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ABU ALI IBN SINA (AVICENNA) — THE GREAT ENCYCLOPEDIC SCHOLAR

To‘rayev Anvar Ismoilovich
Senior Lecturer, Department of Foreign Languages and Social Sciences,
Asia International University

Abstract.
This text highlights the life, scientific activity, and contribution of Abu Ali ibn Sina to the development of world science. It provides information about the scholar’s youth, education, and scientific research in the fields of medicine, philosophy, logic, astronomy, chemistry, and other sciences. In addition, the significance of his famous works, especially Kitab al-Qanun fi al-Tibb (The Canon of Medicine), in the history of medicine is revealed. The text also analyzes Ibn Sina’s philosophical views, scientific thinking, and his influence on Eastern and Western culture.

Keywords: medicine, philosophy, logic, metaphysics, substance, matter, intellect, theory of knowledge, Eastern Renaissance, astronomy, chemistry, geology, botany.

One of the great thinkers who brought the culture of the peoples of Central Asia to the forefront of world civilization during the medieval period was Abu Ali ibn Sina, who became famous in Europe under the name Avicenna.

Ibn Sina (whose full name was Husayn ibn Abdullah) was born in the village of Afshona near Bukhara in the month of Safar, 370 Hijri (980 CE), into the family of a government official. In 986, Ibn Sina’s family moved to Bukhara, and from that time the young Husayn began to receive his primary education and study various sciences. His childhood and youth coincided with the final years of the Samanid dynasty, particularly during the reign of Nuh II ibn Mansur al-Samani (976–997). Due to his talent, strong memory, and sharp intellect, Abu Ali ibn Sina quickly mastered the sciences known in his time. By the age of ten, he had already memorized the entire Qur'an. From the age of thirteen, he began studying elementary mathematics, logic, Islamic jurisprudence, and philosophy. Despite his young age, Ibn Sina thoroughly studied philosophy under the guidance of Abu Abdullah al-Natili and medicine under Hasan ibn Nuh al-Qumri, while gradually practicing medicine himself.

Along with deeply studying the works of earlier Eastern thinkers, he also carefully examined the ancient Greek scientific and philosophical heritage, especially the works of Aristotle, Euclid, Ptolemy, Galen, Hippocrates, Pythagoras, and Porphyry. By the age of sixteen or seventeen, Ibn Sina had already become famous as a skilled physician and scholar. In 999, after Bukhara was conquered by the Karakhanid Khanate, the rule of the Samanid dynasty declined and eventually collapsed. In 1000, Abu Ali ibn Sina left Bukhara and went to Khwarazm, one of the cultural centers of the time. There, he was admitted to the scientific circle at the court of Ali ibn Ma’mun, which functioned as a kind of academy uniting the scholars of his era. Ibn Sina became closely acquainted with prominent scholars such as Al-Biruni, Ibn Miskawayh, Abu Sahl al-Masihi, Abulkhayr Hammār, and Abu Nasr ibn Iraq. However, due to the growing threat and persecution of Mahmud of Ghazni, he was forced to leave Khwarazm and live a wandering life in various cities of Khorasan and Iran. Passing through Abivard, Tus, and Nishapur, Ibn Sina arrived in Jurjan, where he lived at the court of the ruler Qabus ibn Vushmgir as a renowned physician and met his future student Juzjani. Between 1019 and 1021, while serving as a vizier in Hamadan, he fell into conflict with the ruler and was imprisoned for four months. In 1023, he fled to Isfahan and devoted the rest of his life to writing scientific works. His famous works such as Kitab al-Qanun fi al-Tibb (The

Canon of Medicine), Kitab al-Najat, Kitab al-Insaf, as well as his treatises on geometry, astronomy, botany, zoology, logic, and the philosophical story Hayy ibn Yaqzan, were written during his later years. He also engaged in the construction of an observatory in Isfahan. In the final years of his life, due to intensified feudal wars and his own involvement in political affairs, he moved between Isfahan, Ray, and Hamadan. Finally, he died on June 18, 1037, in Isfahan at the age of 57 from a severe intestinal illness [1,34].

