

“The present is the
key to the past.”

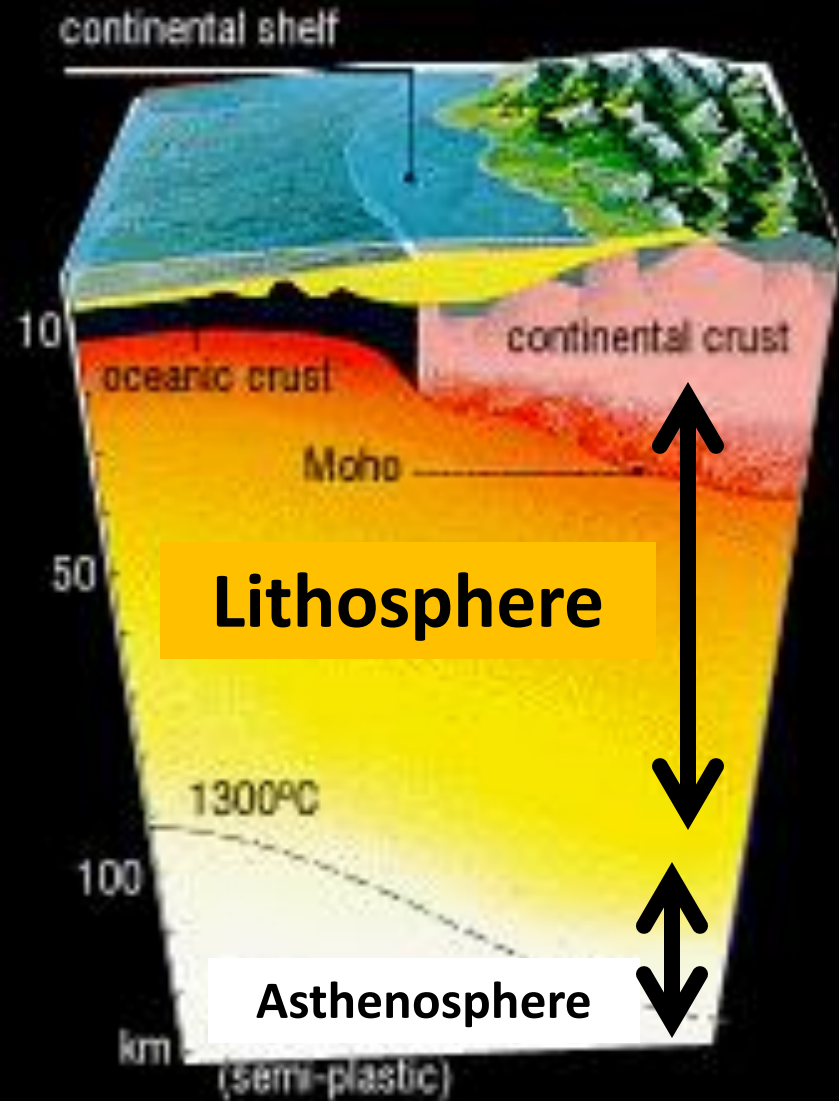
-James Hutton

Geosphere

UPPER MANTLE:

- Lithosphere – the crust & rigid upper mantle

- Asthenosphere – the molten (melted) upper mantle



Mineral Definition:

1. Naturally occurring
2. Solid
3. Orderly **crystal structure**
4. Definite chemical composition
5. **Inorganic**



Mineral vs. Non-Mineral

- Iron



- Steel



Mineral vs. Non-Mineral

- Water



- Diamond



Mineral vs. Non-Mineral

- Seashell



- Table Salt



Birthstones

January- Garnet

Feb- Amethyst

Mar- Aquamarine

Apr- Diamond

May- Emerald

June- Pearl

July- Ruby

Aug- Peridot

Sep- Sapphire

Oct- Opal

Nov- Topaz

Dec- Zircon

Birthstone Info

Find out the mineral name for your birthstone and answer the following questions:

1. What is the mineral name?
2. How does it form?
3. What elements does it contain?
4. Sketch a picture
5. What part of the world is found in?

