

Dinosaurs, Mammoths and other Heavy Weight's at Paleontological Heritage Destinations: The Question of Critical Mass in Educational Tourism Development

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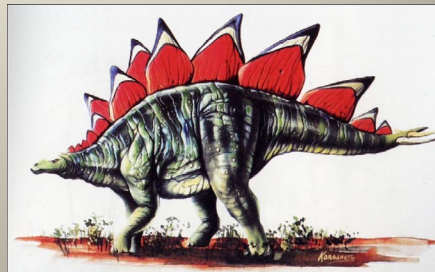
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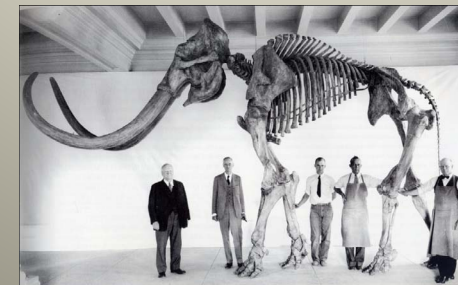
An Increasing Interest in Dinosaur and Ice Age mammal fossil sites

- An increasing popularity of **dinosaurs** and **ice age mammals** in the media (on TV, in movies, etc.) and of **paleontological fossil sites** in educational tourism, in Colorado and worldwide
- More and more paleontological & geological sites are now marked and highlighted in outdoor settings
- Most of these paleontological places of interest are characterized by featuring unusually large, and often humongous species, **heavy weight's**, from the past: from stegosaurus & brontosaurus (in the Jurassic) and triceratops & tyrannosaurus rex (in the late Cretaceous) to mastodons and mammoths (in recent geological time periods, during the Holocene)

A Fascination with Heavy Weight's from the Past: Dinosaurs (1)



The Fascination with Large Extinct Mammals from the 'Ice Age' (2)



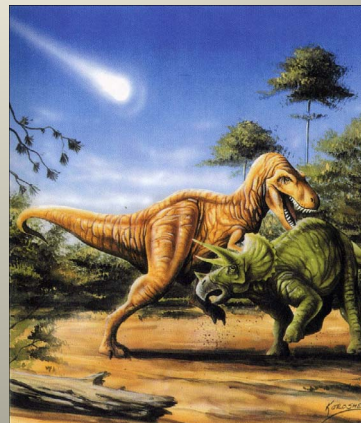
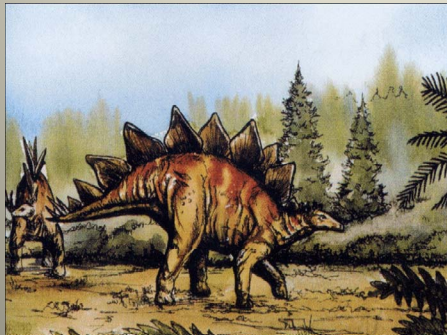
The Question of Critical Mass

- A second theme I would like to address in my paper is the role of large **heavy weight** attractions at paleontological heritage sites in general and, in a wider sense, of **critical mass** in educational tourism development: Is there a critical mass or a threshold for initiating and/or for sustaining growth in tourism development?
- Finally, I would like to examine of whether we can apply the concept of **critical mass** to the explanation of social phenomena, here tourism dynamics

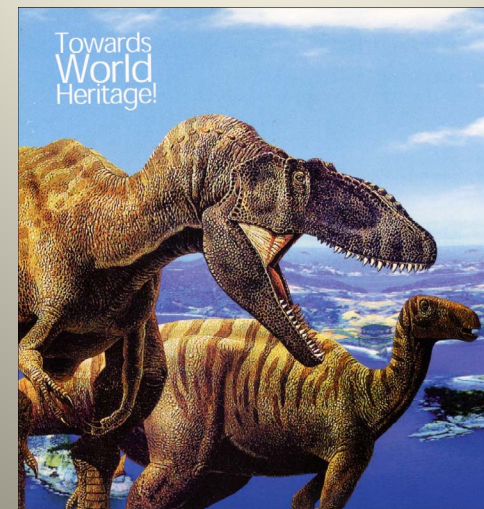
Paleontological Resources for Educational Tourism

