

Geologists studying the jumbled bedrock of the west coast of North America needed a **theory** to explain **how so many diverse sets of unrelated rocks existed all together.**

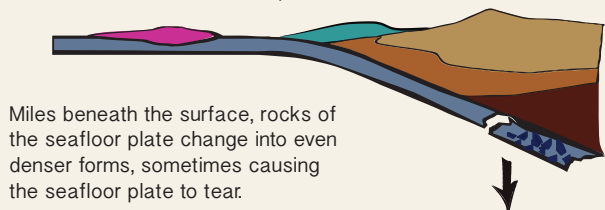
This led to the development of **'the terrane concept'**

an idea key to understanding how continents form from plate tectonic processes.

A terrane describes a **fragment of crust formed on, or broken off from,** one tectonic plate and accreted or sutured to another plate.



Seafloor plates are dense and heavy and thus sink beneath continental plates.



Terranes are 'glued' onto the continent with magma that can rise through these openings.

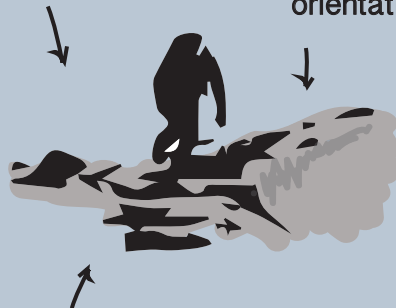
We call large bodies of magma that cool underground '**plutons,**' after Pluto, the Roman god of the Underworld.



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In geology, **terrane** names a group of rocks which share a similar history. It is distinct in meaning from the similar sounding (and more commonly used) word 'terrain'.

The word 'terrain' refers to the lay of the land, elevation, slope, and orientation of features.



'Terrane' describes a history in four dimensions: up and down and sideways, through time.



Both terrane and terrain contain the root *terra* ("earth"). The second e of terrane reflects the eons over which these processes occur.

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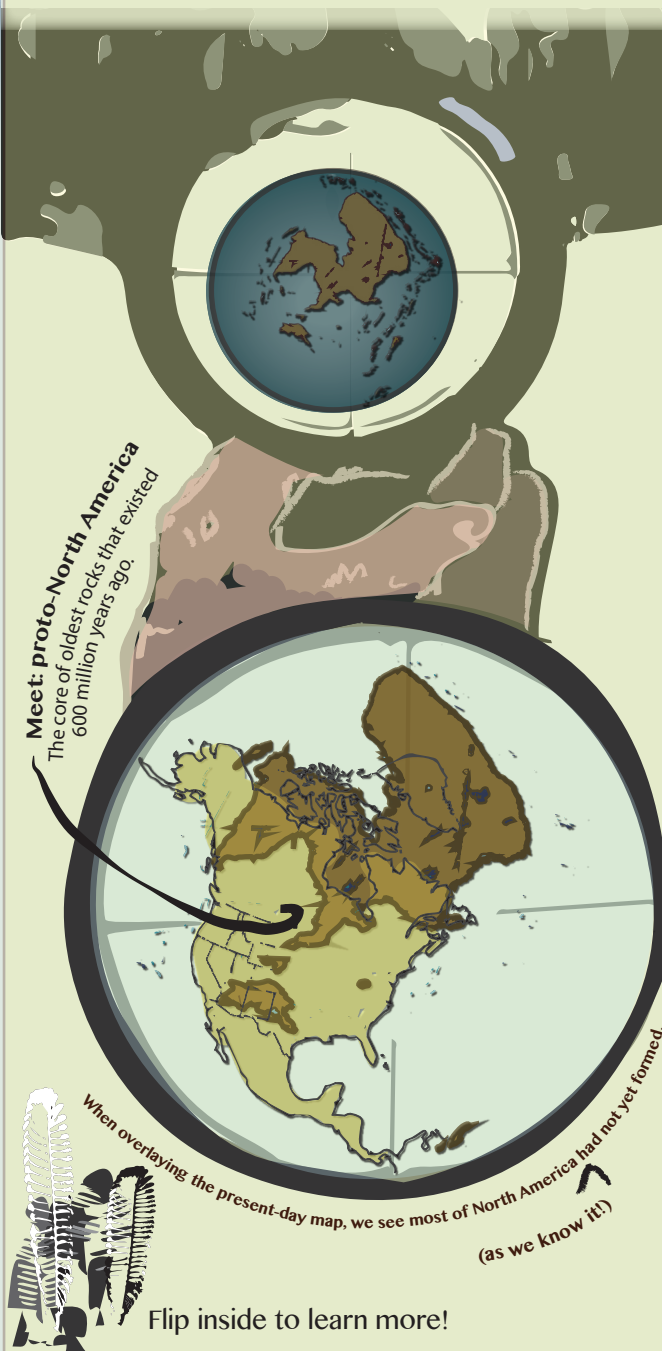
With thanks to the National Park Service and Geologic Society of America.

