

Geoarchaeology

University of Northern Iowa

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Biography



Course expectations

- Entry level
 - No geology background required
 - Team up with rock stars when the your mohs scale reaches 7.
- Work hard/Participate!
 - Weekly quizzes
 - Only one exam, the final
- Ask a lot of questions
- Learn a lot



Learning objectives

- Apply geologic tools and skills to interpret and ideally understand past interactions between humans their landscapes, natural resources, and climates...
- Discover how geoarchaeology may help '*constructively*' drive our understanding of sustainable living...

Mixed format learning opportunities



GeoArch. In-Class activity #1

- Paper and pen...
- In less than five minutes, list as many things as you can about your day so far...
 - What did you need to do to get ready? What do you have to accomplish today? What skills and or tools will you need to accomplish your tasks for today? Etc.



Take two...

- Close your eyes...
- In less than 10 minutes, list (in order of importance) as many things as you can about how your day is going to proceed...
 - What do you need to do to get ready? What do you have to accomplish today? What skills and or tools will you need to accomplish your tasks for today? Etc.



Form groups of two...

Address the following questions...

1. Document your common answers...
2. How would your day be different if you woke up on Jan. 13, 3007 BCE?
3. Which day will be better today or your paleoday? Explain and justify...
4. What do you think the biggest differences between the two days will be? Explain and justify



Discussion

How can we use geoarchaeology to characterize and learn from the past?
Visit to the syllabus...

