

Unit I - Electromagnetism

Day 1 Magnetism

Sections 20-1 and 20-13

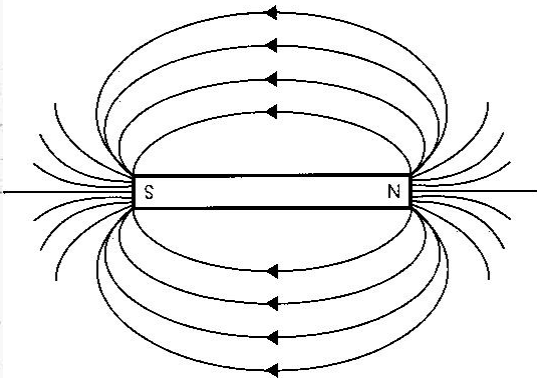
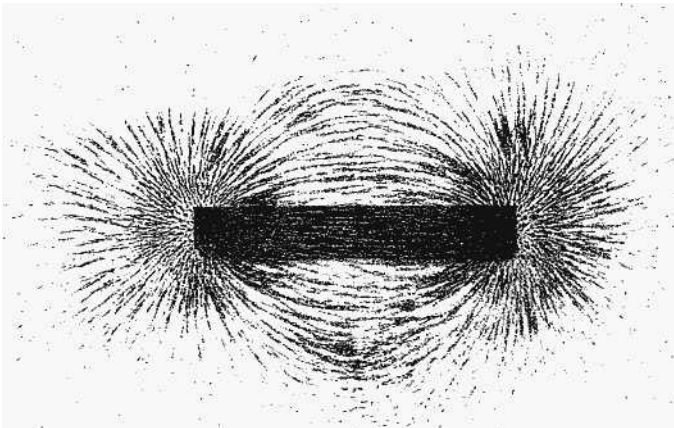
Magnets

Characterized by polar opposites - similar to electric charges

- opposites attract, likes repel
- N + S instead of + and -
- ^{static} electricity \Rightarrow insulators
- magnetism \Rightarrow limited # of metals
- \Rightarrow electricity \Rightarrow Monopoles
- magnetism \Rightarrow Dipoles - we have Never observed a magnetic monopole.

Magnetic Fields

Direction N → S

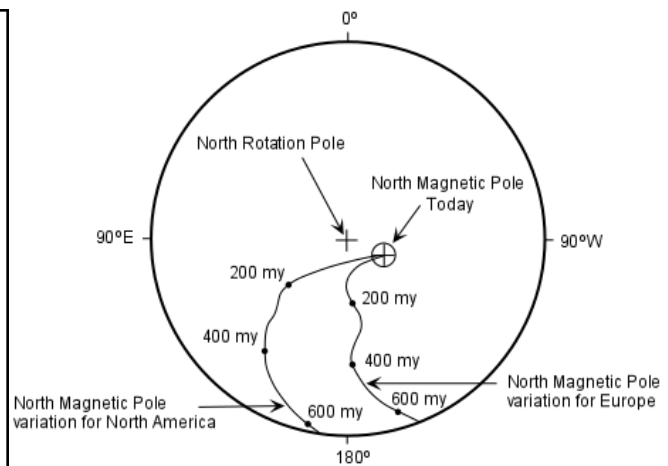
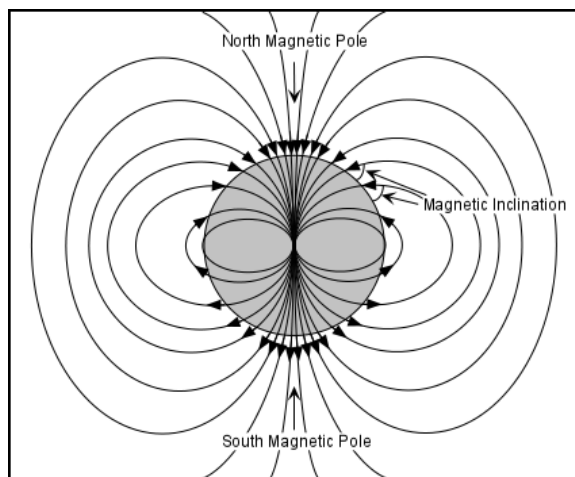


Early History of Magnetism

Early Greek's and Chinese discovered the lodestone and its properties

1263 - Pierre de Maricourt mapped the magnetic field of a lodestone with a compass.
Discovered a magnet had two poles - North and South.

