controversial, and the majority of scientists remain skeptical about psychokinesis.

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00:13:27,000 --> 00:13:36,000

Nevertheless, anecdotal reports suggest that the U.S. military still takes it seriously and restarted its paranormal research in the wake of 9-11.

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00:13:36,000 --> 00:13:46,000

Probably the biggest thing that happened was causing people to think and think differently and to think beyond the realm of the possible as they knew it.

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00:13:46,000 --> 00:13:56,000

So whether psychokinesis turns out to be a genuine phenomena embraced by those with open minds or merely cynical slights of hand,

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00:13:56,000 --> 00:14:05,000

the U.S. military's investigation into whether the mind could be used as a psychic weapon is definitely weird.

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00:14:05,000 --> 00:14:07,000

Or what?

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00:14:07,000 --> 00:14:12,000

The U.S. military is a national security organization that is responsible for the destruction of the U.S. military.

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00:14:12,000 --> 00:14:17,000

The U.S. military is responsible for the destruction of the U.S. military.

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00:14:17,000 --> 00:14:19,000

The U.S. military is responsible for the destruction of the U.S. military.

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00:14:19,000 --> 00:14:26,000

Oh! Almost lost a finger there. I need to hang down with that little pinky for a while yet.

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00:14:26,000 --> 00:14:30,000

But did you know that if I were a salamander or a nude, it wouldn't be such a big deal after all.

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00:14:30,000 --> 00:14:36,000

If they lose a limb or a tail, they can grow another. Wouldn't that kind of ability be cool?

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00:14:36,000 --> 00:14:40,000

But why would a nude be chopping vegetables?

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00:14:40,000 --> 00:14:42,000

Oh!

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00:14:45,000 --> 00:14:49,000

Can humans regenerate their limbs? Sounds like science fiction.

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00:14:49,000 --> 00:14:52,000

Well, it's not.

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00:14:52,000 --> 00:14:58,000

As this next story will show, the future is most definitely here.

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00:14:58,000 --> 00:15:03,000

South Florida 2009 is a typical day for the Maraz family.

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00:15:03,000 --> 00:15:11,000

Dylan goes outside to wash the family car. He's accompanied by his two small sons, Freud and Junior, and 14-month-old Jiva.

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00:15:11,000 --> 00:15:15,000

Their mother, Jeanette, is inside. What happened next?

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00:15:15,000 --> 00:15:20,000

Was the beginning of a bizarre journey into the scientific unknown?

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00:15:20,000 --> 00:15:25,000

He was stepping out. He was coming out from the house to the outside.

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00:15:25,000 --> 00:15:32,000

When Yvonne was following him, he never noticed that Yvonne was behind him.

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00:15:32,000 --> 00:15:36,000

He shut the door like an un-normally kid would do.

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00:15:36,000 --> 00:15:42,000

And Yvonne was grabbing the edge of the door, and he shut the door.

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00:15:42,000 --> 00:15:47,000

In an instant, Jivan's right thumb is cut off just below the nail.

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00:15:47,000 --> 00:15:54,000

I grabbed some rack, the towel from the kitchen, so I put it around his finger.

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00:15:54,000 --> 00:15:59,000

We were like, we need to rush. Yeah. Because he was losing a lot of blood.

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00:15:59,000 --> 00:16:07,000

I believe she was on her second towel. I'm in no blood. So, yeah, we just rushed to the hospital.

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00:16:07,000 --> 00:16:15,000

As they rushed to get medical aid, Jeanette and Freud and have no idea just how badly injured their baby son is.

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00:16:15,000 --> 00:16:25,000

Doctors treat Jivan's injury, but they tell his parents that since the rest of the thumb is missing, the boy's hand will be disfigured for life.

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00:16:25,000 --> 00:16:31,000

We were right at the hospital and waiting for the results.

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00:16:31,000 --> 00:16:41,000

The doctor told us that probably he was going to lose his thumb, and that was a bad news for us at the moment.

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00:16:41,000 --> 00:16:49,000

The Maraz family is devastated. They believe their youngest son will be permanently scarred and partially disabled.

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00:16:50,000 --> 00:16:58,000

But days later, the pediatrician offers some hope. He sends them to a doctor named Juan Bravo.