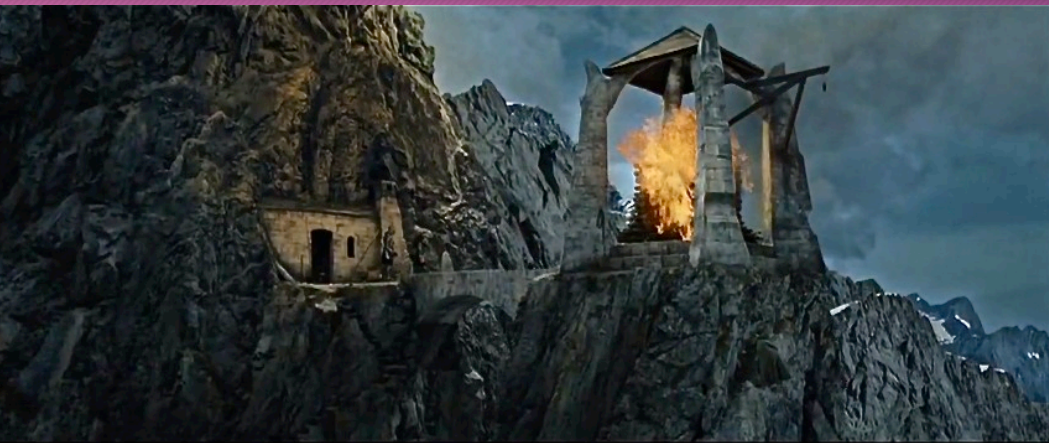
Food/Agriculture



Warfare



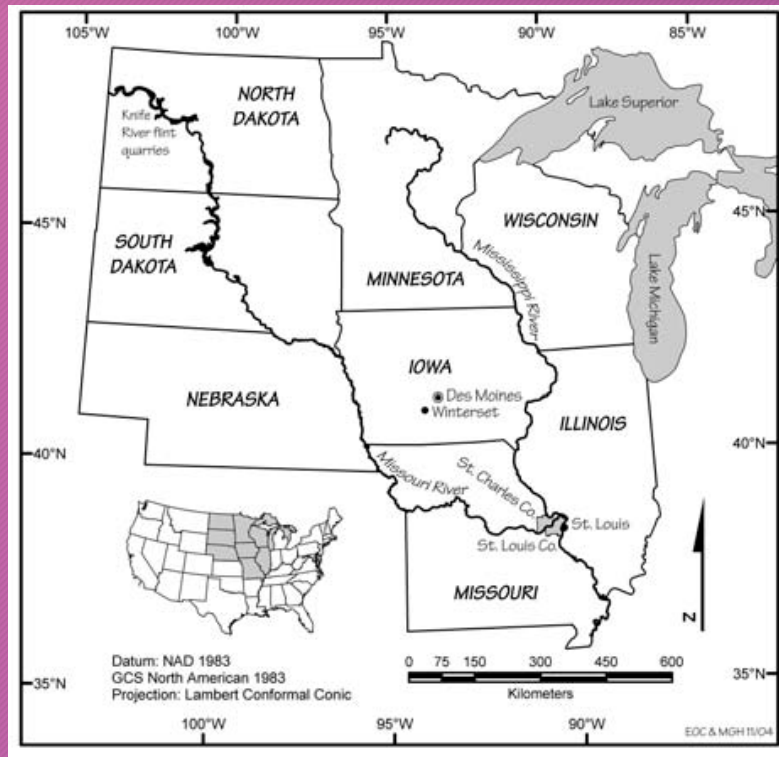
Communication



Natural Resources



Knife River Flint



Water



Engineering



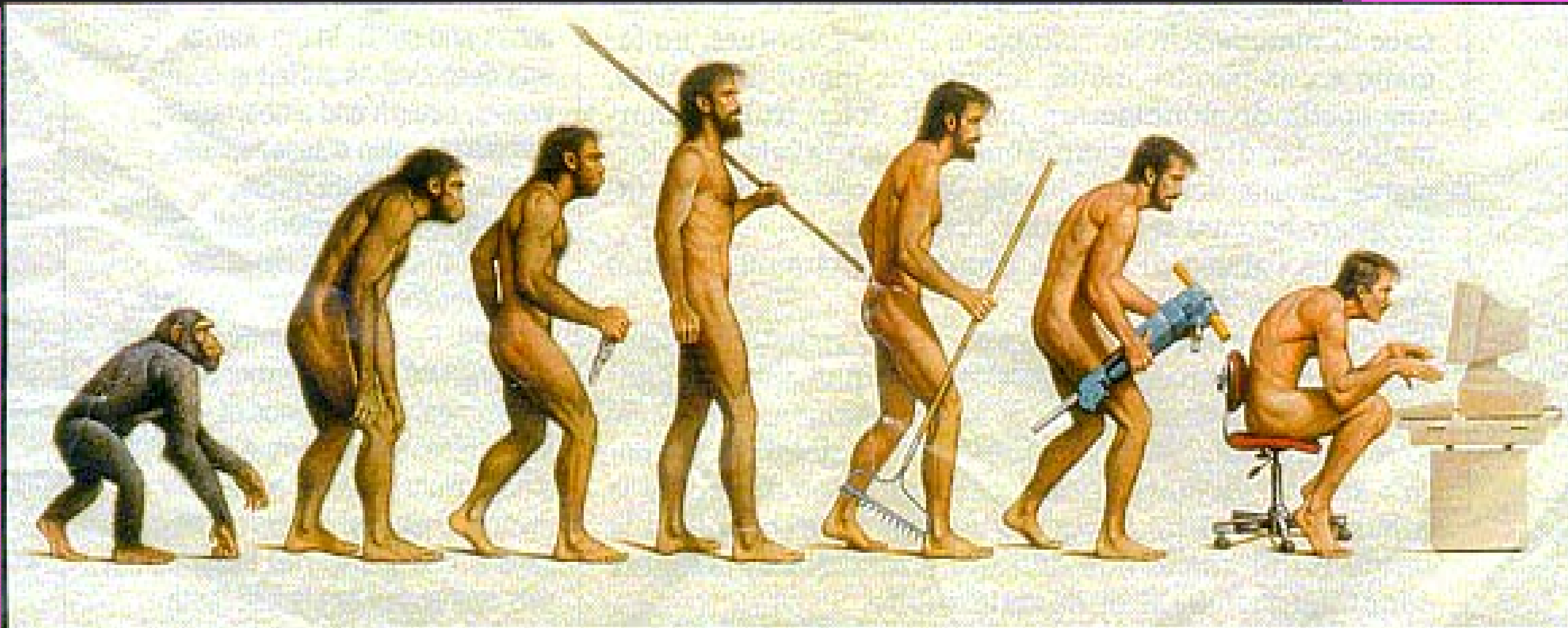
Burials



Material culture