The life path of Abu Ali ibn Sina is known from his own autobiography as well as from sources left by his student Ibn Juzjani. The formation of Ibn Sina's scientific interests and worldview was significantly influenced by ancient Eastern culture, Greek science and philosophy, as well as the struggles of the peoples of Central Asia for independence. In his autobiography, Ibn Sina emphasizes that he carefully studied and widely used important treatises of Al-Farabi such as "Metaphysics" and "Fusus al-Hikam". The total number of Ibn Sina's works exceeds 450, but only about 160 have reached us. Many of his treatises were lost due to constant travel from city to city, feudal wars, court unrest, and various disasters. In many sources, Ibn Sina is primarily described as a physician; however, medicine is only one of the most important fields among his many scientific interests. The majority of his works were written in Arabic, the scientific language of the Near and Middle East at that time, while some were written in Persian. His major encyclopedic work, "Kitab al-Shifa" ("The Book of Healing"), consists of 22 volumes, with its four main sections covering logic, physics, mathematics, and metaphysics. Parts of this work were translated into Latin and other European languages, as well as into Eastern languages, including Russian and Uzbek. Another work, "Kitab al-Insaf" ("The Book of Impartial Judgment"), consisting of 20 volumes, has not survived, as it was destroyed in a fire in Isfahan. "Kitab al-Najat" ("The Book of Salvation") is composed of four major parts: logic, physics, mathematics, and metaphysics. "Kitab Lisan al-Arab" ("The Book of the Arabic Language") consists of 10 volumes. His Persian work "Danishnama" ("The Book of Knowledge") also includes four sections—logic, physics, mathematics, and metaphysics—and has been translated into Russian, with parts published in Uzbek as well [2,7].

The works of Abu Ali ibn Sina were translated into Latin, which in the Middle Ages was considered the scientific language of Europe, and through Latin into other European languages. In addition to scientific treatises, Ibn Sina also created philosophical narratives such as "Tayr qissasi" ("The Story of the Bird"), "Salomon and Ibsol", and "Hayy ibn Yaqzan", which express profound philosophical ideas through literary imagery and events.

Ibn Sina was also a talented poet of his time. He is considered one of the founders of the rubai genre in Eastern, particularly Persian, poetry, and his rubaiyat express deep philosophical conclusions. He also wrote Arabic qit'as (short poetic forms). His poetic heritage has been partially published in Russian and Uzbek. Ibn Sina also composed a didactic medical poem called "Urjuza", which explains medical issues in a popular poetic form. His correspondence on Aristotle's (Arastu's) philosophy with Al-Biruni and with his student, the Azerbaijani thinker Bahmanyār, is well known in the history of science. In particular, medicine and related fields such as anatomy, psychology, pharmacology, therapy, surgery, diagnostics, and hygiene were significantly developed and enriched with new discoveries in Ibn Sina's works. In addition, he put forward new ideas in chemistry, mineralogy, astronomy, mathematics, botany, and the study of geological processes. Among his medical works are "Kitab al-Qanun fi al-Tibb" ("The Canon of Medicine"), "Kitab al-Qulanj" ("Treatise on Intestinal Colic"), "Kitab al-Nabz" ("Book on the Pulse"), "Fusul al-Tibbiyya" ("Wisdom Words on Medicine"), "Tadbir al-Manzil" ("The Management of the Home"), "Fil Hindiba" ("On the Chicory Plant"), and "Risala fi Dastur al-Tibb" ("Treatise on Medical Instructions").

His encyclopedic medical work “Kitab al-Qanun fi al-Tibb” consists of five independent major books, each of which systematically and comprehensively covers a specific field of medicine [3,22].

