**Josiah Gregg Unit Lesson 3**

**Optical Illusions and Mirage**

Light is both matter and energy. It travels in a straight line unless it passes through gases of different density. Let’s imagine that you can view the sun’s light directly. Now imagine viewing the same light from the sun with a large cloud blocking it. Light is still visible, but it passes through the cloud differently than it does through an invisible air mass. Optical illusions sometimes occur because of how light interacts with different substances as it travels through them. A mirage is a certain type of illusion that captures light bending or refracting as it hits different substances and then travels in a different direction. Usually, refraction occurs because of temperature differences in the air. Hot air has a lighter density than cold air because cold air molecules are packed more tightly. Since the air around us, especially outside, isn’t uniform, layers or pockets of cold air and warmer air settle right next to each other. When light passes through areas of difference like this, it shifts and refracts, which in turn changes our perception of what we are viewing.

Optical illusions are a common phenomenon. Even today, most vehicles have rearview mirrors stamped with the words, “Objects in mirror are closer than they appear” to remind drivers about the illusions that these mirrors produce. Josiah Gregg marveled at the sight of optical illusions while traveling on the Plains. He notes, “The optical illusions occasioned by the rarefied and transparent atmosphere of these elevated plains are often truly remarkable…One would almost fancy himself looking through a spy-glass, for objects frequently appear at scarce one-fourth of their real distance-frequently much magnified, and more especially elevated” (88-89). Further, Josiah notes the visual skill of the native Plains people, particularly one Comanche he encountered. He says, “By and by the Comanche pointed anxiously towards the northwest, where he espied a party of his people, though at such a great distance that it was some time before I could discern them…Accustomed to the open plains, and like the eagle to look out for their prey at immense distances, their optical perception is scarcely excelled by that of the king of birds” (202).

Illusions weren’t just entertainment during this period, however. Recognizing people and objects from great distances proved to be vital for survival. Notice Josiah trying to make a hypothesis about the illusions he saw in the following text and imagine how you might react if you mistook a group of animals for people like Josiah did. “Ravens…are not infrequently taken for Indians, as well as for buffalo; and a herd of the latter upon a distant plain often appear so increased in bulk that they would be mistaken by the inexperienced for a grove of trees. This is usually attended with a continual waving and looming, which often so writhe and distort distant objects as to render them too indistinct to be discriminated. The illusion seems to be occasioned by gaseous vapors rising from the ground while the beaming rays of the sun are darting upon it” (89).

Given the great distances that had to be covered along the Santa Fe Trail between water sources, many travelers desperate for water were cruelly tricked by the mirage. Gregg writes, “But the most curious and at the same time the most perplexing phenomenon occasioned by optical deception is the *mirage*, or as familiarly called upon the prairies, the false ponds…The thirsty wayfarer, after jogging for hours under a burning sky, at length espies a pond – yes, it must be water – it looks too natural for him to be mistaken” (89). Because water was so scarce along the Plains, people in caravans learned to be both dependent on and suspicious of their own eyesight.