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00:16:58,000 --> 00:17:04,000

He has a controversial new treatment known as pixie dust. He thinks it could improve Jivan's condition.

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00:17:04,000 --> 00:17:16,000

The product is simple. It's a powder and it's applied to the wound bed, and pretty much you reapply every 24-48 hours, and the tissue regenerates underneath it.

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00:17:16,000 --> 00:17:23,000

Could Jivan's finger be saved? Simply by using a magic dust. It's an extraordinary claim.

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00:17:23,000 --> 00:17:31,000

We call the mother and I remember I call her and say, listen, we've come upon a product that is supposed to be great for fingers.

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00:17:31,000 --> 00:17:38,000

I've got pictures to show you. It should not have any side effects or any future complications for him.

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00:17:38,000 --> 00:17:43,000

And we would like to try it with him. And she was all up for it.

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00:17:43,000 --> 00:17:54,000

But the powder has never been used on a baby before. With no guarantee of success, Jeanette and Froyland would have to take a risk.

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00:17:54,000 --> 00:18:06,000

It was the first time that they had used that on a baby. So I believe it was a first trial and we give them the yes.

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00:18:06,000 --> 00:18:16,000

Knowing little of pixie dust's mysterious healing power, just days after the first application, Jeanette and Froyland checked Jivan's wound.

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00:18:16,000 --> 00:18:19,000

What they found was astonishing.

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00:18:19,000 --> 00:18:29,000

We started seeing that his finger started to get a shape. We were surprised. We never thought it was going to work.

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00:18:29,000 --> 00:18:35,000

We applied powder every 48 hours for the first two weeks and then we spread it out to three times a week the third week.

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00:18:35,000 --> 00:18:38,000

And this really was no need after the third week.

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00:18:38,000 --> 00:18:45,000

It seems like science fiction. In just over three weeks, the seemingly miraculous had occurred.

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00:18:45,000 --> 00:18:53,000

After severing his digit, Jivan's thumb has grown back, nail, fingerprint and all.

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00:18:53,000 --> 00:18:59,000

It looks like 99% equal to his left thumb.

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00:18:59,000 --> 00:19:08,000

When we finally removed the scab that was formed by the magic dust, what was underneath it? It was normal skin. It was a normal finger. It was like it never happened.

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00:19:08,000 --> 00:19:14,000

It's hard to believe that this finger was going to regenerate that fast and heal that fast.

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00:19:14,000 --> 00:19:22,000

I'm very happy. Yeah, I felt very happy to see that his finger grew.

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00:19:22,000 --> 00:19:28,000

But did the powder alone regenerate Jivan's thumb? If so, how?

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00:19:28,000 --> 00:19:33,000

Many pediatricians and other medical experts are skeptical.

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00:19:33,000 --> 00:19:41,000

They believe the fact Jivan's thumb regenerated is not that surprising. It's an ability that starts in the womb.

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00:19:41,000 --> 00:19:50,000

We know that pretty serious injuries in fetuses can be completely healed normal like there was never an injury.

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00:19:50,000 --> 00:20:01,000

What we do know, and I think everybody would agree, is that young children, for example, if they cut off the tips of their fingers, they can occasionally regrow them.

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00:20:01,000 --> 00:20:04,000

That's not a miracle. It was going to happen anyway.

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00:20:04,000 --> 00:20:08,000

But then something extraordinary happened.

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00:20:08,000 --> 00:20:17,000

What is less easy to explain is when you get an individual like a Lee Speedack.

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00:20:17,000 --> 00:20:27,000

In 2005, Lee Speedack, a 64-year-old man at the tip of his finger, cut off in a gruesome accident caused by a model airplane propeller.

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00:20:27,000 --> 00:20:36,000

Weeks later, his finger grew back. It was possibly the first documented case of an adult regenerating a body part.

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00:20:36,000 --> 00:20:43,000

Remarkably, Lee Speedack's doctor suggested using the same powder Dr. Bravo applied four years later on Jivan.

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00:20:43,000 --> 00:20:49,000

Had the pixie dust now regenerated an adult human finger?

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00:20:49,000 --> 00:20:58,000

Dr. Ashkan Jiovani is a plastic and reconstructive surgeon. He believes this kind of regeneration in humans is not possible.