In the first book, Kitab al-Qanun fi al-Tibb, the theoretical foundations of medicine are presented, including its subject, tasks, branches, and methods, as well as the causes and symptoms of diseases, ways of maintaining health, and a concise but remarkably precise overview of human anatomy. It also explains the doctrine of how to preserve health (later called hygiene). This part of the book can be compared to a modern textbook on propedeutics of internal diseases.

The second book of the Canon, devoted to simple medicines, describes the properties of about 800 medicinal substances, along with methods of their preparation and use. Ibn Sina was the first to recommend the use of mercury and its compounds as medicinal agents. He also used wine as a strengthening and wound-cleansing remedy.

The third book deals with diseases of individual organs (including hair and nails) and their treatment methods, and can be regarded as a specialized textbook of pathology. It provides detailed analysis of diseases of the brain, nerves, eyes, ears, nose, throat, abdomen, teeth, heart, liver, and kidneys.

The fourth book of the Canon also addresses general diseases of the human body. It provides information about fevers, tumors, their causes, and surgical conditions such as bone fractures, dislocations, and injuries, along with their methods of treatment. It also discusses poisoning caused by various medicines and the corresponding measures to be taken. In addition, infectious diseases such as smallpox, measles, leprosy, plague, cholera, and others are described.

The fifth book of Kitab al-Qanun fi al-Tibb explains the effects of complex medicines on the human body, as well as methods for their preparation and use. This book is devoted to the science of pharmacology [4,58].

According to him, the main task of medicine is “to preserve human health, and if a disease occurs, to identify the causes that led to it and restore health by eliminating them.” Abu Ali ibn Sina believed that theoretical knowledge and practical experience in medicine must be interconnected and based on each other; otherwise, the science would not develop or achieve its goals. He stated: “Medical science is first divided into two parts — theoretical and practical. The theoretical part expresses the opinions of physicians, while the practical part teaches how treatment and procedures should be carried out. The practical part of medicine is further divided into two sections. The first is the care of healthy bodies, which is called the science of health preservation. The second is the care of diseased bodies, which teaches how to restore health and is called the science of treatment.” Ibn Sina placed great importance on studying diseases through objective and comprehensive observation of environmental conditions. He also advanced the idea that various natural elements in the environment, including air, could transmit diseases through invisible “small organisms” [5,82].

Kitab al-Qanun fi al-Tibb remained the principal medical reference for physicians for about 800 years. During the Middle Ages, it served as the only medical textbook for students not only in the East but also in the universities of Western countries.

In Kitab al-Shifa, Abu Ali ibn Sina provides extensive information on various fields of science, including botany, geology, mineralogy, astronomy, mathematics, and chemistry. His ideas about the formation of mountains, the gradual changes of the Earth’s surface over time, and the causes of earthquakes later had a significant influence on the independent development of geology as a science. He also discussed the idea that certain areas of land were once covered by seas, as evidenced by fossilized remains of marine animals found in solid rock layers. In addition, he

provided information about meteorites and volcanoes. Ibn Sina also made an important contribution to the development of mineralogy. He classified minerals into four groups: (1) stones, (2) fusible substances (metals), (3) sulfurous combustible substances, and (4) salts.

In chemistry, Abu Ali ibn Sina attempted to systematize the knowledge of his time and wrote various works while also conducting experiments. In particular, his ideas in the field of organic chemistry were highly valued by later scholars. He criticized alchemists who attempted to transform base metals into precious metals.

In astronomy, although Ibn Sina did not go beyond geocentric theory proposed by Ptolemy, he sought to identify the internal causal relationships of natural phenomena. He expressed skepticism toward astrology, which linked human life and social events to the movements and positions of celestial bodies. He also worked on creating new astronomical instruments for experimental observation and contributed to botany by studying the natural properties of plants and developing scientific terminology.

