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# WORKS OF THE FAMOUS CENTRAL ASIAN SCIENTIST ABU ALI IBN SINA IN THE FIELD OF PHYSICS

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***Abstract:***

***Introduction.*** *This article examines the scientific and practical work of the sultan of the science of medicine Abu Ali ibn Sina in the field of physics. In the rare masterpieces created by Ibn Sina, his ideas about the structure of mater, the laws of dynamics, natural phenomena, the eye and vision, the historical data in the correspondence of Ibn Sina and Beruni were studied to explain the essence of the content of physics.*

***Research methods.*** *The actual task of physical science is the movement of bodies under the influence of the same force placed on bodies of different masses, their interaction, the laws of inertia, the lifting of heavy loads to the top, the splitting of solid bodies, the expansion and contraction of bodies from heat to cold, the application of the laws of refraction and return in the field of technology and in the field of the manufacturing sector.*

***Results and discussions.*** *In Abu Ali ibn Sina's work" The standard of Minds", schematic images of devices were prepared relating to the mechanics' section of Physical Science for the preparation of simple calculations and the lifting of heavy loads and splitting of rigid bodies by using low-power consumption of complex instruments made with the help of connecting them.*

*It is necessary to remember the correspondence of Beruni with Ibn Sina and the answers to the question, the anatomy of the eyes in the works "Donishnoma" and "The law of Medicine", as well as the ability to see, the structure of matter, the views of teacher Aristotle and Ar-Razi on the division of atoms, and not to understand it endlessly, on the contrary, the idea that the atom could split and that there was a definite boundary was expressed by Ibn Sina. The reasons for the expansion and contraction of bodies from heat to cold, and why the weather varies in different climates of the earth, are due to the fact that the shape of the earth is round, that is, due to the vertical or horizontal inclination of sunlight. It has been shown that they are based on scientific observations to understand physical processes such as*

*lightning, flash, thunderbolt, the laws of refraction and return of light, as well as the dispersion of light.*

*The United Nations Department for the development of the history of Science and culture of the world nations has celebrated the 1000-year anniversary of the birth of Abu Ali ibn Sina by UNESCO. In order to perpetuate the name of Abu Ali ibn Sina, a luxurious palace of culture built in Bukhara was named after the scholar. At the same time, there are also reports that schools, libraries, and many streets are named after Ibn Sina.*

***Conclusion.*** *This article states that Ibn Sina's contribution to science and culture is an undeniable fact, that he has encyclopedic knowledge, and that he has made great discoveries in various fields. It was mentioned that the great legacy of Abu Ali ibn Sina played a decisive role in the development of world civilization.*

***Keywords:*** *physics, mathematics, astronomy, theology, mechanics, power, block, axis, lever, man, twisted axis, atom, molecule, light, vision, heat exchange, lightning, thunderstorm, flash, dispersion.*

**Introduction.** Ibn Sina is an encyclopedic scientist - naturalist, medical worker, astronomer, mathematician, musicologist, writer and poet. He was also known as Avicenna. Ibn Sina's first teacher in the field of science was Abu Abdullah al-Natyly.

Ibn Sina received all the necessary knowledge in Bukhara. The scientist's scientific career began at the age of 18.

The term for Ibn Sina's work, “Madadi Sina”, has been adapted into European languages and used as a term for “Медицина” - medicine. The famous eighteenth-century naturalist Carl Linkey praised ibn Sina services in botany and named one of the rare evergreen plants after him. Ibn Sina wrote more than 400 works, 240 of which have survived. At the Institute of Oriental Studies named after Abu Rayhon Beruni more than 50 works of the scientist and a number of reviews written on them are stored. Among these works is the five-volume "Al Kanun fit tib" ("Laws of Medical Science"), which is the crown of the scientist's work. This work raised the level of medical science to a very high level in its time, and was widely recognized in Western Europe a hundred years after the death of Ibn Sina. In the XII century, the “The Canons of Medicine” was translated into Latin, and began to spread hand in hand. This work was published in a Latin translation in Venice in 1493 year and was published 16 times in a hundred years. Medicine has been taught on the basis of this work for 500 years in all famous educational institutions of Asia and Europe. These invaluable medical laws have not lost their scientific significance even today[1].

Ibn Sina, the owner of the great talent, overcame all the difficulties and obstacles encountered in creating news in the field of Science and left a rich scientific heritage for future generations. He filled the treasure of Science with priceless jewels.

Ibn Sina was interested in astronomy from a young age and this interest lasted until the end of his life. He has written eight independent pamphlets, as well as separate chapters on astronomy in the mathematical sections of the “Kitob ash-shifo” and the “Donishnoma”. He reworked Ptolemy's Almagest and based it on practical astronomy. Ibn Sina determined the geographical length of the city of Jurjan by observing the highest point of the Moon, a method completely new to his time. In “Geodesy”, Beruni speaks of the correctness of this method and associates it only with the name of Ibn Sina. This method was rediscovered in Europe 500 years later (1514) by astronomer Werner.