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00:20:58,000 --> 00:21:05,000

Well, limb regeneration itself is more possible in salamanders and the lizard family.

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In human beings, you can regenerate skin, but to actually regenerate all the parts of a limb, the bones, the skin, the soft tissue fat, tendons, nerves, that's impossible for that to occur.

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Can body parts really grow back from just having the affected area sprinkled in some mysterious magical powder? Apparently so.

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And it turns out this powder is not so magical after all. It's made up of something called ECM, extra cellular matrix. What's ECM? I don't know.

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Steve Battelak is a research professor from the McGowan Institute for Regenerative Medicine.

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Extracellular matrix is the glue that holds all of the cells in our body together. All tissues, as most people know, are made up of cells, different cell types, skin cells, muscle cells, heart cells.

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So extracellular matrix is what you might think of as an instructive template in which all the cells of our body live.

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We can make powder forms, we can make sheet forms that look like sheets, we can make gels out of it, and these are important for different therapeutic applications.

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Extracellular matrix is the scaffolding upon which all tissue in the body is built. This mix of protein and connective tissue can signal the body to start the process of regrowth if applied to a wound.

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Some scientists even believe it may be possible to use extracellular matrix to regrow an entire digit or limb.

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It changes the default mechanism of healing of the body. It's something that Mother Nature has been working on for hundreds of millions of years of R&D, if you want to think of it that way.

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So we're just harvesting it and saying, OK, we know we're never going to do as good, so let's just see if we can collect this stuff without messing it up.

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So where do scientists get their ECM? Well, here's a clue. It's a cute, cuddly pink farmland.

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Well, that just happens to have loads of therapeutic ECM. Perfect for regrowing limbs. Yes, no brainer. It's pigs. But why?

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Pigs are a convenient and abundant source of extracellular matrix. The tissues from which they're made, like skin, small intestine, urinary bladder,

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are the throwaway products of the agricultural industry. So here's a tissue that would have been waste or maybe turned into fertilizer.

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We're now using as a medical device a regenerative medicine tool for reconstruction of tissue.

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Pigs are genetically similar to humans. Because of this, proteins found in their bladders can trigger a response in us. But how do they harvest it?

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So to prepare the extracellular matrix, we start with the raw pig bladder. And then by using a croak scraper, we simply spread the tissue, loosen the muscle fiber.

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Using forceps, then we grab that muscle and literally pull and tear it away from the underlying matrix.

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So that's the outside layer, which we refer to as the abluminal layer, which is where the muscle was attached.

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It then goes through what is referred to as a parasitic acid wash. At the end of that stage, the ECM is ready for use.

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It can be freeze-dried and used as a dry sheet. That sheet then can either be used as is or ground into a fine powder.

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But not everyone is convinced that ECM is the answer to this mystery.

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Rocky Tuwan is the director of the Center of Cellular and Molecular Engineering.

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He believes there's another explanation. Why Lee Speevac and G-Ven's fingertips grew back?

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They may have a unique genetic predisposition that enables them to do it.

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Possibility of regenerating finger is definitely there, as shown by Lee's results.

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He may very well have a genetic, maybe even epigenetic, constitution that allows him to respond in this manner.

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Is it possible that people like G-Ven and Lee are able to regenerate while most of us can't?

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Could we exploit their incredible ability?

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Before we can find the answer, far more research needs to be done.

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What we're trying to do is try to figure out how in rare instances people are able to grow what their mechanisms are

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and then also in situations where they can't regenerate and then try to compare the two.

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And by doing so, we hope to identify those factors or cells or genes that are responsible for this process.

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And that's how we can move forward.

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One way this may be possible is through stem cell research.

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Found throughout growing embryos, but in only certain places in adults,

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stem cells are unique because they can become almost any type of tissue in the body,

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while other cell types like muscle or skin are fixed and unchangeable.

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They're sort of like a wild card in a game of poker.

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Now, if scientists can figure out how to reprogram any cell into a stem cell through genetic

manipulation,

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then it may be possible to regrow body parts wherever there is damage.

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If we can instruct the body to regrow a body part, then why wouldn't we do that?

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I don't think there's any doubt that someday we will be able to control the way cells act in the body.

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In other words, we will be able to instruct the growth of new tissues and organs.