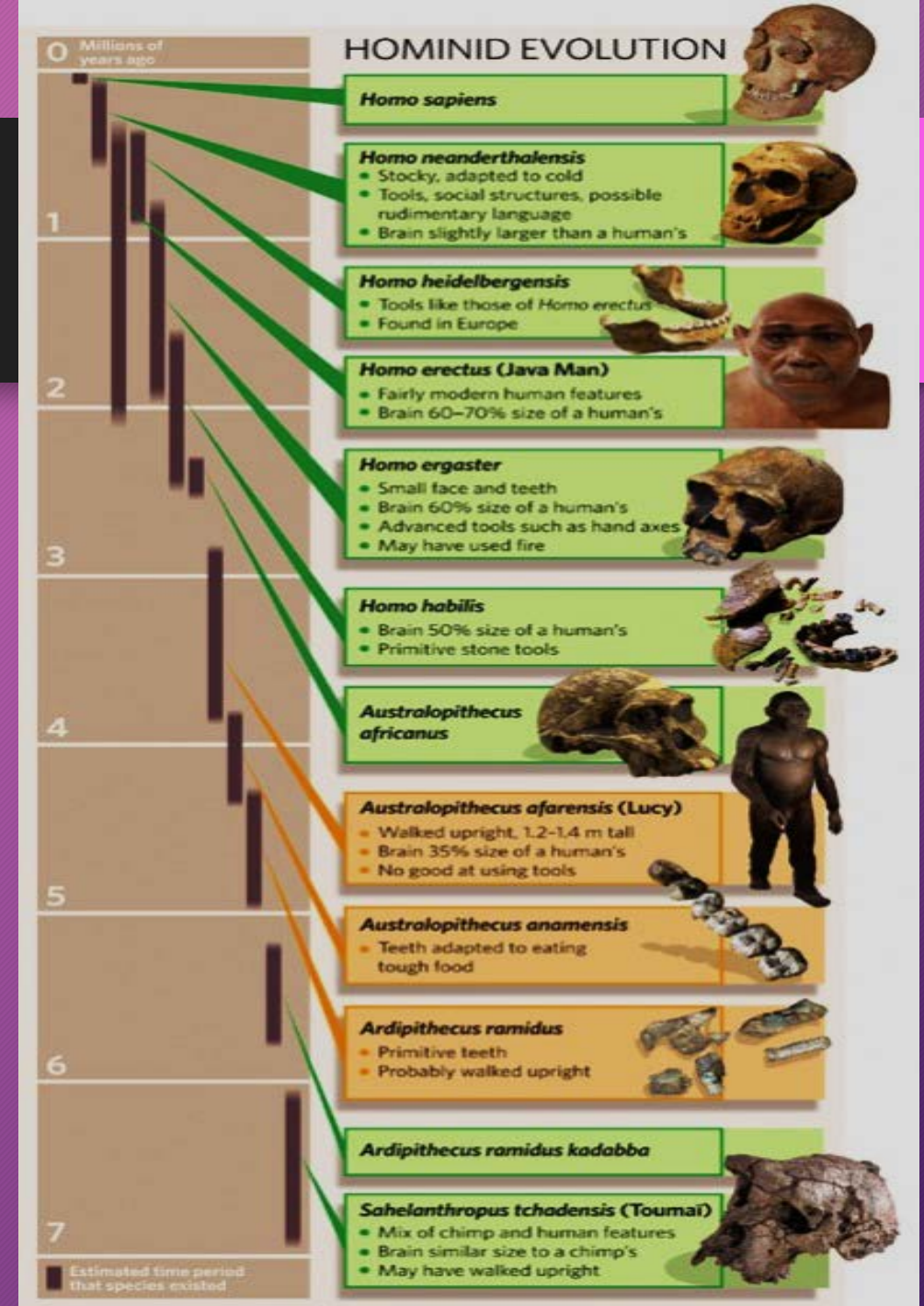


Evolution and the Environment



Geoarchaeology

- Earth history within the timeframe of human history...
- Study of minerals, rocks, sediments and soils as a basis for the interpretation of landscape evolution, climate change and the human past.



