Twitter Thread by Alex (he/him) is fighting for trans kids ■■■■■■



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@AlexPetrovnia



Have you ever wondered why we don't find fossils in the Appalachian mountains? The truth is, we do, they're just not the kind of fossils you might think of—there are no mammals, no dinosaurs, no reptiles. There's something else entirely. ■

See, the Appalachian mountains are old. Yes, all mountains are old, but the Appalachian mountains are *incomprehensibly old*.
They mostly look like this, which leads a lot of people to say they're pretty lame, as far as mountains go. They aren't dramatic.

For those unaware, the Appalachian mountain range extends over what is now the eastern US, reaching up into Canada.

But many people don't realize that the same original mountain chain also reaches to *Europe*.
Wait, what? How is that possible?
This is possible because plate tectonics separated this mountain range.
The Appalachian Mountains are older than the Atlantic Ocean.

In fact, the Appalachian mountains are 480 million years old. For context, that's about 100 million years before the first animals walked on land.

So the vast majority of the fossils found in the Appalachian mountains are from when all life lived in the oceans. And that produces some strange results that may not even look like fossils to the untrained eye.
Here you can see some shells of ancient marine organisms.

Some other fossils (showing how ancient these organisms really are) that you can see in Appalachia are things like this coral, preserved so well you can see the individual structures.

Perhaps most famously, you may have heard of these guys. Although their fossils are found in many places, they are especially famous in the Appalachian region because they are especially prolific here. These are trilobites.

The majority of the fossils in this region are so old that they come from limestone rocks, formed on the bottom of the ocean, when life as we know it hadn't yet evolved. Some of these fossils date back as far as the Ordovician period, which is before FISH evolved.

There are examples of some of the oldest known fossils of life on earth here -- stromatolites. These are fossilized mats of bacteria that still exist today. They show up in the fossil record as a variety of forms, as shown here. They still exist on earth today (photo on right).

But let's get back to the mountains themselves. 480 million years old. What does that *mean*?
The gentle rolling terrain of Appalachia may have once been as high as the Himalayan mountains are today. Erosion is slow, but unrelenting.

The Himalayan mountains are being formed by the Indian subcontinent crashing into the greater Asian continent.
The Appalachian mountains were formed by *more than one* of these gigantic, continent sized mountain building events.

In general, it's agreed that there are three distinct periods of the Appalachian mountain's formation, the Taconian, the Acadian and the Alleghanian. These each represent the existing mountain range being subjected to additional pressures and forced ever higher.

The first, the Taconian Orogeny (mountain forming event, yes geologists say this with a straight face), actually absorbed a tiny subcontinental mountain range, known as the Taconic Range.

The second, the Acadian, had a similar effect, where a chain of islands crashed into what was then the supercontinent of Laurussia.

The third and final orogeny, the Alleghenian, was the largest, where the supercontinents of Gondwana and Laurentia crashed into each other head on. This event also tacked Florida and the Gulf Coast onto the North American Continent.

These multiple mountain forming events, and the forces the mountains were under, is what created many of the gorgeous rock layering in the Appalachian region, often visible in roadcuts.

You can see in these roadcuts where different layers of very different rock (brought together from all over the world) were stretched and blended like putty.

You can also see these forces played out across the landscape itself, like in this elevation model. The folding that created mountain ridges -- from existing mountains being pushed higher by later events -- are distinct.

It's actually visible in some regions to the naked eye in aerial photos.

The very forces that led to these mountains being so unique -- blended and formed by multiple different events, from material from multiple continents -- has created the rolling landscape we see today, hundreds of millions of years later. Some rocks are more durable than others.

The mountains were structured with caps of more durable sandstone overtop of layers of soft limestone underneath. Once the sandstone was breached, it allowed those portions to erode much faster. Ironically, the mountains today stand where ancient valleys were located.

This is reflected back on the landscape in dramatic ways. The mountains are built of sandstone, and covered in forests. The majority of the limestone valleys -- which are full of fertile soils, good for farming, are occupied with farms and towns. This is central Pennsylvania.

The unique geology of the Appalachians also created, under immense pressures, the coal seams that are so famous in this region. In fact, many cultural components of Appalachia, as in many places, can be traced through the geology of the place.

What I love about geology is that, over the timescales required, absolutely every aspect, every particle of soil, is a miracle of chance to have ended up as it is. We are lucky enough to be able to read the past -- and present -- in every curve of the landscape around us.

*One quick note! There ARE fossils from more recent eras that have been found in the Appalachians, in younger layers. These include vertebrates, mammals, and yes, at least one dinosaur -- Appalachiosaurus. Thank you to @anthro_andrew for updating me on this!

@anthro_andrew If you enjoyed this thread, and would like to support my work in scicomm, please consider subscribing to my Patreon! Feel free to let me know what sort of content you'd like to see there, and vote on what topics I write on in the future!
https://t.co/nEHXirXd2m

@anthro_andrew And if you'd like to rep YOUR love of science (including fossil, dinosaur, and geology options!) with some nerdy reusable face masks, please consider checking out my Etsy shop here:
https://t.co/y6p6SP8FjQ

If you'd like to read more about the cultural history of Appalachia, I wrote some about this here: https://t.co/tScmVhzMLk

> Was listening to this and am reminded that the average person doesn\u2019t know about the deeply intertwined histories of Appalachia, workers rights, and environmental epidemiology.https://t.co/uzBQ6HdHlo
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> — Alex (he/him) is fighting for trans kids \u26a7\U0001f3f3\ufe0f\u200d\u26a7\ufe0f (@AlexPetrovnia) June 24, 2021

Holy heck! This response has been amazing! If you feel I've earned it (and want to help me quit my day job to do more of this), my partner and I are still recovering funds from top surgery, and my Venmo is @AlexPetrovnia!