

## **Minnesota Now (MPR) | Minnesota Now Minnesota Now - Geology Lecture 01GAKY04B2J3X7EW5FD52EEBVT**

CATHY WURZER: Here's a question for you-- where can you find some of the oldest rocks on Earth? Well, they might be under your feet right here in Minnesota. Professor Jim Cotter teaches geology at the University of Minnesota-Morris. His lectures cover the history that took place not thousands, but millions and billions of years ago.

And he's got a new platform for his passion for Minnesota geology. He's featured in a new great courses series that you can get at your local library or by ordering it online. Professor Cotter is on the line. Welcome to *Minnesota Now*.

**JAMES COTTER:** Thank you, Cathy, it's nice to be here.

**CATHY** Thanks for being here. That's an interesting fact-- that some of the oldest rocks in the world are in Minnesota.

**WURZER:** Why is that?

**JAMES COTTER:** It really is an amazing thing. Minnesota was part of the first continent that came together very early on in geologic history, ultimately would become North America. But for a short time, it was a micro-continent. And the rocks that underlie Minnesota and up into Canada are grouped into a term called the Canadian Shield. And they represent very, very old rocks that the rest of the continent was added onto over time.

**CATHY** Wow. What stories can geology tell us that history books can't?

**WURZER:**

**JAMES COTTER:** Well, the geology record is one of just a diverse history of both life and Earth processes. In Minnesota, for example, the rocks that underlie the St. Cloud region, they were once a mountain range that would have rivaled the modern Himalaya. It was a huge range. But over time, and through geologic processes, they're worn down.

On the paleontological side, one of the most common fossils in Western Minnesota is shark's teeth. There was an ocean about the time that dinosaurs existed, and it's one of the reasons why Minnesota doesn't have a record of dinosaurs. But the record of sharks is just amazing. They diversified and they took on all different sizes and they ate different things. It's just an amazing history that's preserved in the rock record.

**CATHY** I had no idea, really, that we had mountain ranges around the St. Cloud area-- that is one of the flattest areas of

**WURZER:** Minnesota.

**JAMES COTTER:** You have to have a good imagination to be a geologist. It's true. But it is true. The rocks that are exposed at, say, Quarry Park in St. Cloud, those rocks originally formed 10 to 15 miles deep in the Earth.

They're an igneous rock, a rock that's formed from a magma. And the only way that magma could have cooled as slowly as it did would be to have a protective layer of Earth materials above it. So when you think about it, 10 miles of material have been removed through running water, glaciers. And the end result is over vast amounts of time-- literally billions of years-- a mountain range is worn down to-- it's not exactly the flattest place, but it's pretty low.

**CATHY** Maybe Fargo-Moorhead, we'll maybe go up there. OK, you're right. You're right. You sound like you are-- well, you clearly are jazzed about geology. Where did that love come from?

**JAMES COTTER:** When I was a freshman, I took a course in geology. I didn't really know what I wanted to major in as a student.

And I took a geology course. And a fellow on my dorm floor was in the same class. And we just got excited about it.

And of course, with many geologists, the key was getting out in the field. And we took a field trip. And I really had never seen anything like what that field trip showed me. It was in the folded Appalachians and the Valley and Ridge. And it was just a great experience. And over time, I got more and more excited.

**CATHY** And you've been teaching ever since. Go ahead.

**WURZER:**

**JAMES COTTER:** I've been teaching at Morris since 1984.

**CATHY** Yep, exactly. So I know your students love you. So now you kind of have a wider platform with the Great Courses

**WURZER:** series through the Teaching Company. How did that opportunity come about for you?

**JAMES COTTER:** I got an email out of the blue from Great Courses. And with a lot of emails, as kind of anybody who gets email, I would have probably hit the delete button. But my wife had given me a Great Courses, both maybe a Father's Day and a birthday. And so I knew what they were.

And so I responded, sure, I'll talk to you about it. And they said, would you do a course? And I said, yeah, that sounds interesting-- sounds a lot like what I teach. And then a couple of months into the process, they said, hey, the geologist that we had that was doing practical geology has decided not to do it. Would you switch gears and do practical geology?

And I said, sure. Let's try it. So I asked initially who had suggested my name. And the recruiter didn't know it offhand. And he said, if you want, I could look it up. And I figured I'd just let it lie. I never followed up.

**CATHY** It had to have been a student of yours. It had to be a student, don't you think?

**WURZER:**

**JAMES COTTER:** I wonder if that's true. Yeah. They get me into trouble frequently.

**CATHY** Well, I'm going to get you into trouble right now. As a geologist, what is your favorite part of Minnesota? It's like

**WURZER:** asking who your favorite kid is, I know.

**JAMES COTTER:** Yeah. Yeah. It's a tough question to answer, because Minnesota's got great geology and they've got great parks to visit. I must admit, I'm kind of partial to Pipestone. I like that place. I like the geology. It's really interesting. There are a lot of questions.

And I like the use of the geology in history and very, very important culture. It's just a great park to visit. And I recommend it fully.

**CATHY** Never been there. I have got to go. I know, right? What questions are interesting to you in that part of the state?

**WURZER:** You mentioned questions.

**JAMES COTTER:** Right. So the Pipestone is a kind of unique layer in a very resistant red rock that shows up throughout the Midwest. It's called the Sioux Quartzite. And so the Sioux Quartzite formed as a beach. It was once the Southern edge of that micro-continent I talked about a little while ago.

And in a beach, you wouldn't expect to find the fine grain materials that make up that pipestone layer. And so the chemistry is also very different. So the chemistry of the Sioux Quartzite is quartz, but the pipestone has no quartz in it. So how do you get this very, very interesting and soft layer of rock that's going to become an important component of Indigenous history in the middle of a very, very hard and resistant rock, the Sioux Quartzite? It's just a great thing to think about.

**CATHY** It is. It is. I have loved our conversation. Thank you so much. And best of luck with the course. Who knows where this leads?

**JAMES COTTER:** Thanks, Cathy. I appreciate it.

**CATHY** All the best. Professor Jim Cotter is a Professor of Geology at the University of Minnesota-Morris. You can find his

**WURZER:** Great Courses lecture series online or at your local library.