**Methods.** Ibn Sina, known to the world as the sultan of medical science, also possessed encyclopedic knowledge and created very valuable works on natural sciences. He was one of the first to advance his book of “Donishnoma” in the section “Physics” the idea that matter is made up of tiny particles, that is, atoms.

Ibn Sina, who was very hard-working, enthusiastic and very talented, wrote many works. The “Donishnoma” describes philosophy, physics and mathematics. Ibn Sina divided the theoretical part of science into three parts, such as theology, mathematics and physics. In this case, theology is interpreted as a science about everything outside of nature [2].

Ibn Sina writes about the science of nature - physics: "The essence of this science consists of tangible bodies, because it is in motion and change, it is limited and consists of parts."

Physics, writes Ibn Sina, is the science that studies such cases, and imagining them is inseparable from matter.

Thus, Ibn Sina explains the essence of the science of physics, that the topics of their study are related to matter and motion.

He developed mechanical devices to solve a number of practical problems and described in detail how to use them. These guidelines and rules are a great help in making various mechanical devices to meet people's living needs.

Ibn Sina's book “Physics” focuses on the laws of dynamics [3]. If we look at the following review in the pamphlet: Take two balls, if the size of these ball is different, - -($m_1$ and $m_2$) when the cause is the same, their consequences will be different (Fig. 1). The larger the first ball, the smaller the result compared to the second, and vice versa, the smaller the first ball, the bigger the result. Ibn Sina refers to power as the cause, and to consequence as speed or acceleration. The above words of Ibn Sina can be summarized as follows. When the power does not change, the speed or acceleration is inversely proportional to the mass. Ibn Sina's description is as follows:

Ibn Sina's “The Standard of the Minds” is one of the oldest works written by Central Asian scientists in the field of mechanics. At the same time, this work is of great practical importance. This work describes the rules of lifting heavy loads with

low power, breaking down solids with the help of simple mechanisms and more complex mechanisms - tools, created by connecting them to each other [4].

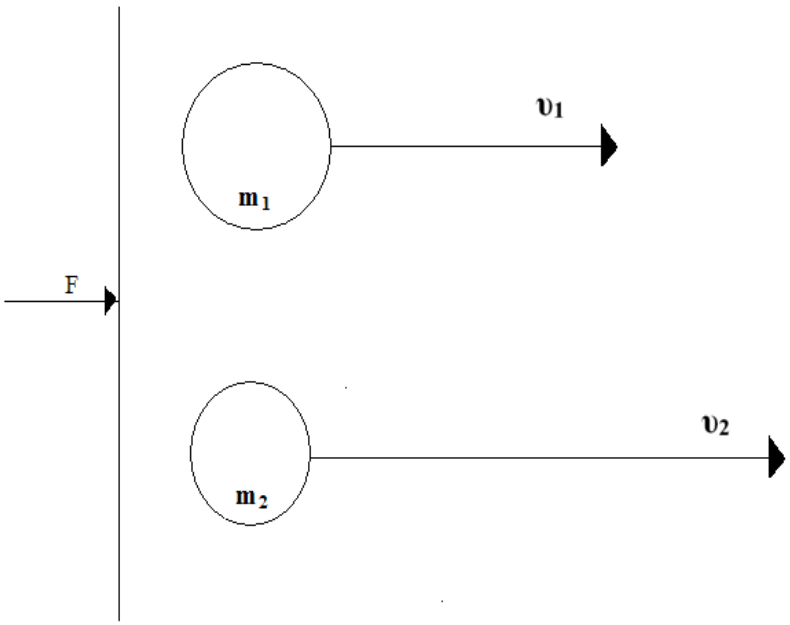


**Figure 1. The acceleration relations that they obtain when they act on objects of different masses with the same power**

It should be noted that the first work written in the field of mechanics and reaching us is the famous Greek philosopher Aristotle's "Problems of Mechanics." It describes the rules of the three oldest simple mechanisms, the lever, the cotter, and the block.

The famous Greek scientist Archimedes (287-212 BC) was very active in the field of simple mechanisms. But many of Archimedes' works in this field have not survived. The first-century Greek scientist and Alexandrian engineer Heron wrote a book called “Mechanics”, in which he described five simple mechanisms: a lever, a cotter, a block, an axis, and a screw. An Arabic translation of Heron's “Mechanics” by al-Baalbakki (died 912) has survived.

“The Standard of the Minds” consists of five chapters, the summary of which is as follows.

The first chapter deals with the names of simple instruments used in mechanics.