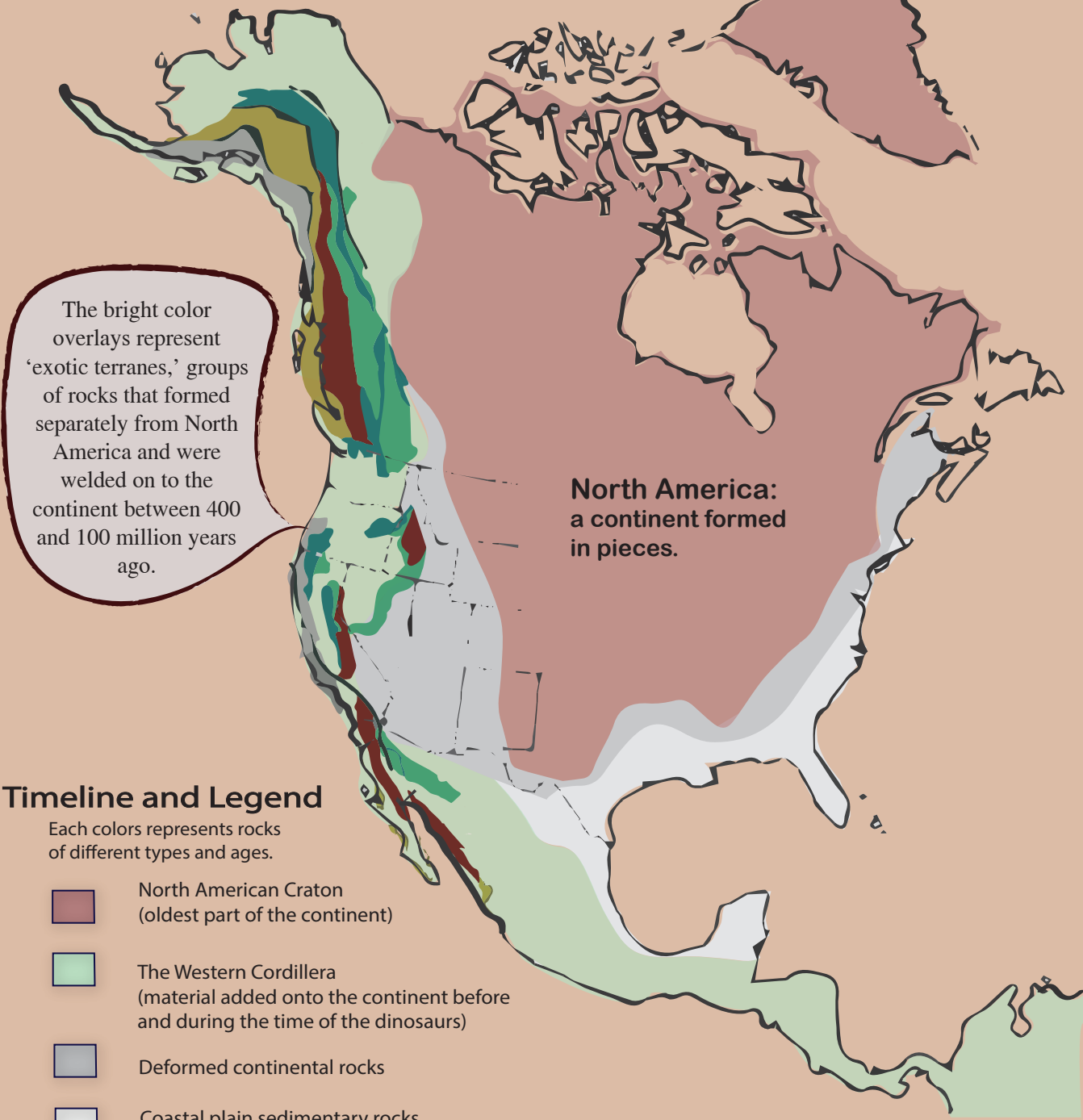
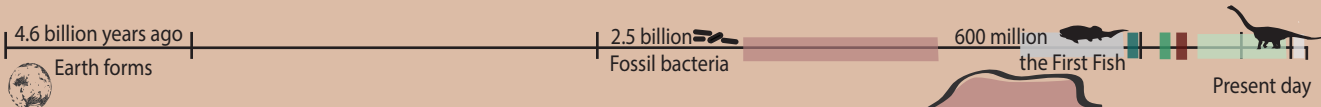
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[How can we imagine the planet 600 million years ago?]

Use the scope to view a geologic reconstruction.





Timeline and Legend

Each colors represents rocks of different types and ages.

- North American Craton (oldest part of the continent)
- The Western Cordillera (material added onto the continent before and during the time of the dinosaurs)
- Deformed continental rocks
- Coastal plain sedimentary rocks (the youngest 'land' to form)

Like a collapsed tower, geologists work with the jumbled pieces of tectonic processes that have already played out their story.



It is only through imagination and dilligent detective work that we can imagine how the pieces once fit together.

In the science of 'paleo-geography'

geologists reconstruct how tectonic plates moved land around in the geologic past.



For example, in the Klamath Mountains of north-western California, **600 million year old cyclomedusoid fossils** give clues that rocks there traveled exceptional distances over the course of geologic time before they were sutured, or accreted, to North America.