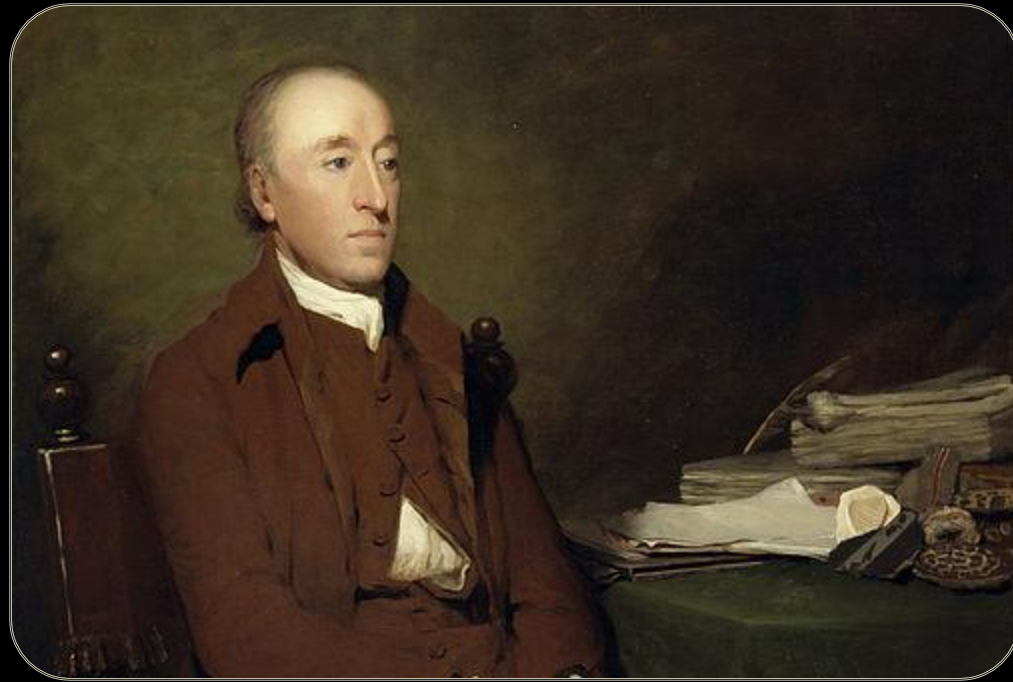
Scientific Controversy

Until to the 1700's:

Society believed :**All** rocks formed from **water** and chemical precipitation

Most people thought granite crystallized from an ancient sea.

James Hutton: The Father of Modern Geology



Proposed a new idea...

Can rocks melt?!!! Where are the clues?



Hutton's fieldwork showed that granite had once been molten.

Hutton found clues that granite was once molten magma. There are places where the melted granite flowed into the surrounding rock.



Scientific Controversy

NEW VIEW

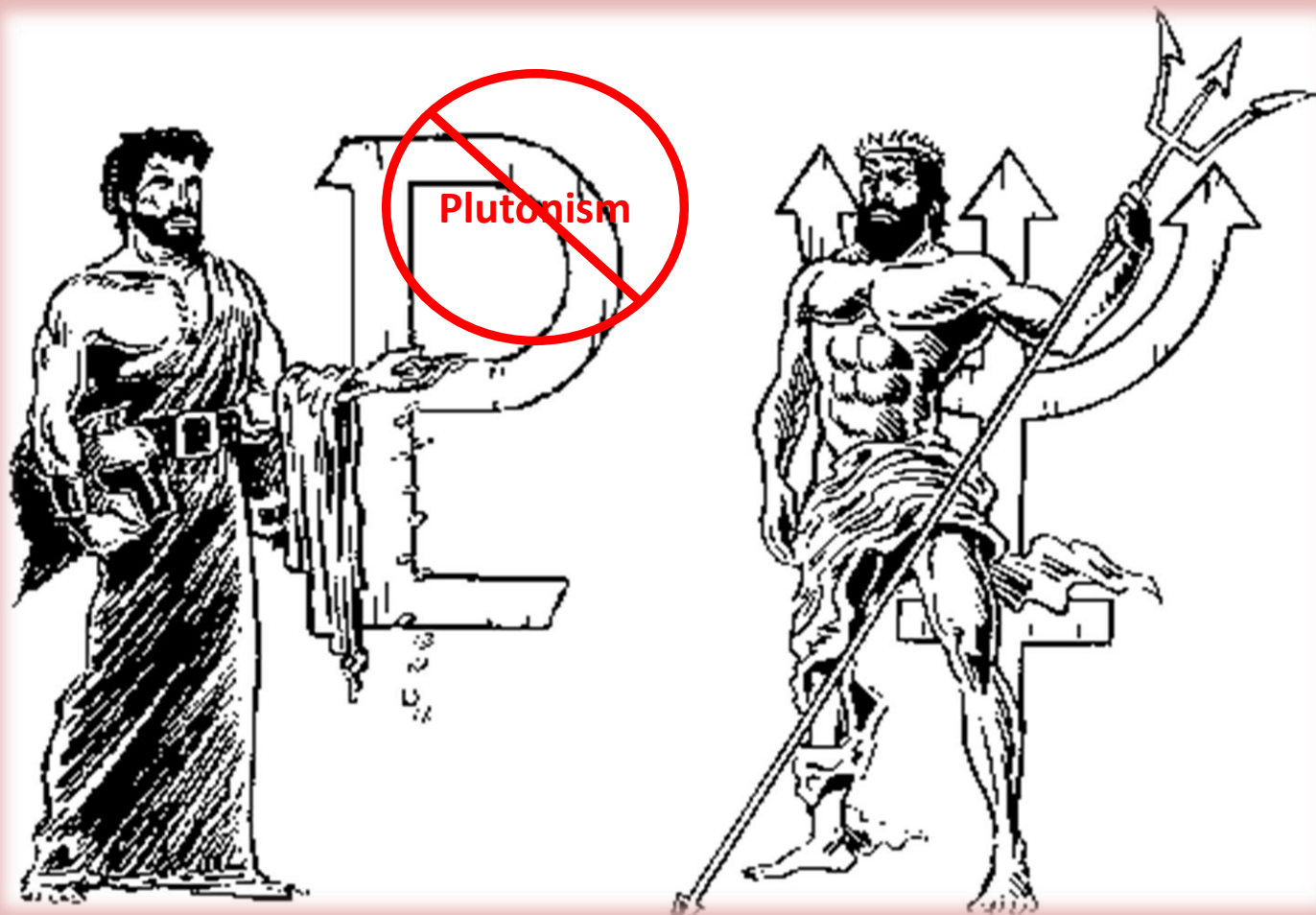
- All rocks originate from fire
- Volcanoes release internal pressure from the interior of the earth and form rocks underground