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But what we would like to do is be able to regrow your heart if you have a heart attack

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that destroys so much of the heart muscle that you're going to die,

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or to replace your kidney to get you off of dialysis, or to regrow your esophagus

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so that you don't have to go through a life of misery after having it removed.

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Instead, we will grow you a new esophagus.

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This is not science fiction. It would have been science fiction 30 or 40 years ago.

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Could this eventually lead to the holy grail of all scientific discoveries?

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Could this give us eternal life?

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The fountain of youth has always been the holy grail.

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It may change the life expectancy.

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If you're able to better locomote because you have better limbs and joints,

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you'll be more fit, for example, and maybe you eat better and feel better and so on and so forth,

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it will probably affect your life expectancy.

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Imagine a world where no one gets old.

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00:27:57,000 --> 00:28:02,000

What will our civilization look like in a hundred or a thousand years?

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00:28:03,000 --> 00:28:06,000

Jeevan can say he had something to do with us.

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Is that weird? Or what?

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What if I was to tell you that long ago, in a time before time,

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in a remote land at the far edges of the known world,

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lived a race of tiny people who lived in constant mortal fear of huge carnivorous dragons?

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You might say, big deal, Shadr, like we haven't seen Lord of the Rings.

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But what I'm talking about isn't an epic tale of fiction set in Middle Earth.

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What I'm talking about is a real race of hobbits that may once have existed

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and fought real dragons right here on our Earth.

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Now, I dare you to tell me that isn't weird or what.

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The remote island of Flores Southeast Asia has one of the most bizarre ecosystems in the world.

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Inhabited by elephants, giant rats, and the deadly Komodo dragon,

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it is also the location of one of the most astounding archaeological discoveries in history.

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In 2001, a team of archaeologists traveled to the island

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and began excavating deep in a cave called Liangboa.

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Researchers started excavating at Liangboa, this limestone cave on Flores, Indonesia.

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And during the first two years of excavation, they found some small bits of human bone,

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but they weren't sure exactly what it was.

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But then in 2003, they discovered more remains.

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This time, it was a complete skeleton of a 30-year-old female named LB1.

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Carbon dating said she lived around 18,000 years ago.

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What confounded experts was that she was unlike any other human being ever found.

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In looking at our species, it certainly does not fit in.

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If it was a member of our species, it would be very strange.

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The reason was astonishing.

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She was only around three feet tall, almost two and a half feet shorter than a modern North

American woman.

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It's a very small individual.

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It was around three foot, maybe a bit less than three feet in height.

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This remarkable discovery led this tiny, full-grown human specimen to be nicknamed the Hobbit.

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Was science fiction becoming science fact?

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And then discovered human-like species only three feet tall, sharing an island with Komodo dragons and giant rats.

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Sounds too incredible?

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The indigenous population of Florese think they know what this species is.

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The mythical Abugogo, a creature they believe once inhabited the island.

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The Abugogo are said to have been small, hairy cave dwellers, same size as the Hobbit.

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These creatures are claimed to have survived until it's recently the last century.

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Is the presence of the Hobbit skeleton's proof that the legends were actually true?

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Legend or not, it's extraordinary, undeniable evidence on an Indonesian island of a fully grown human only three feet tall.

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How could this happen?

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Matt Tokeri is a paleoanthropologist and expert in ancient people.

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He believes one possible reason for their tiny size could be related to a phenomena called island droids.

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Island dwarfism is a description of a phenomena where in some cases on islands, say, or other ecological settings that are isolated,

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that some animals get larger and other animals get smaller.

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So rats and small animals tend to get larger, mostly because of access to resources as it relates to fertility.

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So, you know, if there's only so much food, you're better off to be smaller because then you can have more offspring.

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We don't know for sure if it happened in terms of the Hobbits, it may have, but it may not have.

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Basically, the Hobbit stands about a meter tall.

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And so that's quite small for a full grown adult.

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And so, the Hobbit is a small, large, and large animal.

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That's quite small for a full grown adult.

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And we haven't really seen normal body sizes of that height for a long period of time in human evolution going back more than two million years ago.

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So to find something like that when we actually thought that sort of our body size increase, and particularly our lengthening of our legs,

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was a big part of our human evolutionary story, that to find something that doesn't fit into that and yet coexisted with us is really quite strange.

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But why did these remarkable creatures disappear? What happened to them?