It is said that there are five types of mechanical tools used for lifting heavy loads, splitting solids, leveling bodies, and other purposes with little effort; these include axiss, lever, block (reel), screws, and cotter.

The second chapter deals with the use of mechanical tools.

**Results. 1. About the axis.** The two ends of the Axis are cylindrical, the middle of which is in the form of a parallelepiped (Figure 2).

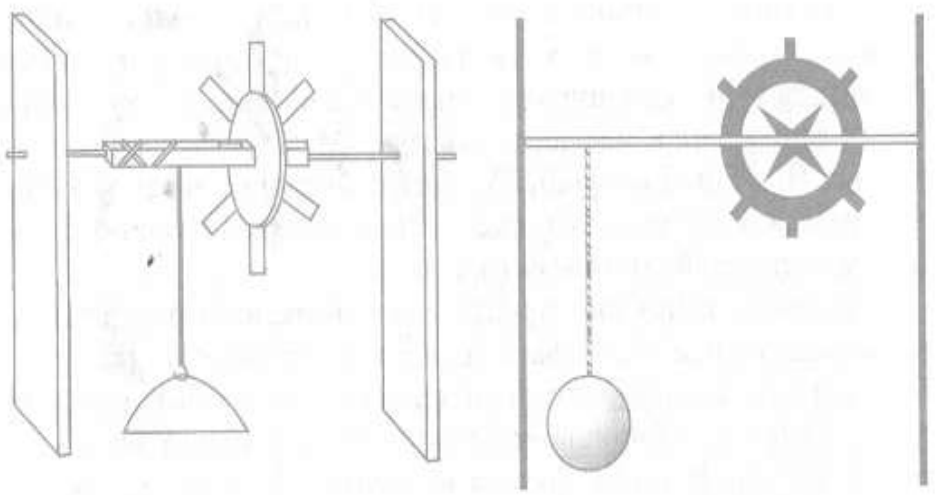

**Figure 2. The reel and its scheme**

The axis is made of iron or wood. A wheel is mounted on one side of the axis, and handles are mounted around the wheel (Figure 3). The axis passes through the center of the wheel and through the holes in the top of the two columns perpendicular to the plane. If you want to use this tool to lift a load of a certain weight with a certain power, then the tool should be made in such a way that the ratio of the diameter of the axis to the diameter of the wheel, like the ratio of the impact force to the weight of the force.

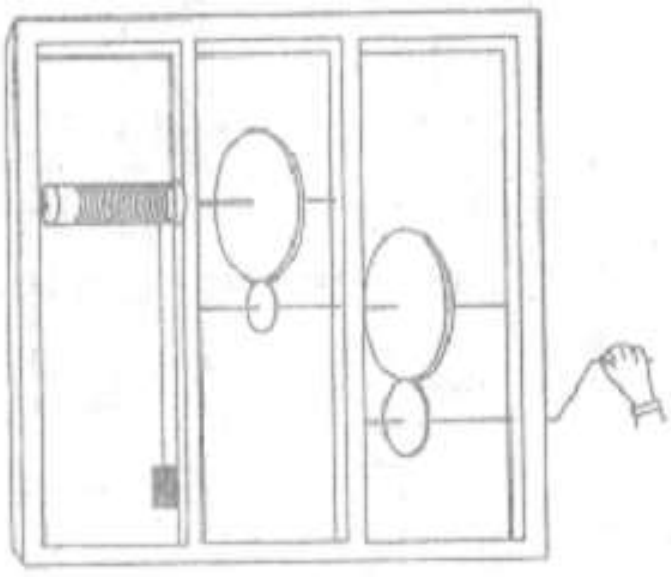

**Figure 3. A device designed to lift a load using gear transmission**

For example, if a load of 10 man (about 4 kg per man) is to be lifted by a man with a force of one man, then the axis must be made so that two cylinders and a middle let it be in the form of a parallelepiped. On one side of it you need to install a wheel with a diameter 10 times larger than the diameter of the axis. The handles are

mounted around the wheel. Then an axis is mounted on two columns perpendicular to the plane and with holes at the top. The other end of the rope is tied to the middle of the axis by tying the lifting load to the rope. Now the handle on the wheel attracts the series towards itself. The wheel spins, the rope wraps around the axis, and the load rises.

**2. About the block.** The block is circular or wheel-like, and the wheel circle is the axis of each engraved wheel (Figure 4).

