



## Science Magazine Podcast Transcript, 14 June 2013

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### **Promo**

The following is an excerpt from the *Science* Podcast. To hear the whole show, visit [www.sciencemag.org](http://www.sciencemag.org) and click on “*Science* Podcast.”

### **Music**

#### **Interviewer – Kerry Klein**

Finally today, I’m Kerry Klein, and I’m here with online news editor, David Grimm, who is going to give us a rundown of some of the recent stories from our online daily news site. So Dave, our first story is about a new method of monitoring animals in the wild. The cheetah is considered to be the fastest land animal on Earth, and a high-tech new radio collar is helping us to understand the secrets of its speed.

#### **Interviewee – David Grimm**

And it turns out because of this research that we’re finding out that speed isn’t everything when it comes to cheetahs. They are the fastest land animal on Earth. They’ve been clocked at more than 100 kilometers per hour, which is as fast as many cars on the highway. And researchers have longed believed that just because they are that fast is why they are so successful at catching prey, but these radio collars you alluded to are shedding some new light on really why cheetahs are such good hunters. It’s really hard, actually, to take a lot of these measurements in the wild. And so what researchers did, they spent 10 years perfecting these radio collars, and what’s cool about them is they have a GPS system so the researchers can monitor exactly where these animals are. They also have gyroscopes, magnetometers, accelerometers, all the sort of things that you want to know to figure out exactly how a cheetah is moving when it is chasing down prey. And these things are solar powered too, so they’ll last for about a year.

#### **Interviewer – Kerry Klein**

So what types of things can we learn about cheetahs in a year?

#### **Interviewee – David Grimm**

Surprisingly a lot. These collars were so good, they were able to actually collect data 300 times a second. So these researchers really had a wealth of information to sort through. They had fitted the collars on three female and two male cheetahs, and they actually watched them over about an 18-month period during their time in the African savannah. And what they found is that these animals do run really fast – actually clocked one of the cheetahs at 106 kilometers per hour. But much of the time, the animals were actually not running that fast. They were topping off at about 60% of that speed. When they did run that fast, it was only for about one or two seconds. What really seemed to matter was how quickly the cheetah could out-manuever its prey, and it did this by breaking very quickly, by turning very quickly. It could make these really sharp turns, and it accelerated with four times the power of the fastest human sprinter. So it wasn’t really

that the cheetahs are able to take down prey because they are so fast, it's because they are able to stop and start very quickly, able to turn very quickly – all the things you'd want to be able to do to chase down a prey that's running fairly erratically.

**Interviewer – Kerry Klein**

So are researchers planning on trying to use this sort of technology with other animals?

**Interviewee – David Grimm**

Well, yes. That's the really cool thing about this study is because these collars have been so effective, the researchers actually want to try them on lions, wild dogs, and even domestic cats. You can figure out what your kitty has been up to while you've been gone during the day. So some pretty cool applications of this work.

**Interviewer – Kerry Klein**

Okay. And next up is a story about the advantages of record-keeping. Modern science takes advantage of many ways of observing the past – sediment cores, ice cores, tree rings, things like that. But we shouldn't underestimate the power of a medieval quill pen.

**Interviewee – David Grimm**

That's right, and especially the writing of medieval Irish monks. It turns out, there is something in Ireland called the Irish Annals, and this is an anthology that includes more than 40,000 entries chronicling many aspects of medieval Ireland. The dates range from between 431 and 1649, so there's a lot of stuff in there. And the reason scientists are interested in those writings is because they are trying to make a connection between volcanic activity and cold spells. Volcanoes belch a ton of sulfur dioxide into the atmosphere, and what the sulfur dioxide does is actually reflects sunlight back into space and that can actually cool various regions of the Earth when you have a volcanic eruption. But it's been hard to draw exact links between the timing of those volcanic events and actually cooling spells on Earth. And the reason is, is because even though we have these ice sheets and these ice cores that you referred to – that's sort of when the ash falls down, it creates layers kind of like tree rings in the ice and researchers can drill these cores and sort of figure out when the layers relate to certain climate events in history. The timing isn't super precise, and they would love to be able to correlate that with other sources of data.

**Interviewer – Kerry Klein**

Cue the chronicles of these medieval monks.

**Interviewee – David Grimm**

Exactly and it's actually not just monks. It's monks, but it's also family historians, writings from Ireland's aristocratic families, and also as time went on, the researchers actually got information from personal letters and military historians. But they actually got a wealth of information. They were able to identify 70 cold spells over this more than thousand year period that they considered very reliable indications of the weather at the time. It's understandable that people would be writing about this stuff because cold spells – it's not just like, hey, it's cold outside but actually they are worried about things

like livestock and crops and the impact the cold weather has on society in general. Especially when you're talking about populations that don't have the modern heating technology that we have today. So this was actually something that people wrote a lot about. And the really cool thing is that the researchers were able to time the writing of these events to 48 distinct volcanic eruptions.

