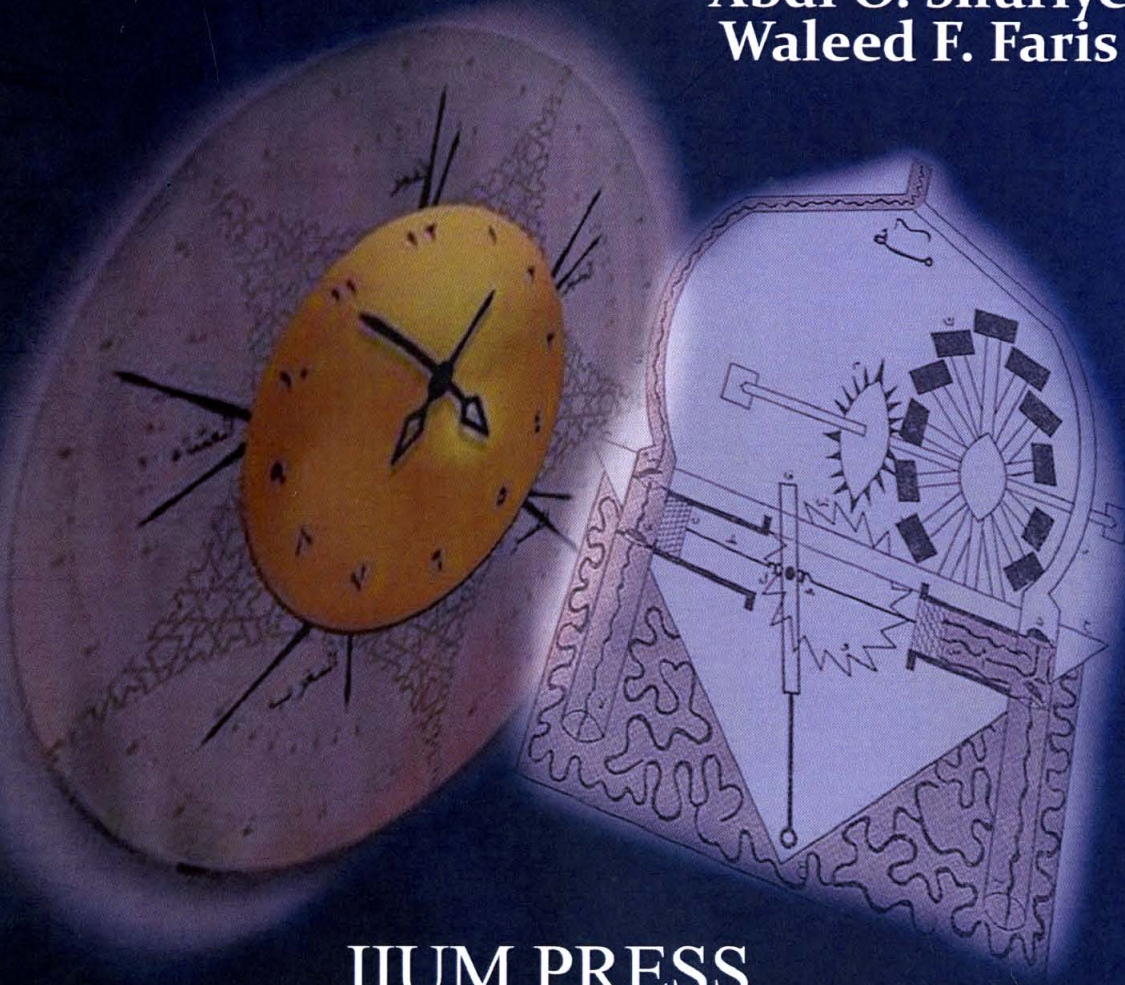


# Contributions of Early Muslim Scientists to Engineering Studies and Related Sciences

Abdi O. Shuriye  
Waleed F. Faris



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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA



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## **Editors**

Abdi O. Shuriye  
Waleed F. Faris



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EMAIL: iiumprinting@yahoo.com

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## CHAPTER TWENTY EIGHT

### AL - KHAZINI IN ON THE DEVELOPMENT OF HYDROSTATIC BALANCE AND ITS FUNCTIONALITY

Bashir Ahmed Danzomo, Abdi O. Shuriye

Fac. of Eng., International Islamic Univ. Malaysia (IIUM), Jalan Gombak, 53100 Kuala Lumpur, Malaysia.

#### 28.1 INTRODUCTION

The significance of this chapter is to review the main contributions of al-Khazini in physics and scientific instruments. The methodology adopted in this chapter includes review of available and reliable literatures and data collected from library and internet sources. The main focus of the chapter is to present the work done by previous Muslim scientists on hydrostatics in the determinations of specific gravities of liquid, precious stones, metals and the hydrostatic balance designed and constructed by al-Khazini. Studies have shown that Al-Biruni and Al-Khazini performed the first scientific experimentations in areas of statics and dynamics; this is particularly for determination of specific weights, such as those based on the “*theory of balances and weighing*”. The strict definition for a specific weight is given by Al-Khazini in “*The Book of the Balance of Wisdom*” and the remainder of the book is devoted to the description of various balances, beginning with balance attributed to Archimedes, proceeding through balances developed by Muslim scholars and concluding with an exhaustive description of the balance which al-Khazini calls “The Balance of Wisdom”.

#### 28.2 ABUL-FATH ABD-AL-RAHMAN AL-KHĀZINI (1115-1130 A. D.)

Al-Khazini was a scientist, astronomer, physicist, biologist, alchemist, mathematician and philosopher who made important contributions to physics and astronomy. According to Helaine (1997, p.480), Al-Khāzini was a Byzantine Greek who lived in Marw, Khurasan province of Greater Iran (located in today's Turkmenistan). Al-Khazini lived and worked under the patronage of the Seljuk court. He was an ascetic character, handing back 1000 Dinars sent to him by the wife of an Emir, living instead on 3 dinars a year, sharing his house with a cat (Robert, 1973, p. 335). The most important of al-Khazini's works in physics is probably his “*Kitab Mizan Al-Hikma*” (The Book of the Balance of Wisdom) a treatise on the physical principles that underlie the hydrostatic balance as well as the construction use of the instrument which was meant for Sanjar's treasure. This work was written in 1121-1122, and dedicated to Sultan Sanjar, (Robert, 1973, p. 336).