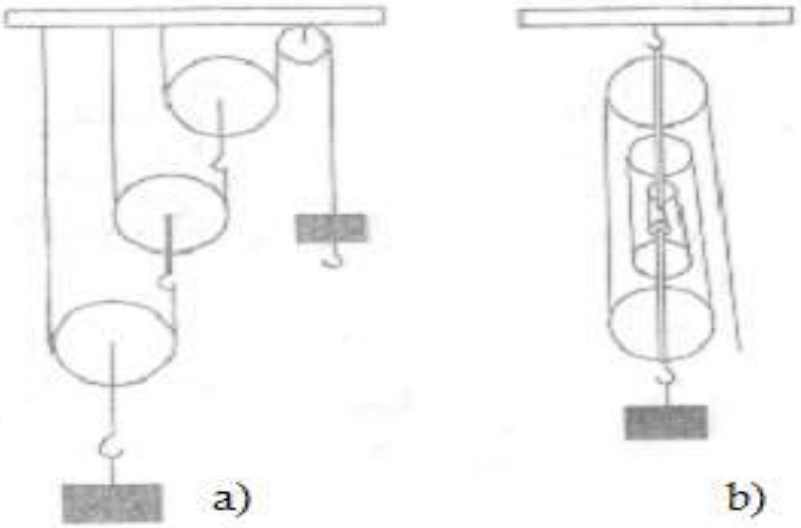


**Figure 4. Different ways of using blocks. a) a device consisting of one fixed block and three movable blocks; b) a system of three blocks mounted on a fixed axis, i.e., three movable and three stationary blocks**

Some of the blocks are fastened upwards and some are attached to the load. A rope is then passed through the grooves of the blocks, one end of which is tied to the load, and the other end is pulled towards the handler, and the load is lifted upwards[3].

To lift the load using this tool, the ratio of the load weight to the number of blocks must be the same as the ratio of the impact force to the number of blocks, i.e. the ratio of the impact force to the load weight. The ratio should be like 1: 2, 1: 4, 1: 3.

For example, if you want to lift a load of 10 man with a force of 2.5 man, then you put two equal wooden poles on the ground and fasten the beam horizontally on top of them. Then take four blocks, two of which are fastened to the horizontal log, and the other two are attached to the load. The rope is taken and one end of it is passed through a series of blocks. After passing through the last block and pulling the end of the falling rope with a force of 2.5 man, the load rises. The larger the number of blocks, the easier it is to lift the load.

**3. About Lever.** This tool is popular among the people. The lever is made of a solid body and consists of a rod divided into long and mutually equal parts (for example, 3, 4, 5, etc.) (Fig. 5).

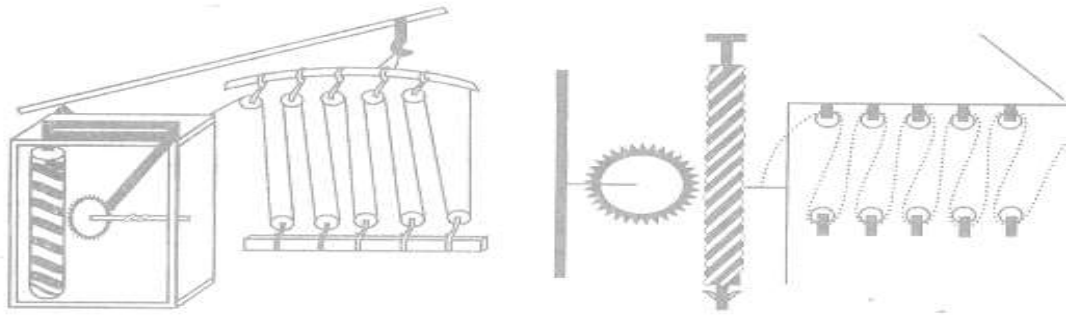

**Figure 5. Method of connection of complex device consisting of lever, polystplast and gear wheel and schematic view of the device**

If a heavy load is to be lifted, another solid object is placed under the lever. This body is placed close to one end of the lever, at which point the load can be easily lifted when the other end of the lever is pressed.

If you want to lift a load of a certain weight with this tool, then the following proportions must be: the ratio of the distance from the point of impact to the point of base to the point of impact shall be equal to the ratio of the weight of the load to the acting force.


**Figure 6. Lever**

For example, using such a tool to lift a load of 5 man with the force of one man, take the rod AB (Fig. 6) and divide it into 6 equal parts. Place the point B under the given load and divide the section BD by one. We put a solid under point D. At that time, when a force is applied to the point A, the load K rises.

**4. The twist-off screw (axis).** The twist is made of axis wood (Fig. 7). Its points are cylindrical and the middle is threaded, like a threaded spring. A rotating wheel is installed at the threaded location of the screw. The handle is mounted on the screw parallel to the plane. The screw itself should be perpendicular to the plane.

If we want to raise the body of the given weight with the help of this tool to the top with a certain force effect, then when making it at that time, the following rule should be followed.