INTERNATIONAL CHRONOSTRATIGRAPHIC CHART



www.stratigraphy.org

International Commission on Stratigraphy

v 2013/01



Time



| Eonothem / Eon | Erathem / Era | System / Period | Series / Epoch | Stage / Age | GSSP | numerical age (Ma) |
|----------------|---------------|-----------------|----------------|--------------|------|--------------------|
| Phanerozoic | Cenozoic | Quaternary | Holocene | | | present |
| | | | | Upper | | 0.0117 |
| | | | Pleistocene | Middle | | 0.126 |
| | | | | Calabrian | | 0.781 |
| | | Pliocene | | Gelasian | | 1.806 |
| | | | | Piacenzian | | 2.588 |
| | Neogene | Miocene | | Zanclean | | 3.600 |
| | | | | Messinian | | 5.333 |
| | | | | Tortonian | | 7.246 |
| | | | | Serravallian | | 11.62 |
| | | | | Langhian | | 13.82 |
| | | | | Burdigalian | | 15.97 |
| | Paleogene | Oligocene | | Aquitania | | 20.44 |
| | | | | Chattian | | 23.03 |
| | | Eocene | | Rupelian | | 28.1 |
| | | | | Priabonian | | 33.9 |
| Mesozoic | Cretaceous | Upper | | Bartonian | | 38.0 |
| | | | | Lutetian | | 41.3 |
| | | | | Ypresian | | 47.8 |
| | | | | Thanetian | | 56.0 |
| | | | | Selandian | | 59.2 |
| | | | | Danian | | 61.6 |
| | | Lower | | | | 66.0 |
| | | | | | | 72.1 ± 0.2 |
| | | | | | | 83.6 ± 0.2 |
| | | | | | | 86.3 ± 0.5 |
| | | | | | | 89.8 ± 0.3 |
| | | | | | | 93.9 |
| | | | | | | 100.5 |
| | | | | | | ~ 113.0 |
| | | | | | | ~ 125.0 |
| | | | | | | ~ 129.4 |
| | | | | | | ~ 132.9 |
| | | | | | | ~ 139.8 |
| | | | | | | ~ 145.0 |

Eonothem / Eon
Erathem / Era
System / Period

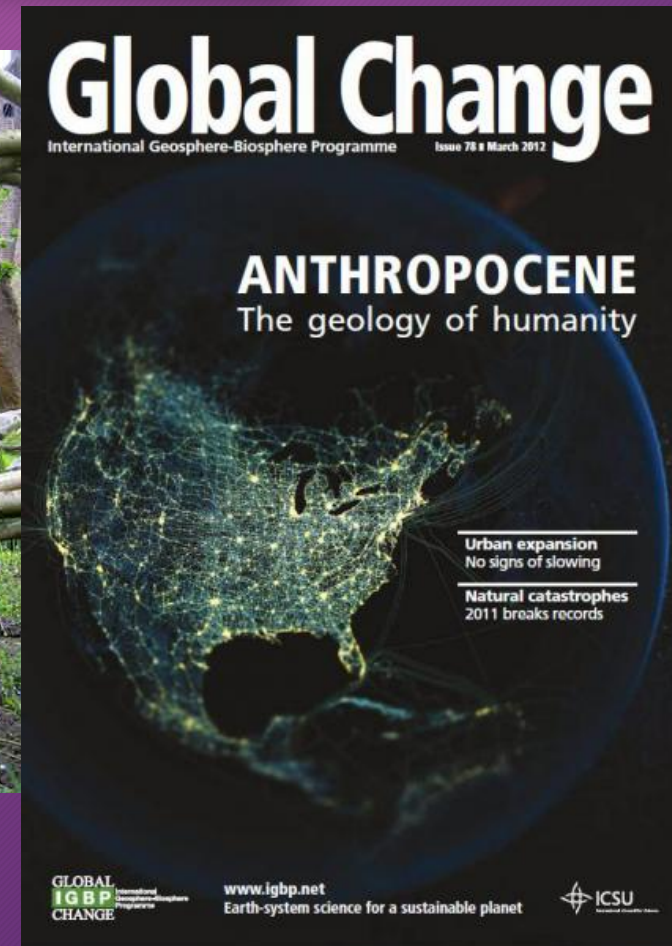
| | Series / Epoch | Stage / Age | GSSP | numerical age (Ma) |
|----------|----------------|-------------|------|--------------------|
| Cenozoic | Quaternary | Holocene | | present |
| | | Pleistocene | | 0.0117 |
| | | | | 0.126 |
| | | | | 0.781 |
| | | Pliocene | | 1.806 |
| | | | | 2.588 |
| | Neogene | Miocene | | 3.600 |
| | | | | 5.333 |
| | | | | 7.246 |
| | | | | 11.62 |
| | | Paleocene | | 13.82 |
| | | | | 15.97 |
| | | | | 20.44 |
| | | | | 23.03 |

