**Another Voice Podcast with Eric Nelson**

**to accompany Strayer/Nelson, *Ways of the World*, Third Edition**

**Newton, Alchemy and the Nature of Scientific Discovery (Chapter 15)**

**SLIDE 15.1**

Do historians focus too much on successes rather than failures?

**SLIDE 15.2 [Image: Philosopher Giving a Lecture on the Orrery]**

When examining movements like the Scientific Revolution, historians do have a tendency to emphasize breakthroughs and discoveries with large-scale implications. This is understandable given the scope and breadth of world history. But focusing only on important achievements runs the risk of making the Scientific Revolution seem like a triumphal march from one great discovery to another. Exploring some failures or dead-ends along the way provides perspective and also sheds light on the processes that underpinned the movement.

The career of the mathematician and scientist Sir Isaac Newton provides an ideal focus for such a reassessment. Newton’s contributions to the study of optics, and his formulation of the modern laws of motion and mechanics place him amongst greatest physicists of his age. What is less well known is that Newton spent much of his time on far less successful pursuits in the field of alchemy—that is the changing of one physical element into another. In his laboratory, he conducted numerous experiments in alchemy, pursuing among other things the long-sought after Philosopher’s Stone—a material capable of turning base metals like lead into precious ones like gold. While modern chemistry has largely overturned the premises on which alchemy was founded, chemistry was still in its infancy during Newton’s lifetime and so the lines between science and alchemy were not yet articulated. Indeed, one could argue that despite failing to find the Philosopher’s Stone, much of Newton’s study of alchemy might still be termed scientific. Newton pursued alchemy with the same experimental rigor with which he examined the laws of physics.

**SLIDE 15.4 [Image: The Telescope]**

In the seventeenth century, it was unclear which subjects of study would hold up to scientific examination and which would not. Remarkable discoveries were transforming basic understandings of the physical universe, both affirming and challenging established thought. It took time for scientists to separate what we might define as the modern sciences from other forms of learning, like alchemy, that did not stand up to experimental scrutiny. It was a process where even the leading minds of the period, like Newton, were drawn into scientific dead ends.

In hindsight, it is easy to forget how unexpected many scientific revelations were. Newton’s greatest discovery in physics—the laws of universal gravitation—which asserted that both objects on earth and in the heavens obeyed the same laws, contradicted the long-accepted teachings of Aristotle and the Church. A profoundly new understanding of the universe only took shape through time and was the result of many unexpected twists and turns that collectively brought forth modern science.

Far from just a sequence of triumphal discoveries, the Scientific Revolution was the product of both successes and failures all connected by a commitment to careful observation, controlled experiments, and the formulation of general laws expressed in mathematical terms.