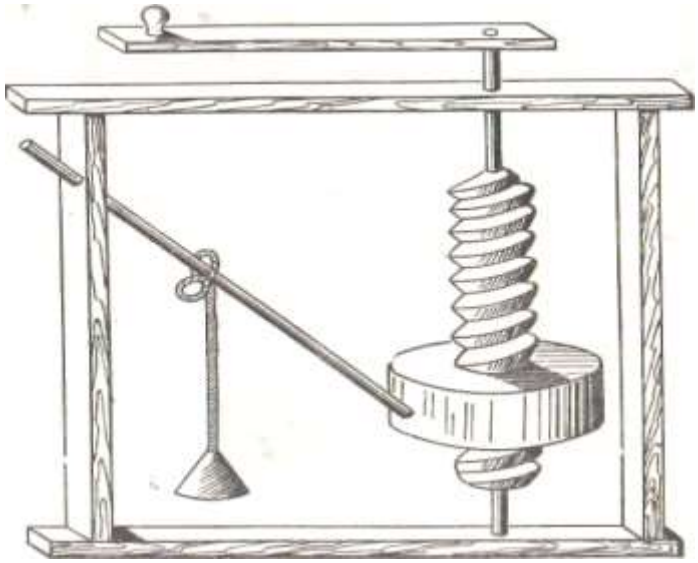

**Figure 7. The appearance of twist-off screw (axis)device**

The ratio of the length of the handle circumference to the length of the screw must be the same as the ratio of the lifting load to the acting force. For example, if you want to use this tool to lift a load of 10 man with a force of 2 man, the length of the circle on the handle should be five times the diameter of the screw. We attach the given load K to the rope and M to the beam. If we rotate the AB handle by a force of 2 man, the load K rises.

In Chapter Three, it is written about how to move instruments with the effect of force, that is, how to knit these instruments in such dimensions as the axis, the blocks and the lever to move.

The fourth chapter describes how to make mechanisms by connecting simple tools together. For example, it's about connecting an axis and a block, and finally connecting four simple tools.

The fifth chapter is devoted to some explanations of the introduction, in which it is written what to follow in order for the above-mentioned instruments to be strong and rigid. [3]

His works, “Physics” and “Mechanics”, played an important role in the development of physics. Ibn Sina's correspondence with Beruni and the chapter on the "anatomy of the eye" in “The Canons of Medicine”, as well as his views on phenomena such as lightning, thunder, and thunderstorm, his descriptions of physics, types of motion, and their relativity, force, inertia, connection between them, rotational motion, centripetal and centrifugal forces, linear velocity, atmospheric pressure, space, convection, nature of heat and their types of transmission, speed of

sound and light, the fact that the eye is an optical system, , the lens and its types, his response on such topics as atomic structure has not lost its strength even now.

Also, the atomistic theory of Democritus and Aristotle was further developed in the works of the great thinkers Ar-Razi, Beruni and Ibn Sina. In one of his questions to Ibn Sina, Beruni said: “Some philosophers have said that the atom does not split and there are no smaller particles. This is ignorance. The second group of philosophers argues that the atom can split and that there is no limit to division. That is extreme ignorance. Because if the fission of an atom is infinite, matter can disappear. It cannot be, because matter is eternal. What do you think about this?” [9]

In his reply to Beruni, Ibn Sina mentions the views of Aristotle and Ar-Razi on the division of the atom, noting that it should not be understood as infinite, but that the atom can be divided and that there is a definite limit. In one of his objections to the young scholar Ibn Sina, Beruni criticized him (Inb Sina) for repeating the ideas of Aristotle and Ar-Razi, urging him to think independently, and asked: “Suppose the atom is divided into two parts. There is a gap between these particles, and these particles are in constant motion, and there are forces between them. It would be better to think about how many times the size of these fractions is larger or smaller than the space between them,” he said.

The notion that bodies expand from heat and shrink from cold has been known since ancient times [5]. However, the peculiarity of water in that it expands from heat and shrinks from cold, and its causes date back much later to Beruni and Ibn Sina. Beruni observes that water expands without shrinking as a result of freezing, and asked Ibn Sina the following question in order to find out his opinion on the matter: "If a body expands due to heat and shrinks due to cold, and the fracture of other containers is due to the expansion of what is inside it, why does a container with frozen water crack and break?"

Ibn Sina answers Beruni's question as follows: “If the body expands behind the heat and requires more space, but breaks the jar: when a similar body cools down and takes up a smaller space, a void appears in the container, and as a result. The cold may have broken the container. There are many changes in nature, and there are many examples. They are responsible for many of the events that take place. But what we have said is enough to answer the question”. Beruni was not satisfied with Ibn Sina's answer and asked Ibn Sina the following question to prove his point: "Why is ice on the surface of the water, when the ice was closer to the nature of the Earth because it froze due to the cold?"

Ibn Sina answers Beruni's question: "When water freezes, air particles are trapped in the water, preventing the ice from sinking to the bottom." In these answers, Ibn Sina draws on the teachings of Aristotle. Beruni objected to Ibn Sina's answer: "If the jug had been broken inwards, then what had been said would have been correct.

