Contributions of Early Muslim Scientists to Engineering Studies and Related Sciences

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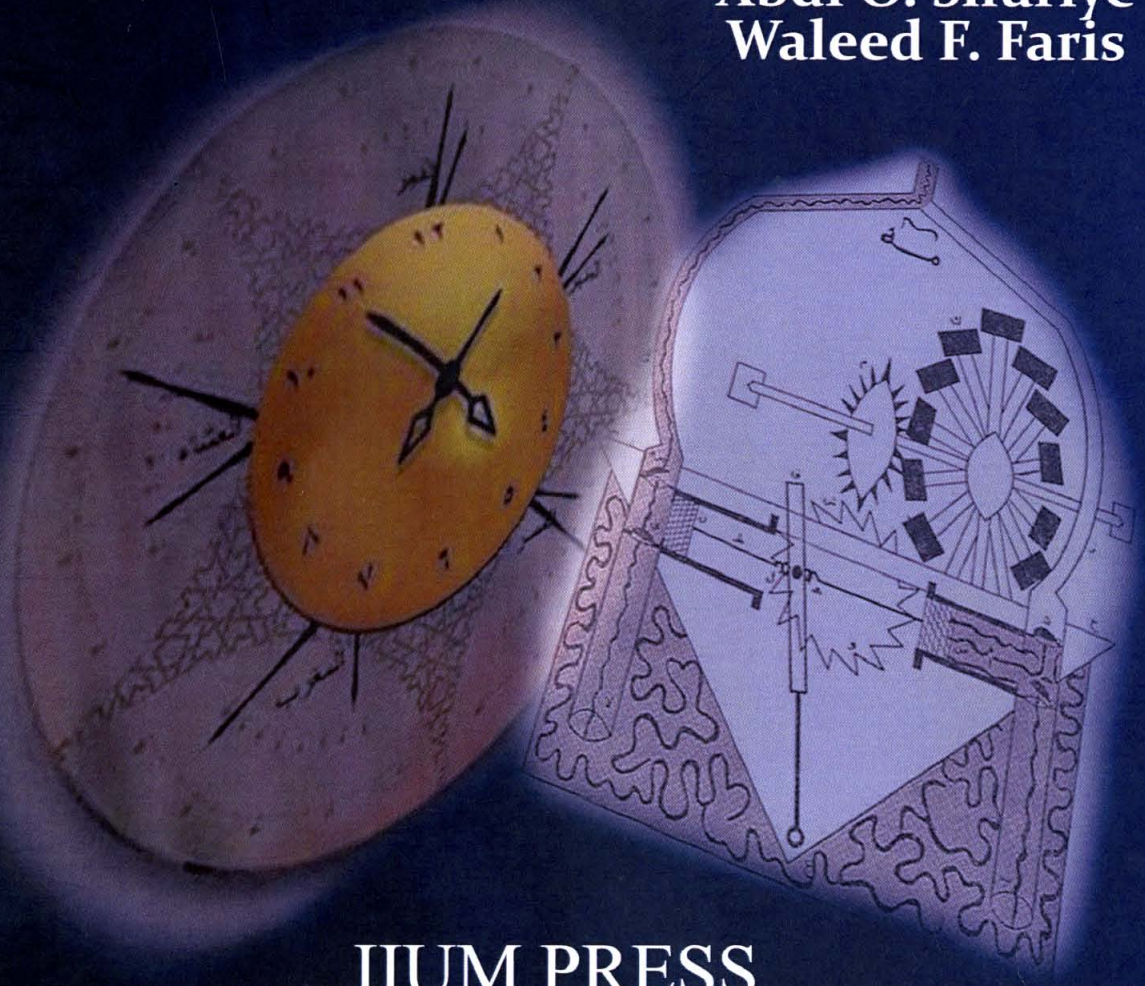

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CHAPTER THREE

IBN AL SHATIR'S INFLUENCE ON MODERN ASTRONOMY

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3.1 INTRODUCTION

The objectives of this chapter are to evaluate the concept of the sun and lunar model developed by Ibn Al Shatir highlighting his influence towards the modern day astronomy and also emphasizing on his other contributions and achievements. The methodologies adopted in order to complete this chapter were library-based research and data collection from reliable sources available online. This chapter explores the mathematical solutions employed by Ibn Al Shatir in the formulation of his sun and lunar theories using trigonometric equations and observation made in Damascus mentioned by Roberts, 1957, p. 430. Furthermore, this chapter also presents other achievements made by Ibn Al Shatir including some of his great inventions in relation to astronomy. Significantly, this chapter will highlight the relationship of Islamic scholars in the development of knowledge corresponding to the Islamic world-view of the first few centuries of Hijra which provided powerful source of inspiration for the Muslim's quest for knowledge and presents the contribution of Muslim Scientist (Ibn Al Shatir) in modern day astronomy hoping to help the world to realize the prominent role played by Muslim civilization in the history of science. "Golden Age of Islamic Civilization" was a period where great emphasis was focused on the pursuit of knowledge many discipline [Faruqi, 2006, p. 391]. At this time Islam was not just a set of religious beliefs, but a set of ideas, ethics and ideals encompassing all aspects of human life resulting in the establishment of an Islamic civilisation with Islamic faith as the driving force.

3.2 BACKGROUND OF IBN AL SHATIR

As an orphan since child, Ibn Al-Shatir was born on 15 Sha'ban 705 Hijra (1 March 1306) in Damascus and raised by his grandfather then by his uncle where he was taught the arts and crafts of inlay works using ivory, wood and pearl. Then, Ibn Al Shatir went to Cairo and Alexandria in order to study further in the areas of mathematics and astronomy. He filled the position as head of muwaqqit and the Umayyad mosque in Damascus, responsible for the regulation of the astronomically defined times of prayer [Kennedy and Ghanem, 1976]. Nevertheless, his most significant contribution to astronomy was his planetary theory [Hockey *et. al*, 2007].

By the end of the 10^{th}century, Arab astronomers certainly were aware of the great discovery of modern gnomonic as depicted in Figure 3.1 which describes a gnomon that is parallel to the earth's axis producing sundials whose hour lines indicate equal hours on any day of the year. A dial of this type was made by Ibn al-Shatir for the Umayyad Mosque in Damascus in 1371 and it is the oldest polar-axis sundial still in existence [Jones, 2005].