



Geological time

The age of rocks

Chris Wilson:

Imagine that the length of a toilet roll represents the age of the earth. Let's use it to unravel geological time, all 280 sheets of it. That was 4.6 billion years of earth history and this last sheet is about 16 and a half million years. So where does humanity fall on this time scale? It barely spans the last perforations on the roll.

Andrew Bell:

Well, Chris has shown us that it's not much use looking at the human history to get evidence for the age of the earth. Our books, our bones just simply don't extend far enough back in time for that to help us. But nonetheless we've got to work with what we have in the present. In a place like this where sand is actually being turned into rocks at the present time and on the most enormous of scales, this is where we start, we have to use what we see at the present time to give us clues into what went on the past.

So what is going on in the present day? Well every time there's a storm wind blows sand from the bay here towards the land and it makes these really fine layers. And I want to prove to you that those layers have to be older than these and I've got a demonstration to do it.

Fine glass jar, now I'm going to pour in some sand and on top of that I'm going to pour-in some pebbles. The two layers record two events; I've poured in the sand, I've poured in the pebbles and it's pretty unthinkable isn't it that I could have got the sand in underneath the pebbles by doing it second, the sand had to go in first. And this establishes one of the fundamental tenets of geology. And that's the Principle of Superposition and that says that under normal circumstances the bed above is younger than the bed below. So when we look at layers of rocks from top to bottom we're reading back through the pages of earth history.

But so what? The beds at the bottom are they a thousand years old, a million years old, a thousand million years old? We don't know but there are ways we can find out, we've come back to Morecambe Bay to look at the present time and there's a nice cross section down here which helps us understand it. Mostly sand, as you can see, the layers of sand that have blown in from the Bay and at the top the grass has grown but here there's a rather surprising feature, the gravel in the middle of the sand, now where's that come from? Well the answer is that it's part of the hardcore for this road. It's been put there by humans when they made the road and we don't know when that was, at least I don't know when that was, perhaps between the wars, but it gives us an absolute marker for how old these sands are, they must be older than that time between the Wars. They're perhaps 70,80 years old or older, these must be younger. And of course the grass is younger still. That's the sort of evidence we need in the rock record.

There's another point here too and that's whilst the sand blew in, perhaps over years and the grass might have taken a couple of years to colonise, the gravel was put down by the cartload -that probably took just Monday to deposit. So that thickness was deposited very much more quickly than that thickness.