But it is clear that the truth contradicts this. I watched the container break outwards. This shows that the size of the container is not the same as inside," he said.

Beruni explains on a scientific basis that the presence of ice on the surface of the ice decreases with increasing volume as the water freezes, and therefore the ice is on the surface because it is lighter than the weight of the water equal to its volume. Beruni measures the density of water in 5 different states experimentally. Its calculation: spring water-1; boiling water-0.959; melting water-0.965; seawater-1.144. These remarkable scientific researches of Beruni were re-proved 699 years later in the experiments of the famous Italian scientist G. Galileo.

Beruni and Ibn Sina explain that the reason for the difference in weather in different climates of the Earth is due to the roundness of the Earth's shape, i.e., the vertical or horizontal inclination of sunlight due to its spherical shape. In addition, Beruni, Ibn Sina and Umar Chaghminy explain that due to the decrease in temperature at different heights of the atmosphere (maslan: mountain hills), the water vapor in the atmosphere is transformed into rain, snow, hail due to the cold, as well as due to various variations in temperature.

In his book "Physics", Ibn Sina states that water vapor rising from the ground turns into clouds due to the cold, and thickens (condenses) on the mountain tops. He explains that the formation of snow, rain and hail depends on the high and low temperatures. Ibn Sina mentions that hail is more common in spring and autumn [10].

Umar Chaghminy's (XII-XIII) conclusions about the weather are very similar to those of Beruni and Ibn Sina. In his book "Mulohasfai Hayatil Basita", Chaghmini writes: "The air surrounds the earth. When the air is heated by sunlight, vapors are formed in it. The heat causes the water vapor on the ground to rise, forming clouds. Depending on the degree of coldness of the weather, or rain, or snow, or hail falls to the ground, "he said.

According to Ibn Sina, there are natural and artificial sources of heat and cold in nature. According to him, there are three external causes of heat: first, the proximity of heat heats a cold body. For example, grass heats water. The second is movement and friction. For example: if you shake the water, it heats up, if you rub the stone on the stone, it heats up, and a fire comes out. While thinking about the transfer of heat due to motion and friction and the conversion of mechanical energy into heat energy, on the next page of this book he states that if air did not have heat, it would not rise, which is an explanation of the convection phenomenon. As the third external source of heat, it is thought of the distribution of heat by the way of irradiation. Ibn Sina also mentions that the rays passing through a magnifying glass gather at the point of reflection and burn. This feature is also found in the works of Abdurahman Khazin much later.

According to Ibn Sina, no form can produce sound on its own. The sound can be heard through the ear. When two objects touch each other, the air moves and vibrates to produce sound. Sound waves travel very fast[6].

Vibrations of air propagate rapidly as they pass through bodies. Ibn Sina admits that when they (the vibrations of the air) reach the ears, the hearing affects the sides of the cause.

In a letter to Ibn Sina, Beruni wrote: “When a white, round, clear bottle is filled with clear water, it burns like a round stone. If the bottle is emptied of water and filled with air, it will not burn and will not collect sunlight. Why did this happen? So how do you get the power to burn water and the power to collect sunlight?”

Ibn Sina answered this question as follows: “Of course, water is a thick, relatively heavy, dense, clear body. Anything of this quality reflects light. Therefore, a round bottle filled with water reflects light. The accumulation of light creates a burning energy. But it is not strongly reflected in the air. Because the air is relatively delicate and sparse. Therefore, if that round glass is filled with air, there will be no strong reflection in the glass.” In fact, when light passes from a low-density medium to a high-density medium, or vice versa, when it passes from a high-density medium to a low-density medium, it changes its direction. 'changes. In physics, this phenomenon is called the refraction of light.

When parallel rays pass through a convex lens, these rays are concentrated at one point and have the power to burn. This point is called the focal point of the lens. If we compare the above-mentioned views of Beruni and Ibn Sina with the laws of modern physics, we can be sure that our ancestors were absolutely right in this matter as well.

Beruni asks Ibn Sina the following question to find out his opinion on seeing and the reasons for seeing: “Perception through the light of the eye - what is vision, why is an object under clear water visible, when the clarity of the light of the eye is reflected from clear objects? Why is the water smooth and shiny?”

Ibn Sina answered Beruni's question as follows: “According to Aristotle, sight is not a loss of clarity. Seeing is the loss of clarity, says Plato. When the words of Aristotle and Plato come together, there is no difference between the two ideas. Of course, Plato made this point as absolute and general as it is a program for many. Master Abu Nasr al-Farabi explained in his book that there is no difference between the two words, and the suggestion that the opinions of the two leaders (i.e., Aristotle and Plato) should unite. But according to Aristotle, seeing with the light of the eye is the effect of the natural moisture inside the eye. It is a thin, clear layer of moisture in the eye, which can transform into all colors and receive colors. It is appropriate to transfer colors by meeting the object that transmits the type of color. Natural skin moves from one type of moisture to another with a subtle sheen and is affected by

color. When this moisture passes from one type to another, it is used as a means of not feeling the incoming energy.