- A worldwide trend: Paleontological and geological heritage sites continue to attract considerable attention
- In the U.S., far more than one hundred paleontological sites have been preserved and made accessible for visits
- Frequently, these places of paleontological interest have on- site information in form of markers, kiosks or visitor centers and/or nearby local museums
- In Colorado: 10 – 12 sites with outstanding paleontological resources highlighted in outdoor settings and/or displayed in local visitor centers/museums
- Near Denver: The Morrison-Golden Fossil Area National Natural Landmark (with **Dinosaur Ridge** and the **Fossil Trace Area**)

Species Featured at Dinosaur Ridge and the Fossil Trace Area (from the Jurassic and the Cretaceous)



A New UNESCO Designation: GeoPark



GeoParks, a UNESCO Program

- The Global Geoparks Network (GGN) is a UNESCO program established in 1999
- Since 2004, the group has held regularly conferences (International Geoparks Conferences)
- There are currently 87 geoparks in 27 countries
- Most of the geoparks are in Europe (including 7 each in Germany and in UK) and in Asia (24 in China)
- So far, no geoparks in the United States (1 in Canada)
- Two Colorado areas with outstanding geological & paleontological resources consider an application

Geopark Designation

- Geoparks are areas of geological (& paleontological) heritage with international significance and a sustainable development strategy
- A geopark contains one or more protected geologic features at the core and small or mid-sized towns around it or inside the geopark's border
- Applications must include a management plan designed to foster socio-economic development that is sustainable
- Members of the GGN will decide on each application

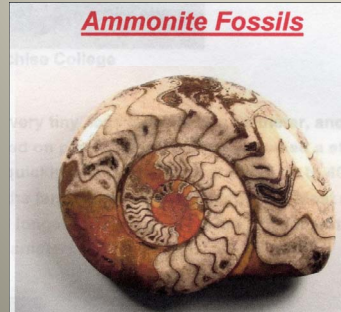
Recognition of Paleontological Resources

- Paleontological resources are frequently important features of a GeoPark
- Diversity of geological and paleontological resources is important
- Paleontological fossil sites should shed light on the existence of a variety of species (fauna & flora), in particular, of larger species dominant in a given geological time period

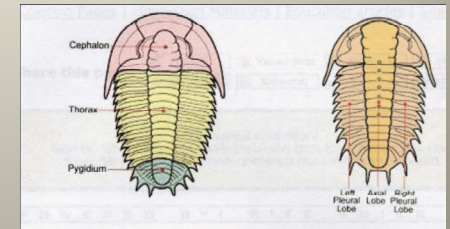
Overlooking smaller fossils at paleontological heritage sites

- Smaller fossils which are an important part of the spectrum of the flora and fauna in a given geological time period are often overlooked
- Ammonite fossils (from the Cambrian, ca. 415 million years ago and from the Triassic, Jurassic and Cretaceous time periods, ca. 225 to 65 million years ago) and trilobite fossils (only from the Cambrian time period) are in many places the most common fossils to be found
- Not a single museum in the U.S. focuses on the hundreds or thousands of ammonite and trilobite species
- By contrast, 'heavy weight's' receive a lot of attention

Ammonite Fossils

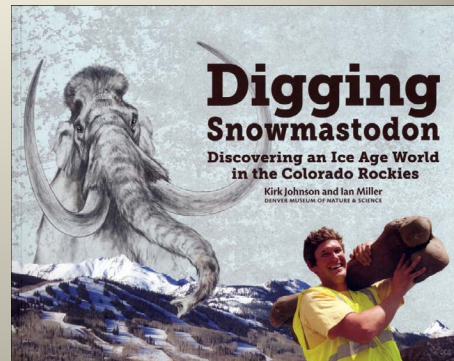


Trilobite Fossils



Fascination with Larger Species: The Case of Ice Age Mammals Found at Snowmass, Colorado in 2011

