



The Institute of Ismaili Studies

“Universality and Modernity of Ibn al-Haytham’s Thought and Science”

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with an introduction by Azim Nanji**

Abstract

Ibn al-Haytham (965-1039), also known as Alhazen, was an Arab philosopher, physicist and mathematician whose legacy in the West is mainly due to his work in the optics. However, Ibn al-Haytham’s contributions go far beyond his famous optical *oeuvre*, *Kitab al-Manazir*. In his lifetime of study, Ibn al-Haytham was able to articulate a relationship between the physical, observable world and the world of intuition, psychology and mental processes. His theories of knowledge and perception, which link the present-day domains of science and religion – resulted in a philosophy of existence based on the direct observation of the ‘real’ as it presents itself to the seeing subject. Much of his thought in this field is still present in the discourse of twentieth-century philosophy and phenomenology.

Keywords

Ibn al-Haytham, Alhazen, optics, ophthalmology, phenomenology, beauty, science, philosophy, metaphysics.

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Introduction

What accounts for the complexity of our world, our environment and ourselves, and for our great fascination with mapping and understanding the processes underlying this complexity?

These questions continue to guide the intellectual quest for the study and meaning of science as well as religion. Among Muslims, this quest has a long and distinguished history.

The Fatimid era reflected a particularly creative period in the flowering of science, art, culture and architecture. It was also accompanied by a very significant development in all the religious and philosophical sciences. Ibn al-Haytham exemplifies the spirit of the time and his work as a scientist marked him as a figure of influence in his time, as well as beyond, in both the Muslim and Western worlds.

Ibn al Haytham and his colleagues did not see faith and religion as being mutually exclusive subjects of enquiry. They saw the intellectual quest as being a shared experience, encouraging and validating an engagement and exploration of the whole of creation. Alhazen, as Ibn al-Haytham came to be known to the Latin West, was also an engineer and first came to Cairo to apply his skills as a mathematician to regulate the flow of the water in the Nile.

As the boundaries of science and religion continue to expand and be challenged in our time, it may be worth examining the models and inspiration of the medieval Muslim scientists and the enabling environment that encouraged their work. One of the most important lessons they might teach us is to recognise the gift and value of the intellect and to avoid dichotomising human development. The study of scientific processes is also the beginning of the journey for the understanding of the Reality underlying those processes.

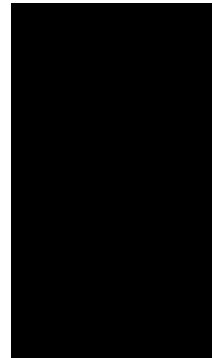
Azim Nanji

Ibn al-Haytham and his Optics

Abu'l-Hasan ibn al-Hasan ibn al-Haytham al-Basri al-Misri (965-1039 CE), also known in Europe by the Latin names Alhacen, Alhazen, Avenatan or Avennathan, was an Arab mathematician, physicist and philosopher born in Basra, Iraq. He spent many years of his life in Fatimid Cairo, working under the auspices of the Ismaili Imam-Caliph al-Hakim bi-Amr Allah (985-1021). He conducted important research in geometry, astronomy, mathematics and optics, based on an in-depth knowledge of the Greek scholars and philosophers, resulting in one of his most important works, the *Kitab al-Manazir*



From a scientific point of view, the *Kitab al-Manazir* presents a radically new approach to the studies of optics in the Middle Ages, starting fro





The Influence of the *Kitab al-Manazir*

The *Kitab al-Manazir* had a strong impact upon European thought through a Latin translation entitled *Opticae Thesaurus*





French philosopher Gaston Bachelard, observing the specific experience of ‘the poetic image’.¹⁷ Bachelard says “in the resonance we hear the poem, in resounding we speak it, it is ours.” This corresponds to Ibn Haytham’s thought, “in the resonance we *see the thing*, in resounding we *look at* it, it is ours.” It is in these terms that the relationship of the human being with the material world establishes itself, that his existence begins.

In this outlook, we also find the same basic argument on which Merleau-Ponty based his philosophy, demonstrating that “the body is itself the original knowing subject from which all other forms of knowledge derive” and “that all the higher functions of consciousness are rooted in and depend upon the subject’s prereflexive, bodily existence (*le corps propre*), i.e. perception.”¹⁸

An examination of the influence of Ibn al-Haytham’s works yields some surprising facts. Generally speaking, in the Muslim world, as in other monotheistic conceptions of reality, humanity occupied a subordinate position in relation to the divinity, and realistic artistic representation was avoided. It was Ibn al-Haytham who provided the impetus for Christian Europe to further develop the notion of human primacy in the conception of the universe, and to express this in the visual arts through the human figure and its realistic representation. In other respects, Ibn al-Haytham developed a genuine philosophy of existence based on the direct observation of the ‘real’ as it presents itself to the seeing subject. These observations were made centuries before the modern questioning of the experience of the world by Merleau-Ponty and other phenomenologists, who proposed ‘a return to phenomena’ after centuries of absolutist thought built by modern western philosophy. This recognition raises, it seems to me, a fascinating philosophical question upon which we can meditate.



A Pakistani stamp commemorating Ibn al-Haytham’s contributions to the field of optics.

¹⁷ To understand notions of the phenomenological method and approach, see the introduction of Gaston Bachelard, *La Poétique de l’espace* (Paris, 1978); the expression ‘le doublet phénoménologique des résonances et du retentissement’ appears on p. 6.

¹⁸ See ‘Merleau-Ponty, Maurice’, in *The Cambridge Dictionary of Philosophy*, pp. 484–486.



Facts About Ibn al-Haytham

Ibn al-Haytham was a prolific writer who composed no less than 44 treatises on physics, philosophy, astronomy, mathematics, medicine and other subjects. Many of these works were produced from a modest room in the college-mosque of al-Azhar provided to him by the Fatimid state. One of Ibn al-Haytham's remarkable achievements was a detailed description of the human eye and the functions of its various parts. He also wrote on the propagation of light and colours, optical illusions and reflections, spherical and parabolic mirrors, shadows and eclipses, the rainbow and the halo. He was one of the earliest scholars to recognise gravity as a force and knew correctly the relations between the motion, space and time of falling bodies. Most of his scientific writings are of a highly mathematical character and based on his own experiments and calculations.

Ibn al-Haytham was a genuine scientist who made new discoveries in the physical universe. His greatest contribution was in the field of optics, for which he is called the "father of optics". All the current ideas about light, optics and ophthalmology are founded upon his observations and findings. According to the hi