Contributions of Early Muslim Scientists to Engineering Studies and Related Sciences

Abdi O. Shuriye
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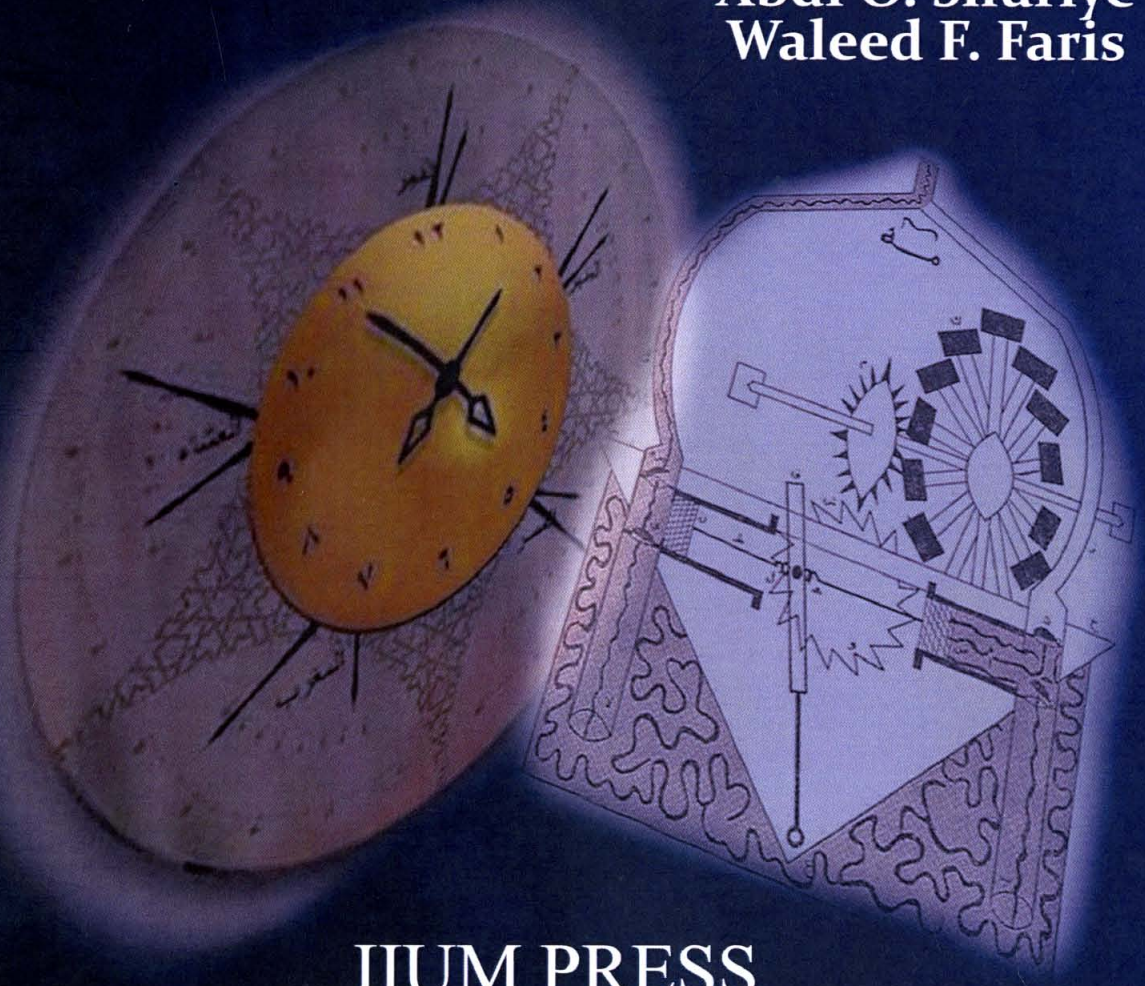

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CHAPTER TEN

AL-BIRUNI'S VIEWS ON THE DISCOVERY OF THE SPHERICAL EARTH

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10.1 INTRODUCTION

The objective of this chapter is to explain the concept of spherical earth and the data used is collected from reliable sources. The technique of Eratosthenes was used to measure the circumference of the earth, 200 years before Al Biruni. However, this chapter investigates the method used by Al-Biruni to find the earth's circumference and this was the most precise calculation of earth's circumference during the medieval period. The chapter also explores the mathematical solutions that were provided by Al-Biruni to determine the circumference and radius of the earth. Hence, the significance of this chapter is to present Al-Biruni's concept of spherical earth.

10.2 CONCEPTUAL ON SPHERICAL SHAPE OF THE EARTH

The shape of the earth is close to that of an oblate spheroid which is a sphere flattened along the axis from pole to pole in such a way that there is a bulge around the equator. This bulge results from the rotation of the earth. Earth's circumference and diameter differ because its shape is classified as an oblate spheroid or ellipsoid, instead of a true sphere. It causes the diameter of the earth at the equator is 7,926.28 miles (12,756.1 km) while the earth's diameter at the poles is 7,899.80 miles (12,713.5 km). The circumference of the earth at the equator is 24,902 miles (40,075 kilometers), while the circumference of the earth through the poles is 24,860 miles (40,008 kilometers) (Edward, 1889, p.69).

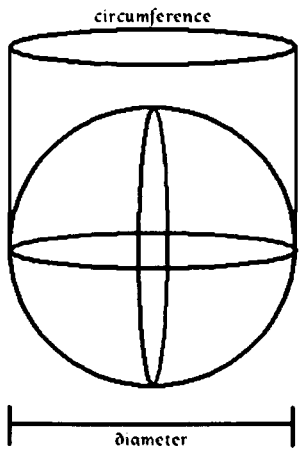

Figure 10.1: Adopted from: (http://www.lyberty.com/encyc/articles/earth.html)