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Some theorize the Hobbit may have become extinct because they were eaten by the island's Komodo dragon population.

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Not nice.

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The Komodo dragon was a part of the Hobbits, if there's no question, just like it is the life of people that live on Komodo and Rincha today.

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Did the Hobbits go after Komodo dragons? Or did the Komodo dragon go after the Hobbits?

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These are questions that will continue to be answered. These are all possibilities. We're just not sure exactly how it played out.

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But whatever their fate, this extraordinary discovery confronted scientists with an amazing possibility.

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Our human evolutionary history is incomplete. And the Hobbit is an entire new species.

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Well, the discovery on the floor has certainly broadened our understanding of human evolution.

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Does it change any of the general themes of what we've known? Not really.

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But it does show us that we come from a very diverse family tree and that some of those branches of that tree subsisted for a lot longer than we thought previously.

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Generally we thought things like homophoresiensis went extinct a million or two million years ago and yet now we see them living very well on an isolated island in Indonesia up until even 18,000 years ago when modern humans are definitely in the near area.

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Knowing that there was a totally different early human species living on Earth coexisting with us that looked so different than us is something that was really mind-blowing to the scientific community.

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Well, I thought it was absolutely fantastic. I think it adds a real level of diversity to our family tree and seeing something that in some ways looks so primitive that is so recent in time is really this great experiment in being human.

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No matter what you thought it was, it's just an incredible find.

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I remember when it was first announced, you know, many, many scientists including myself were very skeptical about it. I mean, could this really be real?

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But over time, you know, the evidence has just been consistently presented that shows us that, yeah, this is legitimate different species than our own.

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Whilst the discovery of the Hobbit excited many scientists, others were less convinced.

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I had a different viewpoint on this from the outset because when I read that first paper about the skull, it just didn't fit. And so I looked for an alternative explanation.

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So is the Hobbit skull just a lonely example?

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Or is there other evidence that can prove it is a new species of human relative? Is there anything else unique about the Hobbit?

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Well, it turns out they do have one distinctive characteristic that many experts say is proof that it is a separate species.

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Matt Toccheri is a paleoanthropologist and expert in ancient people. Matt has studied bones of the Hobbit's wrist.

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He believes the unique structure is proof that this is a new species.

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The reasons why I think it's a different species stem largely from my own research, which happens to be on the evolution of the wrist in humans and our close relatives, the great apes.

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There's been some big changes to our wrist in the last million years. Well, Homo Fressiensis doesn't show those changes.

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And so that basically says to me that it must be descended from an ancestor prior to that a million

years ago because it doesn't share the derived anatomy we see in us in Neanderthals.

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Matt found that a key bone in the Hobbit's wrist is different to modern humans and more similar to a chimpanzee or ape.

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He believes this means that the Hobbit is in fact a new and unknown species of human cousin.

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In terms of the wrist evidence, you can see that it's remarkably similar to what we see in chimpanzees.

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Now, that doesn't mean it's more closely related to a chimpanzee because the Hobbit share anatomy with modern humans in Neanderthals that chimpanzees don't.

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But what the wrist shows to us is that it retains the anatomy of the primitive hominin and so it must have branched off prior to this new morphology evolving.

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And that's pretty amazing.

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This compelling evidence was presented to the world's scientific community.

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Since there were portions of other Hobbit skeletons found, they classified it as its own species with a Latin name *Homo floresiensis*.

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But anthropologist Robert Martin has a different theory to explain the mystery of the Hobbit.

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This skull is really quite unusual. The skeleton is quite unusual and so you can understand why people said it must be a new species. It's a very unusual individual.

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Martin believes the Hobbit's inclusion into our evolutionary history was based on too little evidence.

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Archaeologists only recovered one skull among all the skeletal remains.

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And the point I really want to emphasize is that we have fragments of other individuals but we only have one skull.

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If they had found two or three or four skulls that were all the same, it would be much more difficult to argue.

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We should be very, very careful about basing huge interpretations on single specimens.

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Dr. Martin feels the skull isn't consistent with our evolutionary history.

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He believes its small size raises a big problem.

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The Hobbit's skeleton is nearly 18,000 years old.

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If what we know about human evolution is true, the Hobbit's brain should be larger than it is.

