International Year of the Light-2015

UNESCO declared 2015 as the international year of the light, focusing on the science of light and its application for raising global awareness about how light based technologies promote sustainable development and provide solutions to global challenges in energy, education, agriculture and health **.UNESCO is also celebrating 1000 years anniversary of a key Muslim scientist and researcher into the science of light -Ibn Al-Haytham and his** remarkable seven volume treatise on optics **Kitab al-Manazir**. The methodology of investigation using experiment to verify theory, known as the modern scientific method was first introduced by Ibn Haytham and therefore he is called "the first scientist"

Through his Book of Optics -Kitab al-Manazir, his ideas influenced European scholars including those of the European Renaissance. He was one of the earliest scientists to study the characteristics of light and the mechanism of vision. Today, many consider him as the "Father of modern Optics"

I asked several graduate students of Science and technology of a local university about "IBN HAITHUM" and his contributions to field of science, none has any knowledge of this famous scientist.

Institute of Medieval and post Medieval Studies (IMPMS) was established in Dallas in 2009 to make people aware of the great contributions of the Islamic civilizations to the west and indeed to the whole world by presentations and disseminations of written and Audio-Visual Material as well as by organizing conferences and special events on this subject. As a past president of IMPMS I am writing this brief article to commemorate the 1000th anniversary of the work of this great Muslim scientist.

Ibn-Al- Haytham: The Father of Modern Optics

Born: 965 in (Basra, Iraq) Died: 1040 in (Cairo, Egypt)

This year marks one thousand years of the pioneering work on Optics, the seven volume "KITAB-AL-MANAZIR' by Ibn-Al Haytham probably the first and the greatest scientist in the two thousand years.

The period between the 9th Century and the fourteenth Century of the Christian era is referred to in Europe as the 'Dark Ages'is generally accepted as 'The Golden Age of Islamic Civilization'. During this period, the Islamic Empire, which stretched from Spain to China, saw many fascinating advances in science, technology and medicine, making discoveries that had a huge and often underappreciated impact on our world.

The Greeks believed that scientific fact can be discovered through reason, or simply attributed to the actions of the gods. It is understood by students of science that everything must be proved. You cannot make claims about scientific theories

based on assumption without experimentation. Before Ibn Al-Haytham, that was not the case. Ibn Al-Haytham was the first scientist in history to insist that everything be proven through the scientific method for discovering new information.

An example of his independent thinking is his theory of vision. The earlier scientists like Pythagoras, Euclid, Ptolemy, etc. believed that some rays are emitted from the eye, which bounce back from the object into the eye, enabling a person to see the object. Al-Haytham rejected this and explained vision as due to rays of light being reflected from the object into the eye. This was the first time that anybody had described the mechanics of sight accurately. He went on to divide light into two basic groups: primary and secondary. Primary light is the light radiated by an illuminating body, such as a lamp, a fire, the stars or the sun. Secondary light is primary light that has been reflected of another surface. During the day, Ibn al-Hay ham theorized, the sun provides primary light, while every other visible object – for example a bird, a tree, a stone, a blade of grass – reflects the light of the sun. He suggested that even the atmosphere reflects light, which is why the sky brightens even before the sun rises.
His experiments and dissection enabled him to understand the structure of the eye, and to identify the lens, cornea and retina. He also suggested that an optic nerve carries visual sensations to the brain. It was the first time anybody had suggested that vision occurs in the brain, not the eyes. The pin-hole camera or "camera obscura" was also his invention. By this he was able to prove that light travels in straight lines. Ibn Haytham has written over 100 treatise but most of them are not survived. Even more impressive, he came up with these theories while permanently confined, most probably in a single room, for 10 long years.
He completely refuted astrology as a scientific subject. He came to the conclusion that the ideas of astrology were not rooted in any type of science, but in the thoughts and feelings of astrologers. He also noted that astrology directly contradicts one of the main ideas of Islam – that God is the cause of all things, not astronomical bodies.

A seven volume work on optics, *Kitab al-Manazir,* is considered by many to be ibn al-Haytham's most important contribution. In Vol -1Ibn al-Haytham made it clear that his investigation of light will be based on experimental evidence rather than on abstract theory. He notes that light is the same irrespective of the source and gives the examples of sunlight, light from a fire, or light reflected from a mirror which are all of the same nature. He gives the first correct explanation of vision, showing that light is reflected from an object into the eye. Most of the rest of Book I is

devoted to the structure of the eye .His studies of optics did led him, , to propose the use of a camera obscura, and he was the first person to mention it. Book II of the *Optics* discusses visual perception while Book III examines conditions necessary for good vision and how errors in vision are caused. From a mathematical point of view Book IV is one of the most important since it discusses the theory of reflection. Book VI of the *Optics* examines errors in vision due to reflection while the final book, Book VII, examines refraction (1)

Conflicting stories are told about the life of Ibn al-Haytham, particularly concerning his scheme to regulate the Nile. In one version, told by the historian Ibn al-Qifṭī (d. 1248), Ibn al-Haytham was invited by al-Ḥākim (reigned 996–1021; also known as "The Mad Caliph") to Egypt to demonstrate his claim that he could regulate the Nile. However, after personally reconnoitering near the southern border of Egypt, Ibn al-Haytham confessed his inability to engineer such a project. Although still given an official position by the caliph, Ibn al-Haytham began to fear for his life, so he feigned madness and was confined to his own home until the end of al-Ḥākim's caliphate. Ibn al-Qifṭī also reports that Ibn al-Haytham then earned a living in Egypt largely by copying manuscripts; in fact, he claimed to possess a manuscript in Ibn al-Haytham's handwriting from 1040(3).

Al-Haytham's work was rediscovered in Renaissance Europe and his breakthroughs on astronomy, mathematics, and optics and, above all, the scientific method, helped lay the foundations of Renaissance,

Ref:

1. **J. J. O'Connor** and E. F. Robertson, 'Abu Ali al Hassan Ibn al Haytham', Mac Tutor History of Mathematics (1999). (www-history.mcs.st-andrews.ac.uk).
2. **Ibn Al-haytham: First Scientist (Profiles in Science): Bradley .Stephens..** Morgan Reynolds Pub.
3. **Richard Lorch "Ibn al-Haytham Arab astronomer and mathematician"** *www.**britannica**.com/**biography**/Ibn-al-Haytham.*