This moisture perceives the work that is created in it. That's the decent thing to do, and it should end there. This is stated in the second article of the philosopher's “Kitab al-Nafs” and in the commentaries on this book.

It is clear from the answer that Ibn Sina, although he considered Plato's statement about the causes of vision, that is, "Vision is the exit from the eye (light)" in a general way, but even more so by commenting on Aristotle's idea and leaning on his thoughts.

Ibn Sina clarified this issue in his major works, “Physics” and “The Canons of Medicine”: If light comes out of our eyes and illuminates things, and as a result we see things, why do we not see them at night?” he rejects Plato's view. It is characteristic of this thing that even Galileo developed Plato's view, he explains: “When you look at the moon, you see the reflection of the rays radiating from you in the mirror, and when the rays from such a mirror fall on the objects, we see them.”

Ibn Sina explains that the main causes of vision, on the contrary, are the result of light coming from objects falling on our eyes and refracting them through the cornea, and then appearing as an image on the retina of the eye [7].

Ibn Sina devotes one chapter of the third part of his book, “The Canons of Medicine”, to the anatomy of the eye. In this section, he covers many issues, such as the structure of the eye, the causes of vision, vision with two eyes, and the ability to distinguish colors.

In Ibn Sina's book “Physics”, he attributes the shrinking of distant objects to the shrinking of the viewing angle, and even cites manual evidence. The work also explains the phenomenon of dispersion and the cause of the irradiation around the Moon on a scientific basis. According to him, the cause of the dipersion (rainbow) phenomenon is the separation of light rays from the Sun into colored rays as they pass through the clouds in the atmosphere. The reason it is arc-shaped is because of the spherical nature of the Earth's atmosphere.

The formation of a beam around the Moon in the field of view due to the fact that the rays coming from the Moon fall on the cloud particles in the Earth's atmosphere and return from it as if from a mirror, and the illuminated source (Moon) is about the same distance occurs from the Earth's atmosphere. This means that Ibn Sina narrates both issues on the basis of his own scientific observations and not on the basis of various myths.

Ibn Sina writes in his book, “A Treatise on the Stars”, in response to Amir Sultan Muazzam Ghiyasiddin's questions about the appearance of the stars at night and the absence of the day. The pamphlet consists of three parts, in which the night is

visible and the day is not visible because the observer emphasizes the strong or weak lighting of the position.

Ibn Sina, in his book “Physics”, describes the appearance of lightning and the causes of thunderstorms as the result of the clouds in the atmosphere colliding with each other as a result of strong winds. This is a reminder that lightning can strike when the collision is strong. He also writes that lightning is seen before and thunder is heard after, due to differences in the speed of light and sound in the air. They say that the ratio of velocities is inversely proportional to the propagation times [8].

Ibn Sina's treatise, “The Explanation of the Causes of Thunder”, provides important information on this subject. The booklet consists of six parts, which explain the causes of lightning and thunderstorms in more detail. The first section describes seven causes of thunderstorms:

1. When two clouds collide, one hits the other and a sound is produced as a result of strong resistance.

2. A sound is made when a wind blows into a cloud.

3. When fire (lightning) strikes a cloud, it crosses it. This happens when you put a hot iron in water.

4. The wind is blocked by icy (cold) clouds when it hits hard. It's almost like we're hitting a piece of paper and making a loud noise.

5. When a light (weak) wind enters an empty (rare) cloud, it is as if the reed is moved by the wind, from which we hear a sound.

6. A loud sound is also produced when a light (weak) wind enters a loose (sparse) cloud a lot and the cloud is scattered.

7. When solid clouds rub against each other, a hard sound is produced from it, just as the winds rub against each other.

The second part of the pamphlet is called “The Lightning Causes”. In this section, he explains four reasons for lightning.

The third section is called "Description of the causes of lightning without lightning." In this section of the treatise, Ibn Sina explains the three causes of lightning and thunder.

The fourth chapter is called “The Statement of Lightning Without Thunder”. This section explains why the sound of lightning, that is, thunder, cannot be heard.

The fifth chapter is devoted to the "Explanation of the causes of lightning before thunder." According to Ibn Sina, in fact, lightning and thunder are formed at the same time. But before we hear the sound of thunder, we see lightning faster. It's like the sound of someone in the distance making firewood. As you know, sound is actually produced by percussion.