Ibn Sina's worldview was strongly influenced by Al-Farabi, and he continued Farabi's ideas in social and philosophical matters. He enriched and systematized progressive philosophical thought with new natural-scientific ideas, elevating it to a new stage. According to Ibn Sina, the task of philosophy is to comprehensively investigate all existing things—their origin, order, interrelations, and transformations—based on the principles of necessity, possibility, actuality, and causality.

He divided existence into two categories: necessary being (wājib al-wujūd) and possible being (mumkin al-wujūd). The necessary being is independent of anything else and represents a single whole, which is the most powerful, wise, and eternal God. All other things exist in a possible form and originate from the necessary being—God. The relationship between necessary and possible existence is one of cause and effect. This process occurs through emanation, similar to the gradual spreading of light from the sun.

Through this process, intellect, soul, and body, along with the celestial spheres, come into existence and become real entities. All of these belong to substance. In addition, there are accidents (attributes) in existence, such as color, shape, smell, and other sensory qualities. A body consists of form and matter (hyle). God is eternal, and so is matter, which is His consequence and the foundation of all concrete bodies. The forms and manifestations of things change, but their material basis does not disappear. Matter exists prior to all things that come into being and does not depend on them. The simplest form of matter consists of four elements: air, fire, water, and earth. Through different combinations of these elements, complex material objects are formed. Although these objects change and take different forms, their material basis—the four elements—remains eternal. According to him, mountains and stones appeared first, then plants, then animals, and finally humans as the highest stage of development. Humans differ from all other living beings through speech, language, intellect, and the ability to think.

Deep understanding of real phenomena and engagement in science are characteristics unique to human beings. In his work "Risolatun fi taqsim al-mawjudot", Abu Ali ibn Sina classifies all existence into structural components, enumerates them one by one, and provides definitions for each. In this treatise, concepts such as necessary being (wājib al-wujūd), possible being (mumkin al-wujūd), substance, accident, matter, form, intellect, element, body, power, perception, mineral, animal, speech, and language are briefly defined as philosophical categories [6,41].

Human knowledge arises through the process of understanding things. Knowledge consists of sensory perception and thinking through concepts. Ibn Sina writes: "Sensation is an effect that does not represent external objects themselves, but what arises in our senses. The senses are like a mirror of material images, and since they reflect the length and width of material forms, humans cannot

perceive objects without a material basis and cannot understand bodies without them."

Human intellect is enriched and developed through the study of various sciences. In this regard, Ibn Sina places special emphasis on the science of logic. The intellect is interpreted as the criterion of all knowledge and practical activity. He writes: "Any knowledge that is not measured by the scale of reason cannot be true, therefore it is not real knowledge." In the medieval philosophy of the Near and Middle East, including Central Asia, the theory of intellect occupied a very important place.

In the works of Abu Ali ibn Sina, special attention is given to examining the structure of science, defining the classification of disciplines, and systematizing them. In this regard, he further developed the classification of sciences initially proposed by Al-Farabi. In Ibn Sina's major philosophical works such as "Kitab al-Shifa", "Kitab al-Najat", and "Danishnama", philosophical knowledge is presented in the order of logic, physics, mathematics, and metaphysics. Among these, logic is interpreted as the method of knowledge and the scientific way of studying existence and reasoning about it.

He writes: "Logic gives a person a rule by which one can avoid errors in reasoning." Through logic, a person distinguishes true knowledge from falsehood and learns unknown things. Ibn Sina paid great attention to the study of logic and devoted special treatises to it. In particular, he made a significant contribution to the study of logical methods, definitions, judgments, inference, and proof, and developed logic after Al-Farabi as a correct method of knowledge.

In addition to logic, he classified all other sciences as studies of natural and social phenomena in his work "Aqsam al-Ulum al-Aqliya" ("Classification of Rational Sciences"), where he systematically listed and defined them. Ibn Sina divided philosophical sciences into two main categories: theoretical and practical sciences.

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