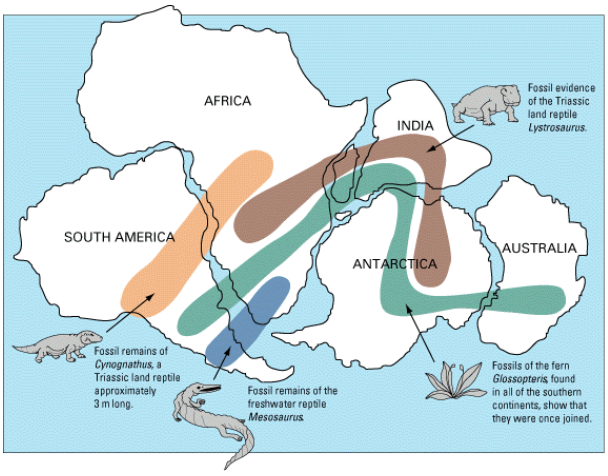
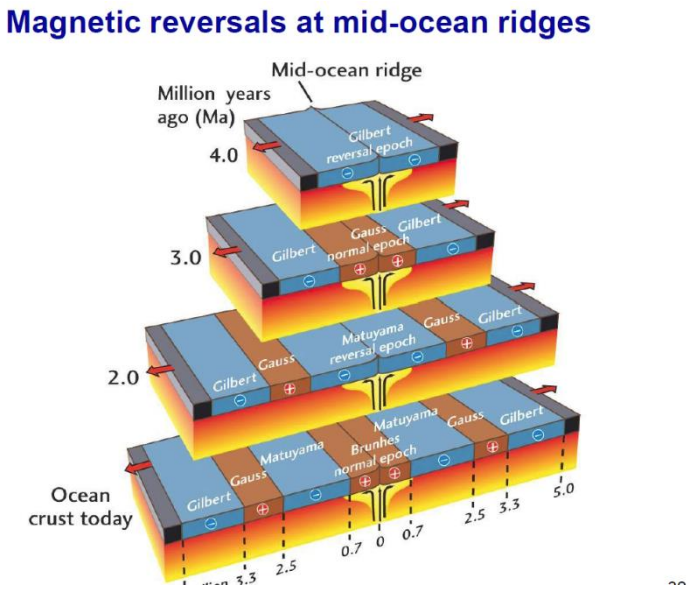
Why was the idea of Pangaea not accepted in the first place?

Dear Belle,

The story of Pangea and the theory of plate tectonics is a very good example of how science works sometimes. In the 1920s, Alfred Wegener got the idea that the continents moved when he looked at a map of the continents and saw that they fit together like pieces of a puzzle. He then gathered evidence that would support his idea. For example, rocks and animal assemblages on different continents seem to match (see figures). However, is this evidence enough to prove the theory? For many people in the day, it was very strange to think that the continents moved. Other theories could also explain the animal assemblages. For example, animals could have moved from one continent to another when sea level was lower. About twenty thousand years ago, sea level was so low that you could walk across from France to England, and you could also walk between northeastern Russia and north America on land (or ice). So, other theories could explain the same data that Wegener collected. Moreover, one of the biggest problems for Wegener was that he could not explain HOW the continents moved. Therefore, many other scientists did not believe his theory. The key piece that was missing was the evidence that the Oceans spread apart. This was only discovered in the 50s and 60s when scientists and the US army mapped the sea floor. To understand this development, you have to understand something about the Earth's magnetic field. The Earth is like a large magnet with a north pole and a south pole. Because of this characteristic, a compass points north. At some times in the past however, the poles were flipped. For example, 800,000 years ago, a compass would have pointed south. Some minerals in the rocks are magnetic. When the rock forms they orient themselves like little compasses. For



example, magnetic minerals in a rock that formed 800,000 years ago would point south. Scientists have mapped the orientation of these little magnetic minerals in the rocks on the sea floor, and they found that the sea floor had stripes that were symmetric around the mid ocean ridge. In the figure below, all the blue lines mark times when the magnetic minerals pointed south, and the red areas mark times when the magnetic minerals pointed north. This was the missing evidence to show that new oceanic floor was created in the middle of the oceans and therefore could explain what pushed the continents around on the Earth Surface.



Part of the work that scientists do is to develop theories and test them with data. Sometimes, the data that we have is not enough to prove a theory. Instead, we need to gather more data, and sometimes we have to first develop a new technology (for example the technique to measure the orientation of magnetic minerals in rocks on the sea floor). Moreover, humans are often slow at accepting new theories that are very different to all the other theories that existed before. Therefore, it can take a while until a groundbreaking new discovery is accepted.