The sixth section is entitled "Description of the causes of lightning." In this last chapter of the treatise, Ibn Sina describes the causes of lightning striking the earth

and objects on the ground. It was only in the seventeenth and nineteenth centuries that it was proved that the main causes of lightning and thunderstorms were due to amber events in the atmosphere, that is, that they were indeed caused by wind friction of clouds in the atmosphere.

The following question addressed by Beruni to Ibn Sina discusses the nature of light. "If the heat (light) comes from the center, then why does it come to us from the sun? Is it light or hypotheses? The scholar raises two important issues with this question. First, in contrast to the geocentric teachings of Beruni, Aristotle, Ptolemy, and their followers that the Earth is at the center of the universe, the whole universe revolves around the Earth, light propagates from the center, referring to the heliocentric theory on the other hand, he wants to know Ibn Sina's views on the nature of light.

Ibn Sina confirms Aristotle's view of sunlight by rejecting the dissipation of heat from the center.

**Conclusion.** The United Nations Educational, Scientific and Cultural Organization (UNESCO) has decided to celebrate the 1000th anniversary of the birth of Abu Ali Ibn Sino, a world-renowned encyclopedist, in 1980 by the decision of the twentieth session of the General Conference of UNESCO in Paris in 1978. In the autumn of 1980, the world community celebrated the 1000th anniversary of the scientist as a celebration of science and culture, a holiday to strengthen friendship between scientists of different nationalities.

In our country, this anniversary was celebrated with great solemnity on September 17-26, 1980[9].

Also, in Bukhara region since 1978, the celebration of the anniversary began with great preparation.

The Republic raised the issue of reconstruction of the village of Afshona, where the great scientist was born (Ibn Sino village, Peshku district, Bukhara region). Modern housing, schools, kindergartens, museums, libraries and more have been built. Today, the new Afshana, which is steeped in oriental architecture, is showing its beauty. Today, Afshana, which has become a beautiful town, is like a luxurious and beautiful palace built in memory of our great compatriot Ibn Sina.

Today, the descendants of Ibn Sina live in 126 houses with beautiful and modern furniture, a 320-seat high school, a 130-seat kindergarten, where children are educated and brought up, as well as the Ibn Sina Memorial Museum, library and 400-seat palace of culture, a service house, a hospital, a teahouse and other domestic and cultural buildings were built, all of which were beautifully decorated with oriental-style patterns.

In the middle of these magnificent buildings stands a six-meter-high bronze statue of the great scientist. Everyone who comes to this statue looks with affection

and pride at a scientist who has dedicated his life only to the cause of science and the health of the people.

On September 17-26, 1980, the celebrations of the 1000th anniversary of our great compatriot Ibn Sina were held, and these celebrations became a celebration of true friendship of peoples. A solemn meeting dedicated to the 1000th anniversary of the birth of the famous scientist Ibn Sina was held in Moscow on September 17. It was attended by scientists from all regions of the country, members of the public and more than 120 scientists from abroad. The Vice-President of the Russian Academy of Sciences P.M. Fedoseev spoke about "the great encyclopedic scientist Abu Ali ibn Sina and his role in the development of science." Scholars gathered at the conference spoke about Ibn Sina's very rich and meaningful work.

On September 24, the festivities began in ancient Bukhara. The people of Bukhara greeted Russian and foreign scholars who attended the ceremony of our ancestor Ibn Sina with great joy and pride. On the same day, the International Jubilee Conference dedicated to the 1000th anniversary of the birth of Ibn Sina began its work in the Palace of Culture named after Abu Ali ibn Sino in the ancient city of Bukhara.

The conference was opened with congratulatory speech by the Vice-President of the Russian Academy of Sciences P.N. Fedoseev and A.K. Karimov.

Many foreign scientists also took part in this international scientific conference and made presentations on various topics. Among them were guests from Bulgaria, GDR, India, France, England and other countries. They spoke about the translations of the works of the great scholar Ibn Sina in their countries, their great achievements in the study and writing of works in this field. The in-depth reports of foreign scholars were widely discussed.

The Beruni Institute of Oriental Studies of the Academy of Sciences of Uzbekistan has published a collection of articles dedicated to the 1000th anniversary of Abu Ali ibn Sino in Uzbek and Russian languages. Both collections contain articles on the great encyclopedist's great contribution to the social and exact sciences.

The museum of the history of the peoples of Uzbekistan has a rich collection of exhibits on the life and work of Abu Ali ibn Sino.

In order to perpetuate the name of Abu Ali ibn Sina, the luxurious palace of culture built in Bukhara was named after the scholar. At the same time, schools, libraries, and many streets were named after Ibn Sina.

Ibn Sina's contribution to science and culture is an undeniable fact. He had encyclopedic knowledge and made discoveries in various fields. The rich legacy of Abu Ali ibn Sina played an important role in the development of world civilization.

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