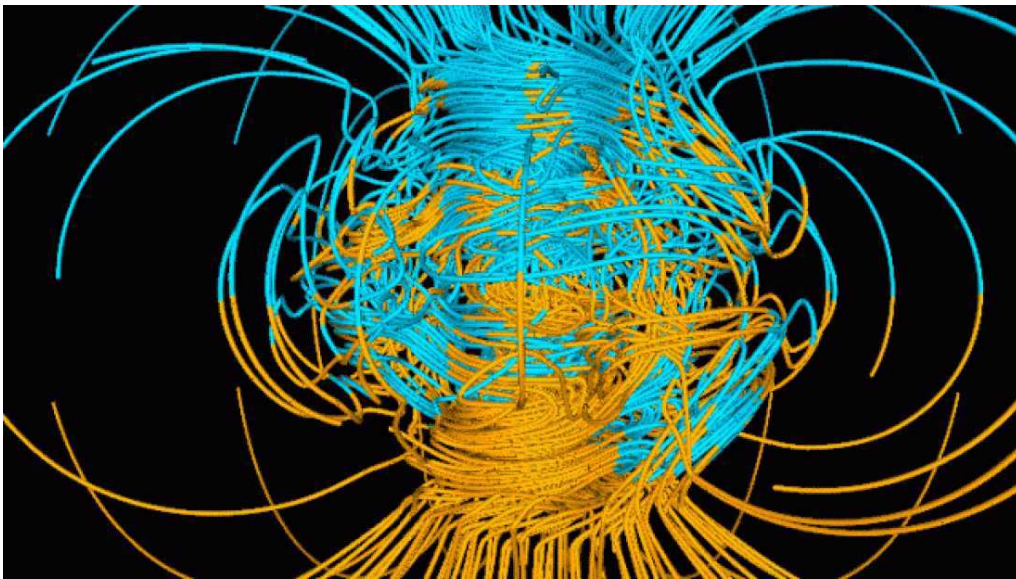
1600's William Gilbert concluded that the Earth itself was a giant magnet



Initial studies of the how the position of the Earth's magnetic pole varied with time were conducted in Europe. These studies showed that the magnetic pole had apparently moved through time. When similar measurements were made on rocks of various ages in North America, however, a different path of the magnetic pole was found. This either suggested that (1) the Earth has had more than one magnetic pole at various times in the past (not likely), or (2) that the different continents have moved relative to each other over time. Studies of ancient pole positions for other continents confirmed the latter hypothesis, and seemed to confirm the theory of Continental Drift.

Images and note on pole variation from

<http://earthsci.org/education/teacher/basicgeol/platec/platec.html>



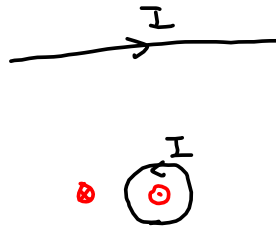
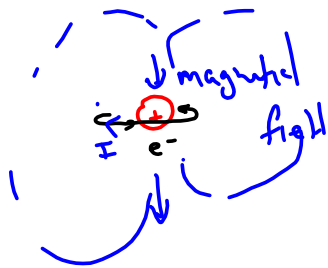
<https://www.iflscience.com/environment/earth-s-magnetic-field-about-flip/>

What causes magnetism?

Domains



Electron Spin



RHR
Thumb in dir.
of I
Fingers wrap
in direction
of field

Magnetic Field (\vec{B})

SI unit of Magnetic Field - Tesla (T)

Magnetic Field Between 2 Parallel Surfaces