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You have to go back three million years to find the brain that's small.

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But over the last three million years, the brain has got bigger in every other single hominid except this one.

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So that's a problem.

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If we look at all of the known hominid skulls and plot out the brain size, you get a very nice curve.

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And the only thing that doesn't fit is this Hobbit from Flores.

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Martin has an amazing theory of his own.

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He suggests that the Hobbit's skeleton actually belongs to a modern human from Flores

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who suffered from a congenital disease known as microcephalia.

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And microcephalic simply means small head.

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It is a developmental abnormality.

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It's the cost of the skull of a modern human microcephalic, a small brain, modern human.

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And this brain is exactly the same size as in the Hobbit.

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Another convincing piece of evidence is that this disease also has another side effect.

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It produces a small body just like the Hobbit's.

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So the mystery deepens.

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Is it possible that the world's scientific community is wrong about the Hobbit?

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To add to the mystery, completely new species of long extinct human relatives have started popping up all over.

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Most recently in a remote cave in Siberia where a tiny preserved human-like finger bone was unearthed

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with DNA unrelated to any of our so far discovered proto-human pals.

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Dr. Breanna Pobina is an education specialist from the Smithsonian Institute.

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She believes the Hobbit is just one of many previously undiscovered species and more will likely be found.

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New fossils are being found all the time.

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They often fit very well into the early human family tree.

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At least three other species of early humans have shared the earth with our species, Homo sapiens.

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Homo erectus, Homo neanderthalensis or neanderthals, and Homo floresiensis, the Hobbit.

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Potentially this new species found in southern Siberia, this pinky bone, could have even been a fourth species.

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One of the ways they've determined this pinky bone belonged to a new species was by examining its DNA.

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Recent technological advances make it possible to sequence the genes of long extinct species,

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but mysteriously the Hobbit's DNA has never been examined. Why?

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It turns out the original DNA samples were damaged, and more bizarre since the first scientific paper was published,

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no one has been granted access to the original skeleton.

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The specimen has been kept pretty much under wraps by the discoverers.

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I requested access to CAT scans, CT scans to check this out, and I was refused access.

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You're not allowed to publish if you don't make the material accessible to other scientists.

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Despite the debate, *Homo floresiensis*, aka the Hobbit, is now widely accepted as a new human species.

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There's a lot about human evolution that's still a mystery. In a way it's like putting together the pieces of a puzzle.

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In the last 10 or 15 years, we've had an unprecedented amount of discoveries that tell us that the human family tree extends back about double the amount of time that we initially thought.

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That the number of human species on the family tree is about double the number that we originally thought.

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So these finds, these new genetic finds, the fossils, the archaeological evidence,

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really is filling out the human family tree, shedding light on some of the darker mysteries of human evolution.

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Hobbits might indeed have existed, but their true origins may remain a mystery forever.

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Is that weird, or what?

408

00:42:52,000 --> 00:42:57,000

What kind of mystery is the mystery of human evolution?

409

00:42:57,000 --> 00:43:03,000

What kind of mystery is the mystery of human evolution?

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00:43:08,000 --> 00:43:14,000

So there we have it. Three weird mysteries each with equally weird theories to possibly explain them.

411

00:43:15,000 --> 00:43:23,000

The US military investigates the power of mind over matter? What did they find?

412

00:43:23,000 --> 00:43:29,000

Can we control objects or even kill just by using our minds?

413

00:43:31,000 --> 00:43:35,000

Or are psychokinesis just a trick of magic?

414

00:43:37,000 --> 00:43:42,000

A young boy and an elderly man both regrow their fingers after horrific accidents.

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00:43:45,000 --> 00:43:52,000

Can we regenerate limbs simply by using powder extracted from a pig's bladder?

416

00:43:53,000 --> 00:44:01,000

Or on an Indonesian island inhabited by deadly Komodo dragons, archaeologists discover something extraordinary

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that could rewrite the history of human evolution.

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00:44:05,000 --> 00:44:08,000

A tiny three-foot skeleton.

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00:44:08,000 --> 00:44:10,000

Is this a new species of human?

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00:44:10,000 --> 00:44:15,000

Do hobbits really exist? You decide.

421

00:44:16,000 --> 00:44:23,000

Join me next time for more stories that will undoubtedly be weird, or what.