What Do You Think?

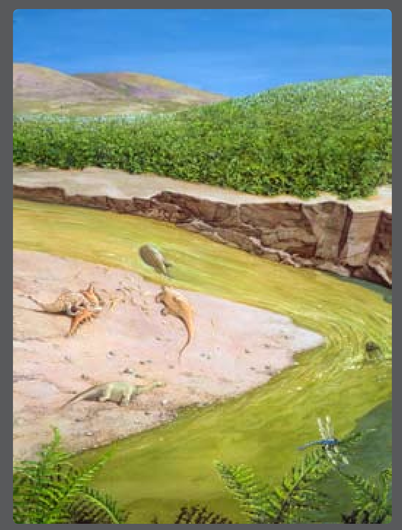
What evidence do paleontologists use to understand the history of the Cleveland-Lloyd Dinosaur Quarry?

Muddy Bog – Sticky mud traps herbivorous animals and the carnivores that attempt to feed upon them. Supporting evidence would be:

- *Some articulation (bones connected)*
- *Some bones with tooth marks or breaks*
- *Vertical orientation of bones*
- *Thick bone layer*
- *High ratio of carnivores to herbivores*

Riverbed – Carcasses are slowly washed onto a sand bar and preserved over time. Supporting evidence would be:

- *Some articulation (bones connected)*
- *Bones vary from good to poor condition*
- *Small bones missing or washed away*
- *Bones oriented by stream flow*
- *Sediments coarse-grained (sandstone)*



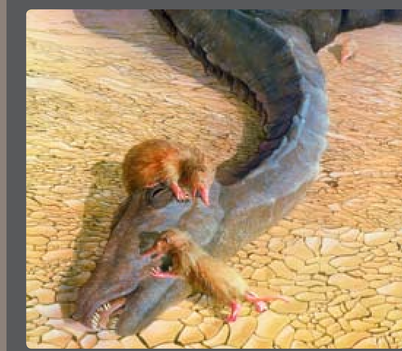
Paleontologists examine every aspect of the fossil remains and geologic setting to understand the history of the quarry. Are the skeletons complete or are the bones scattered? How many and what types of fossils are present? How old were the animals when they died? What is the geologic setting in which the fossils are entombed? What was the climate like when the animals were alive? These all become important clues to the puzzle. After examining the data, scientists develop theories to explain the formation of this bone-bed. How do you think this bone-bed was formed?

Quarry Characteristics

- Dense concentrations of bones
- Disarticulated skeletons (bones are scattered)
- Most bones in good condition
- Some bones have tooth marks or breaks
- Some bones crushed (or trampled)
- Both large and small bones present (smaller bones didn't wash away)
- Horizontal orientation of bones
- Bone layers indicate multiple events
- Majority of dinosaurs juvenile
- Sediments fine-grained (mudstone or clay)
- Bone layer relatively thin
- High ratio of carnivores to herbivores

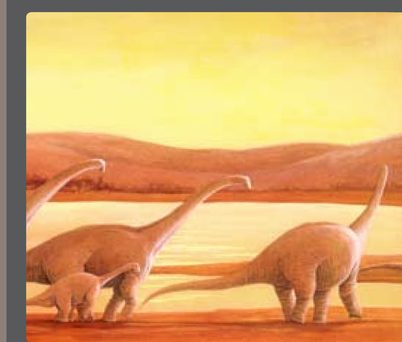
Illustrations courtesy of Carel Brest van Kempen ©

> *"There is no branch of detective science which is so important and so much neglected as the art of tracing footsteps"*
> *– Sir Arthur Conan Doyle*



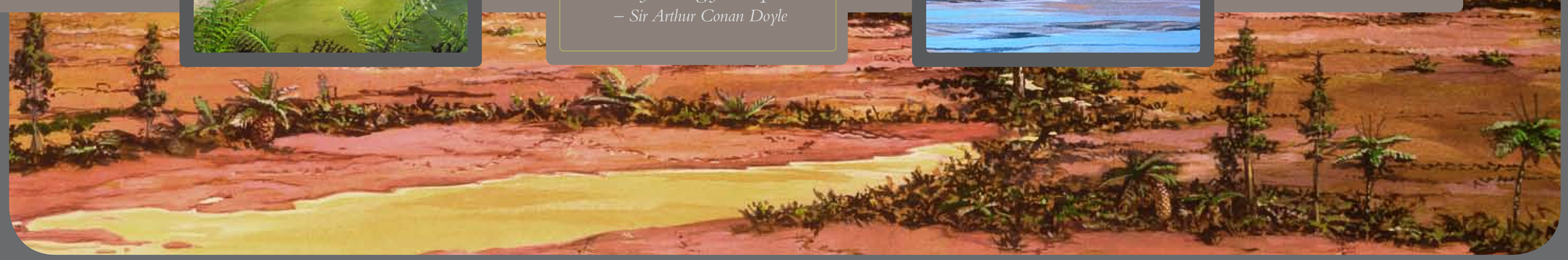
Poisoning – animals drink from a contaminated waterhole. Supporting evidence would be:

- *Some articulation (bones connected)*
- *Sediments fine-grained (mudstone or clay)*
- *Bones outlining the shoreline*
- *Geochemical evidence*



Watering Hole in a Drought – During a series of droughts, animals congregate and die as their only source of water evaporates. Supporting evidence would be:

- *Dense concentrations of bones*
- *Disarticulated skeletons (bones are scattered)*
- *Some bones crushed (or trampled)*
- *Random orientation of bones*
- *High ratio of herbivores to carnivores*

Flood Event – A devastating flood drowns huge numbers of animals, and then deposits them in one place. Supporting evidence would be:

- *Dense concentrations of bones*
- *Complete skeletons*
- *Bones oriented by stream flow*
- *Both large and small bones present (smaller bones didn't wash away)*
- *Sediments both coarse- and fine-grained (pebbles, sand, mudstone, and clay)*