Magnetic Striping

The confirmation of the theory of plate tectonics relies on key insights and scientific experimentation. One of these is the knowledge of the magnetic properties o ocean crust.

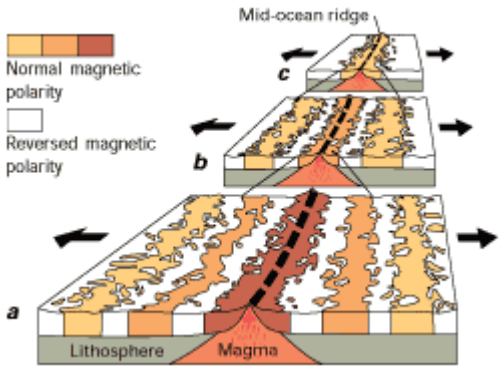
Early in the 20th century, Bernard Brunhes in France and Motonari Matuyama in Japan recognized that rocks generally belong to two groups based on their magnetic properties. One group known as *normal polarity* has within its mineral composition a polarity similar to the Earth's magnetic north. The magnetic properties of the other group, called reversed polarity, is the opposite of the Earth's present day magnetic field. The reason, tiny grains of magnetite found withi the volcanic basalt that make up the ocean floor behave like little magnets. These grains of magnetite can align themselves with orientation of the Earth's magnetic field. How? As magma cools, it locks in a recording of the Earth's magnetic orientation or polarity at the time of fooling.

The Earth's magnetic field is similar to the field generated by a bar magnet with its north end nearly aligned with the geographic North Pole. Yet the Earth's field is the result of a more complex, dynamic process: the rotation of the planet's fluid iron rich core. Scientists have known for centuries that the Earth's magnetic field is dynamic and evolving. The magnetic field drifts slowly westward at a rate of 0.2 degrees per year.

However, over tens of thousands of years, this field undergoes far more dramatic changes known as *magnetic reversals.* During this reversal, south becomes north and north south apparently in a geological blink of an eye – perhaps over a period of a few thousands years. What these reversals recorded were stripes o seafloor maps-- stripes of alternating normal and reversed polarities of ocean crust. These "stripes" formed the pattern known as *magnetic striping*.

The ocean floor had a story to tell. That story would unfold in the work of three scientists. In 1962, two British scientists, Frederick Vine and Drummond Mathew and Canadian geologist Lawrence Morley working independently suspected that this pattern was no accident. They hypothesized that the *magnetic striping* was produced from the generation of magma at mid-ocean ridges during alternating periods of normal and reversed magnetism by the *magnetic reversals* of the Earth's magnetic field.

A theoretical model of the formation of magnetic striping.



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