0.002 Ma

Anthropogenic into the Anthropocene



0.00001 %



Archaeometry

- Applied/laboratory geoscience towards the characterization of archaeological sediments and cultural material capable of leading to provenance, prospecting, and dating/chronology...



Sir Charles Lyell - 'Father of Geoarchaeology'



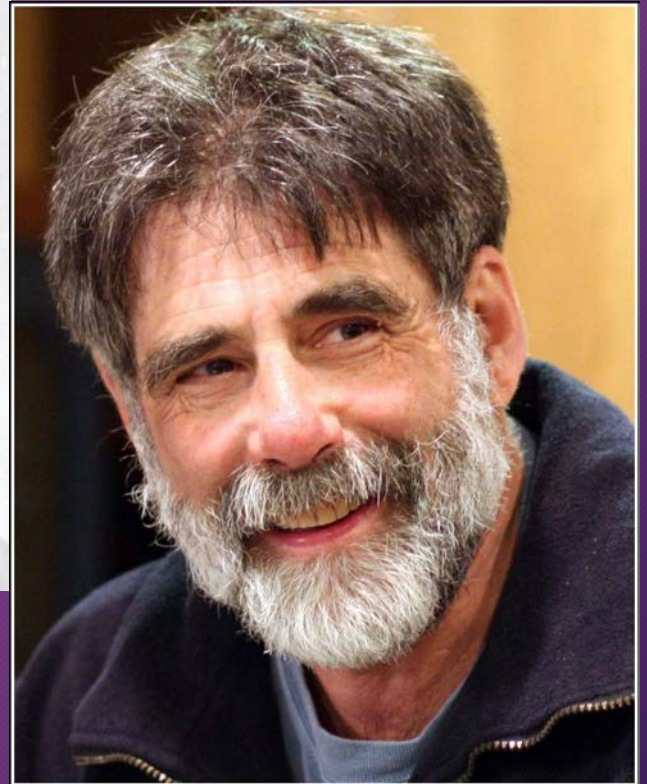
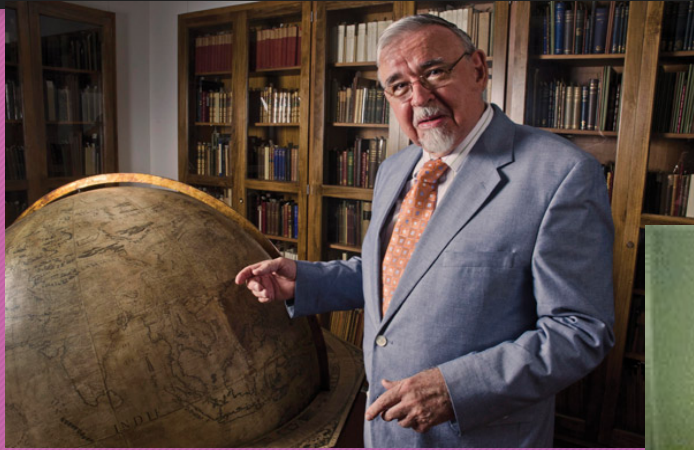
- 1850s
- *Book - Geological Evidences of the Antiquity of Man*
 - *Defined an archaeological problem, then characterized and interpreted it with geologic knowledge and principles.*

John Wesley Powell - The American West

- 1880s
- Founded
 - The US Geological Survey
AND
 - The Bureau of American
Ethnology



A lot of people



Summary

Geoarchaeology may help to...

1. Characterize the development of the archaeological record.
2. Predict an archeological sites original context, secondary alterations, and preservation through geologic knowledge and principles. (e.g. preferential discovery and documentation)
3. Provide modern civilizations a historical context, so that (idealy) we learn from the successes and mistakes of our ancestors with respect to how we interact with our environments.