- 2010 discovery of fossils from the late Holocene, from 120,000 and 70,000 years ago, near the ski resort of Snowmass
- Seven weeks of digging in 2011 produces a large number of fossils, many from now extinct animals of the two time periods: mastodons, mammoths, giant bison, camels, huge ground sloths



The Snowmass Discoveries: Excitement among the Volunteers – Showcasing the Findings in Public



Large Ice Age Mammal Fossils Displayed: The Case of a Bison Latifrons Skull 6 Foot 4 Inch Long

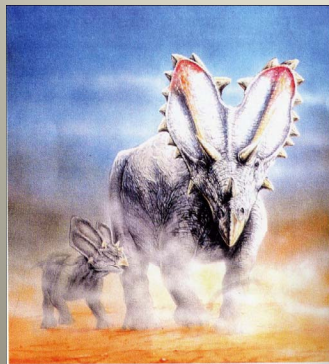


New Paleontological Heritage Sites in the Making

- The main exhibit of the Snowmass findings at the Denver Museum of Nature and Science, with a careful and creative reconstruction of paleo-environments
- A second on-site exhibit at the Ice Age Discovery Center in Snowmass (near Aspen, CO) featuring the highlights, e.g. a young Columbian Mammoth ("Snowy") and other favorites



What Does It Take to Start a New Paleontological Heritage Site: A Question of Critical Mass?



‘Critical Mass’ Concept

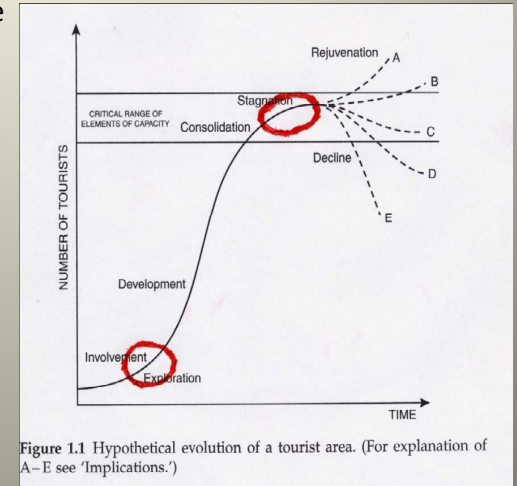
- Critical mass is a concept used in many fields & contexts, including physics (initially in the study of thermodynamics), group dynamics, politics, public opinion and technology
- Working definition for use in the study of sociodynamics according to Lynn Marcus (1987): ***“Critical mass is a sociodynamic term to describe the existence of a sufficient amount of adopters of an innovation in a social system such that the rate of adoption becomes self-sustaining and creates further growth*** (as an aspect of Everett Roger’s *Theory of Diffusion of Innovations*)”
- Social factors influencing critical mass may involve size, interrelatedness and level of communication in a society

Applying Critical Mass to the Study of Tourism Dynamics

- As shown in the case of the development of educational tourism at paleontological heritage sites: a **critical mass** is necessary or favorable for getting started
- Sufficient **critical mass** can be achieved either in form of **paleontological attractions** (such as one or several featured **heavy weight's**) or a sufficient number of **complementary paleontological & geological resources** (of different nature)
- Applying the notion of **critical mass** to models in tourism studies raises the question:
- Can this provide a further foundation or a new explanation for the **Resort Cycle model** (initially sketched by Christaller 1955/1963, then given a more precise form by Butler 1980) ?

A New Framework of Interpretation for The Resort Cycle Model : Gaining and Losing Critical Mass

- Two crucial turning points in the evolution of a tourist area:
(1) after 'discovery' and local involvement a turn to rapid growth (thus gaining sufficient critical mass for take-off) and
(2) the leveling off of rapid growth as continued increase can no longer be sustained (losing critical mass)
- Changing 'momentum' due to number of tourists, types of tourists and a changing image



Concluding Thoughts and Questions

- **Critical Mass** might be a necessary minimum condition for moving objects in a desired direction
- Can we apply such laws from physics/natural sciences to social phenomena? And to Tourism Dynamics?
- Can changes in communication, with the result of a gaining or losing 'momentum' for a person, a group, or social phenomena be also applied to the rising or falling popularity of tourist destinations?