Lecture six

Islamic Science, Theoretical and Applied: Its Achievements and Influence on Western Science and Technology

- **A. The Pre-Islamic Sources of Islamic Sciences**

- **1.** Muslims sought out the secrets of alchemy in Alexandrian science.

- **2.** They sought out the botany and mathematics of Persian science.

- **3.** They sought out the astronomy and mathematics of Greek and Indian science.

- **A. The Pre-Islamic Sources of Islamic Sciences**

- **4.** They also learned much from ancient Mesopotamian and Chinese sciences.

- **5.** From the eighth to the fifteenth century, Islamic science was the most active and advanced form of science in the world.

- **6.** Islamic science did not disappear after that, but it began to wane and no longer influenced the Western world.

B. General Characteristics of Islamic Science

- **1.** It was global in character and universal in its openness to other scientific traditions.
- **2.** Its use of reason, empiricism, and especially observation was vastly important.
- **3.** It also was very tied to religion and had roots in the sacred character of nature and the doctrine of unity.

C. The Achievements of Islamic Science

- **1.** People do not give enough credit to Islamic science even as they recite Arabic numerals.

- **2.** In mathematics, Muslims created Arabic numerals on the basis of Indian mathematics based on the decimal system, and developed the sciences of algebra and trigonometry.

- **3.** Muslims synthesized both Greek and Indian astronomy, expanded mathematical astronomy, and made new observations of the heavens; they also developed many astronomical instruments such as the astrolabe.

C. The Achievements of Islamic Science

- **4.** Muslims made many advances in the fields of medicine and pharmacology and introduced new surgical instruments.

- **5.** Their critique of Aristotelian physics was later built upon by Galileo; they also formulated the concept of momentum.

- **6.** Alexandrian alchemy and rudimentary chemistry were inherited by the Islamic world in the eighth century, and there were many major contributions to the field by then, based on this early heritage.

C. The Achievements of Islamic Science

- **7.** Muslims added a great deal of knowledge in the life sciences, especially in the classification systems and in the descriptions of various flora and fauna.

- **8.** They also made unique contributions in agriculture, spreading various plant forms around the world and improving methods of irrigation.

D. The Applied Sciences and Technology

- **1.** The Islamic community came up with a number of innovative mechanical devices, early forms of irrigation, and important materials such as tiles.

- **2.** They were well known for their architecture, including early air-conditioning using methods of ventilation and airflow.

D. The Applied Sciences and Technology

- **3.** They were expert cartographers and masters of navigation, even helping the great Western explorers in their adventures.

- **4.** Ironically, this would eventually be the Islamic civilization's undoing, as it began the gradual weakening of their global presence, especially in the Indian Ocean.

E. The Influence of Islamic Science in the West

- **1.** Islamic science was the basis for medieval and Renaissance science in the West.

- **2.** Major figures of Islamic science, such as al-Khwarazmi, al-Razi, Ibn Sina, and Ibn al-Haytham, were influential figures in Western science.

F. Contributions of Islamic Science to the West

- **1.** Islam provided the West with numerous medical theories and practices, pharmacology, Arabic numerals and algebra, planetary theory and criticism of Ptolemaic astronomy, new astronomical tables and instruments, and star names.

F. Contributions of Islamic Science to the West

- **2.** Islam provided criticism of the Aristotelian theory of motion, developed the concept of momentum, discovered the basic tenets of chemistry, and invented many chemical instruments still in use today.

- **3.** There are still many names of Arabic origin in Western science, such as algebra, chemistry (from alchemy), alembic, and, indirectly, the trigonometric functions.

G. The Influence of Islamic Technology upon Western Technology

- **1.** Many Islamic contributions to optics, musical instruments, architectural techniques such as vaulting and irrigational techniques, surgical and astronomical instruments, and metallurgy were passed on to the West.

G. The Influence of Islamic Technology upon Western Technology

- **2.** Attempts to purge Western languages of inherited Arabic vocabulary during the Renaissance, especially in the fields of science and technology, were not completely successful.

- **3.** In fact, about 10 percent of Spanish vocabulary is still based on Arabic.