



REVIEW OF PHYSICAL PRINCIPLES IN THE WORKS OF IBN SINO



Docent K.M. Muminov, Bukhara State University, Uzbekistan

Many sources have underlined that famous encyclopedic scientist Abu Ali Ibn Sino, known in the East as "Shaykh-ar-Rais", had written more than 450 works in such fields as philosophy, medicine, mathematics, physics, astronomy, chemistry, botany, geology, psychology, literature, music etc. 274 of these works have reached our days. 185 of them, are devoted to philosophy, 40 to medicine, 30 to astronomy, physics, chemistry, botany and 4 to poetics.

Our scientists like Farabi, Beruni, Ibn Sino, A. Hazini, U. Hayyatn, U. Chagmini, Ulughbek, N. Koshi, N. Tusi had greatly contributed to the development of physics. A special attention is given to the works of Ibn Sino in medicine, while a less attention is devoted to his works in physics and astronomy. Ibn Sino had written many works in mechanics, acoustics, heat, light, electricity and magnetism, optics etc. These works have not lost their importance yet.

"Kitob-ash-Shifo" of Ibn Sino consists of 18 headings. Its second part is fully devoted to thoughts about the universe with 13 headings devoted to natural sciences, like physics, chemistry, botany, zoology, geology, astronomy, metrology, mathematics, MUSIC.

Ibn Sino has explained some physical terms as matter, time, movement, objectivity of the universe on a materialist view in his "Donishnoma". Ibn Sino says that matters consist of small particles. His thoughts about movement and time are especially important. He insists that if there is no movement, than there is no time. Besides, speaking on forced and natural movements, Ibn Sino by experiments shows that forced movement is the result of external force, while natural movement is the outcome of nature.

Ibn Sino's "Meyor-ul-ukul" is devoted to mechanics and gives information about simple and complex mechanisms. Structure, making and usage of mechanisms are

considered, various implementations working in relation with about 30 "Golden rules of mechanics" are explained in this book.

Ibn Sino insists that physics is a science about nature. He says that matter and movement are related with each other. The famous dialogue of two great scientists of the East, Beruni and Ibn Sina reveals the fact of them having deeply possessed physical knowledge. According to Ibn Sina, the bases for all knowledge are experiments. Experiments are of great importance in sharing exact terms.

Ibn Sina had explained heat processes in a scientifically right ways. Rejecting the thought that existing heat is a material running out of center, Ibn Sino assumes heat as a thing send by using *araz*. This thought complies with contemporary physical views. In physics part of his "Donishnoma" he criticizes wrong views on seeing at that time and defines the process of seeing by schemes. He also gives his thoughts about light speed and compares it with sound speed. In "Kurozae tabiiyot" and "Konun hikmat" he had explained reasons of collecting light rays by lenses and that small flames can be obtained by using schemes. He had showed the ways images are obtained and can be reversed, small and big images can be shaped.

It is fascinating that Ibn Sino could show the shaping process of images in human eyes by using physical explanations of our days. He had criticized the viewpoint of many scientists, who had been thinking that things could be seen when rays go from one's eyes to a thing in "Physics" book of his "Donishnoma", under the heading "About the usefulness of viewpoints on seeing".

Ibn Sino had showed that sun rays are collected in a particular point after passing through special glasses. He also gives his thoughts about the nature of light in his dialogue with Beruni. Beruni had already explained that light is the flow of particles. Ibn Sino's views about sound waves, musical theory, sound speed are of great importance.

A special place in Ibn Sino's thoughts is given to light dispersion. Beruni and Ibn Sino had named the dispersion: as "Rustam's rainbow" and explained it as a result of a process of water particles passing through Earth atmosphere.

Researching many works of Ibn Sina related to physics and using them in courses of history of physics are among today's most actual issues.