Plutonist vs. Neptunist

An Earth from Fire

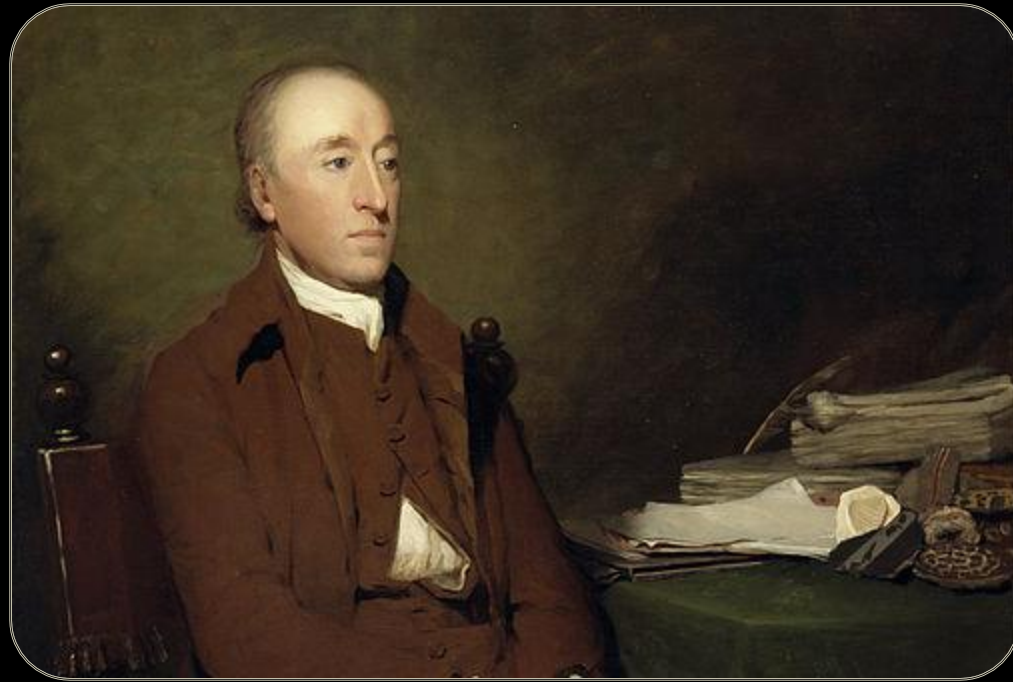
An Earth from Water



Acceptance of Topic

- 1830 – ACCEPTANCE Charles Lyell published, “*Principles of Geology*” Scientific revolution led to the widespread acceptance of the once- radical concept that the earth was constantly changing.

James Hutton= Rock Cycle



Contribution= Rock Cycle

Rocks

- Solid material made of a mixture of naturally occurring **minerals**
- Grouped into 3 main types, based on **how they formed**

Types:

Igneous

Sedimentary

Metamorphic



PROCESSES THAT FORM ROCKS

1. Igneous Processes

- **Intrusive rocks:**
 - formed deep within Earth
 - Magma "intrudes" into existing rock
- **Extrusive rocks:**
 - formed from lava at Earth's surface
 - Lava cools quickly in air

2. Sedimentary Processes

1. **Weathering**: Existing rocks are broken down by chemical or physical means to create **sediments**.
2. **Erosion**: sediments are removed by wind, water, ice, or gravity.
3. **Deposition**: erosion energy becomes too weak to carry the sediments and they are "dropped".
4. **Compaction**: Pressure placed in sediment layers cause them to change to rocks.
5. **Cementation**: sediments are joined together (cemented) by minerals dissolved in water.
6. **Strata**: Layers of sediments go through the process and a rock forms over time.

3. Metamorphic Processes

Metamorphism:

- **Changing** of one type of rock in to another due to -
 1. Tremendous **heat**
 2. Great **pressure**
 3. **Chemical reactions** (a change in composition of minerals)

The Rock Cycle

The continuous PROCESSES that cause rocks to change over time.