Reading Guide for September 10

from Cvancara, *Field Manual for the Amateur Geologist*

Chapter 12. Reconstructing Past Events

p. 126. One key point of this introduction is the statement, along with the acceptance of the principle of uniformitarianism, that "certain events of the past do not take place in the present." The world, in fact, has evidently changed over time.

pp. 126–133. *Mountain Building*. This long section describes most of the large-scale earth processes in the plate tectonic model. There is a lot here, and it is important to understanding most of the constructive processes that operate on Earth.

p. 127. The one complete paragraph on this page describes the large-scale interior structures of continents.

- What are **shields**?

- What is the overall structure of **stable platforms**?

pp. 127–128. The paragraph spanning this page turn describes the primary structures of the ocean floors. It does not explain how they form; that will come later.

- Of what type of rock is the **oceanic ridge** composed?

p. 128. The first two full paragraphs describe the basic structure of the planet Earth and what tool has enabled us to learn about it.

- If the Earth is compared to a hen's egg, which parts of the Earth correspond to which parts of the egg?

p. 128. The next paragraph describes two pieces of evidence supporting the theory of continental drift.

- What are these two lines of evidence?

pp. 128–131. The theory of **plate tectonics** is summarized here.

- Describe the main similarity and the main difference between continental drift and plate tectonics.

- What processes occur at oceanic ridges?

- What occurs at **subduction zones**?

p. 131–132. Now the stage is set to explain how mountains form. The first setting examined is the collision zone between continental crust and oceanic crust.

- What do the two plates do in this setting?

- What sort of mountains form?

p. 132. Very little space is devoted to describing the conditions at the other two types of plate collision. Do note the names of prominent mountain ranges created in continent-continent collisions.

p. 132. The last full paragraph describes the concept of **isostasy**. This concept is a bit complicated, so read this paragraph carefully and slowly, sentence-by-sentence. Follow the sequence of what happens to mountains as they uplift and erode.

- Why is erosion of a mountain range accompanied by uplift of the remaining rocks?

- What is left after a mountain range completely erodes away?

pp. 132–133. The one paragraph spanning this page break explains what continental shields are, how they form, and how they grow. Make sure you stop to understand all of this.

pp. 133–136. *Former Continental Seas.* This section describes tracing the continental Cambrian sea in North America. The Cambrian was not the only time that much of what is not North America was sea-covered, but this is a good example of understanding the past from evidence remaining in the present. You don't need to follow the particulars of the reconstruction, but do read along to see what evidence the author presents and how he interprets it. Also see what observations are consistent with more than one interpretation.

p. 136–138. *Past climates.* Using the same rock record, the author now determines the prevailing climate in North America during the late Cambrian. He cites two lines of evidence that indicate the climate was tropical.

- What are these two separate lines of evidence?

The part about the trade winds won't necessarily mean much to you now, as we haven't yet learned about how these winds blow or what drives them. For now, accept that the presence of trade wind patterns is a third line of evidence indicating a tropical location for North America in the Cambrian.

p. 138. The final paragraph of this page describes other types of geologic evidence that can be used to infer past climates. These apply to climates and conditions not seen in the rocks of the North American late Cambrian.