**Interviewer – Kerry Klein**

So we already knew that volcanic eruptions could cause this cold weather. We already had evidence of these in ice cores around the world. So how exactly do these added records actually help us understand these events?

**Interviewee – David Grimm**

Well, it gets the timing more precise about the link between the eruptions and the cold spells. It also suggests that there may be a lag time between when the volcanoes erupted and when the cold spells happened. 38 of the 48 eruptions occurred within five years of the episodes of cold weather. And often, that was five years before the cold weather happened is when the volcano erupted. And that may seem like a long lag time, but it could take a lot of time for these particles to get into the air so researchers are getting a better sense of the timing. They've also just got more data now. They can, sort of, tweak their climate models when they are trying to predict how future eruptions are going to impact climate. They now have this additional source of data to draw from.

**Interviewer – Kerry Klein**

And then of course today, we've got social media. We've got Twitter.

**Interviewee – David Grimm**

We do. We still have Irish monks but we don't have to rely on Irish monks as much. We've got Facebook and Twitter to take their place.

**Interviewer – Kerry Klein**

Right. And in our final study, we're contemplating what happens when we stare into the face of death. There's a saying that goes "there are no atheists in foxholes," implying that the fear of death turns people to faith, but a new study suggests otherwise.

**Interviewee – David Grimm**

Well, a new study suggests that people will turn to science as well. It's a little bit of a biased study, because the people they recruited for the study already didn't have a strong belief in religion. So these weren't necessarily people that were going to turn to God anyways in a very stressful situation. But it does suggest that when people don't have religion in their lives, they find something else to turn to when they are confronting death, and in this case, that something else is science.

**Interviewer – Kerry Klein**

So how did a scientific study make people confront death? And not face a lawsuit?

**Interviewee – David Grimm**

Right. Well, they didn't go to foxholes. What they did was they actually turned to competitive rowing, which is a very stressful sport. They recruited 100 rowers, mostly in their 20's, and again, these people didn't have very strong religious convictions. And they broke the rowers into two groups – one that was about to race in a regatta so they are very stressed out. And the other was preparing for a less stressful training sessions. And then they had the rowers complete surveys, which asked them to agree with statements like “we can only rationally believe in what is scientifically provable” and “a scientific method is the only reliable path to knowledge.” And what they found is that athletes that were getting ready for this big rowing competition had higher anxiety levels, as you would expect. They were also significantly more likely to express a strong belief in science based on the survey. In fact, 15% more likely than the rowers in the other group.

**Interviewer – Kerry Klein**

But that doesn't quite have an element of death in it.

**Interviewee – David Grimm**

That's right. So actually the researchers did another experiment where they recruited staff members and students at two large universities in the United Kingdom who also didn't have very strong religious beliefs. And they asked some of them to write about their own death and others to write about the experience of dental pain. So subjects who contemplated their own mortality again showed about a 15% stronger belief in science based on a similar survey that had been used in the previous experiment – 15% stronger than the subjects that were just contemplating dental pain. So this we got death more into the equation here. People aren't actually confronting death, but they are actually thinking about their own mortality a lot.

**Interviewer – Kerry Klein**

But of course, this wasn't people that were religious and asking them to turn over to science.

**Interviewee – David Grimm**

Right. The point of this study isn't to show that everybody's going to turn to science. It's that people that don't have faith to turn to will find comfort in science. If science and religion have anything in common, they are both ways that help us understand our world and sort of feel comfortable in our world. If we believe in God, then we sort of believe we have a place in this world, and that helps us take comfort in life when things don't always go well. With science, it can be kind of similar. If we believe that there's very sound scientific principles that guide everything around us, then when things don't go well, some people can take comfort in these principles realizing that the world is a very logical, ordered place, and that seems to be what's happening here.

**Interviewer – Kerry Klein**

Alright. And what else have we had on the site this week?

**Interviewee – David Grimm**

Well Kerry, for *ScienceNOW*, we've got a story about how zapping your brain can make other people look more attractive. Also a study about how a rare genetic disease in humans is getting some explanation thanks to a similar disease being found in dogs. For *ScienceInsider*, our policy blog, we've got a story about a scientific flash mob in Rome. Also a story about how the genomic business has added nearly one trillion dollars to the U.S. economy. Finally for *ScienceLive*, our weekly chat on the hottest topics in science, this week's *ScienceLive* is about bioelectronics – our cyborg future – man melding with machine. And next week, our *ScienceLive* is about the science of summer blockbusters. What do Hollywood movies get right and wrong when it comes to science? So be sure to check out all these stories on the site.

**Interviewer – Kerry Klein**

Great. Thanks, Dave.

**Interviewee – David Grimm**

Thanks, Kerry.

**Interviewer – Kerry Klein**

David Grimm is the online news editor of *Science*. You can check out all of our news at [news.sciencemag.org](http://news.sciencemag.org), including daily stories from *ScienceNOW*, science policy from *ScienceInsider*, and *ScienceLive*, live chats on the hottest science topics every Thursday at 3 p.m. U.S. Eastern time.