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**ARABIC SCIENTIFIC RESOURCES IN THE IX-XII CENTURIES`
TURKIC NATIONS**

Annatation. In the article, the works of the Turkish scholars who lived between the 9th and 12th centuries as well as main sources of the Turkic-speaking scientific style which would start in the 13th century are analysed. Scientists such as Ibn Wase ibn Turk, Al-Farghani, Al-Khwarezmi, Al-Khatib Al-Baghdadi, Ahmed ibn Al-Hasan Abu Sa'id al-Bardai, Abu Ali Bardai, Abu Hussein Yakub ibn Musa Al-Ardavili, Abu Abdullah Al Hussein ibn Abdul- al-Urmawi, Abu Abdullah Muhammad ibn Bakuwei Bakuvi wrote in Arabic in accordance with the requirements of the period, but historical sources and the comments in their works prove their Turkic identity. In subsequent years, their compatriots interpreted these works in Turkic languages and these works were considered main books of various scientific fields for centuries in the East.

Turkish scholars take significant places in world science. Outstanding scientists such as al-Farabi, al-Biruni, al-Farghani, Nasir al-Din al-Tusi and others were leading representatives of the Middle East scientific school as well as authors of significant works related to mathematics, astronomy, geology, geodesy, medicine and other sciences. Subsequently, these works stimulated the development of the science in Europe and became the main source of the formation of the modern science.

Keywords: Arabic language, scientific style, Al-Biruni, Al-Khwarezmi, Turkic science.

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**АРАБСКИЕ НАУЧНЫЕ ИСТОЧНИКИ ТЮРКСКИХ НАРОДОВ
IX-XII вв.**

Аннотация. В статье анализируются труды тюркских ученых, живших в IX – XII вв., а также основные источники тюркоязычного научного стиля, зародившегося в XIII веке. Такие ученые, как Ибн Васа ибн Тюрк, Аль-Фергани, Аль-Хорезми, Аль-Хатиб Аль-Багдади, Ахмед ибн Аль-Хасан Абу Саид аль-Бардай, Абу Али Бардай, Абу Хусейн Якуб ибн Муса Аль-Ардавили, Абу Абдулла Аль-Хусейн ибн Абдуаль-Урмави, Абу Абдулла Мухаммад ибн Бакувей Бакуви, писали на арабском языке в соответствии с требованиями того периода, но исторические источники и комментарии в их произведениях доказывают их тюркскую принадлежность. В последующие годы их соотечественники интерпретировали эти произведения

на тюркских языках, и эти произведения веками считались главными книгами различных научных областей на Востоке.

Тюркские ученые занимают заметное место в мировой науке. Выдающиеся ученые, такие как аль-Фараби, аль-Бируни, аль-Фергани, Насир ад-Дин аль-Туси и другие, были ведущими представителями ближневосточной научной школы, а также авторами значительных работ, связанных с математикой, астрономией, геологией, геодезией, медициной и другими науками. Впоследствии эти работы стимулировали развитие науки в Европе и стали основным источником формирования современной науки.

Ключевые слова: арабский язык, научный стиль, Аль-Бируни, Аль-Хорезми, тюркская наука.

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IX-XII ҒАСЫРЛАРДАҒЫ ТҮРК ХАЛЫҚТАРЫНЫҢ АРАБ ҒЫЛЫМИ ДЕРЕККӨЗДЕРІ

Аннотация: Мақалада IX – XII ғасырларда өмір сүрген түркі ғалымдарының еңбектері, сондай-ақ 13 ғасырда пайда болған түркі тілдес ғылыми стильдің негізгі деректері талданған. Ибн Васа ибн Түрік, әл-Фергани, әл-Хорезми, әл-Хатиб әл-Багдади, Ахмед Ибн әл-Хасан Абу Саид әл-Бардай, Әбу Әли Бардай, Әбу Хусейн Якуб ибн Мұса әл-Ардавили, Абу Абдуллаһ Әл-Хусейн ибн Абдул-әл-Урмави, Әбу Абдулла Мұхаммед ибн Бакувей Бакуви араб тілінде сол кезеңнің талабына сай жазған, бірақ тарихи дереккөздер мен олардың еңбектеріндегі пікірлер олардың түркіге қатыстылығын дәлелдейді. Кейінгі жылдары олардың отандастары бұл шығармаларды түркі тілдерінде түсіндірді, ал ғасырлар бойы бұл еңбектер Шығыстағы түрлі ғылыми салалардың негізгі кітаптары болып саналды.

Түркі ғалымдары әлемдік ғылымда көрнекті орын алады. Көрнекті ғалымдар: әл-Фараби, әл-Бируни, әл-Фергани, Насыр ад-Дин ат-Туси және басқалар Таяу Шығыс ғылыми мектебінің жетекші өкілдері, сонымен қатар математика, астрономия, геология, геодезияға байланысты маңызды еңбектердің авторлары, медицина және басқа ғылымдар. Кейіннен бұл еңбектер Еуропадағы ғылымның дамуына түрткі болды және қазіргі ғылымның қалыптасуының негізгі қайнар көзі болды.

Тірек сөздер: араб тілі, ғылыми стиль, әл-Бируни, әл-Хорезми, түркі ғылымы.

Scientific style has a long history in Turkic languages. However, Turkic science history is not the same with scientific history written in Turkic languages. Historically, substantial part of scientific-philosophical works related to scientifically and culturally progressing Turkic nations were written in other languages. Particularly, beginning from the period when Islam commenced to enter Turkic society, the biggest part was created in other languages. Turkic scholars were writing in Arabic in order to achieve spreading of their works to larger masses. Because of the lasting dominance of initially Persian, subsequently Arabic, then again Persian languages over long centuries, social-political conditions as well as objective and subjective reasons, the number of ancient written

works in Turkic that we currently have is not so large. Perhaps historically there have been such ancient works created in Turkic languages that they could extend Turkic scientific history to more previous manuscripts. However, this history is currently calculated based on the bi-lingual dictionaries belonging to XIII century. Significant part of the works belonging to the XIII century proves that this process was based on historical traditions and had deep roots. On the other hand, scientific works by Turkic authors which written in Arabic were among significant scientific sources until this period.

In the territories where Islamic religion, which appeared in the early VII century, began to be spread, Arabic gradually became to get religious and political language status as well as scientific one. Definitely, this did not happen because of own features of the language. Arabic, thanks to the massive spreading under the rule of the religion and Arab caliphs' directives to translate scientific knowledge in ancient Greek, Latin and Persian languages got scientific strength. Thus, Arabic, the language of the sacred religion, also became a mean to learn ancient scientific knowledge. Through getting dominance on the languages of territories invaded, Arabic also developed rapidly thanks to these languages. All these facts led to scholars to write in Arabic. This process began in the IX-X centuries and initial scientific works were related to the religion. New religion and understanding of its theses, learning of the Sharia more deeply already became necessity for the society. This was also related to the fact that teaching of the sciences, particularly religious ones was realized in the madrasas under supervision of the mosques. Existence of the sophisticated connoisseurs of the Islamic religion was also in the interest of the Caliphate. There are many Turkic scholars among theologians of that period. Among the Turkic theologian scholars who lived in the X-XI centuries, Makki ibn Ahmad ibn Sadaveyh Bardai, Al Khatib al-Baghdadi, Ahmad ibn al Hussein Abu Said al-Bardai, Abu Ali Bardai, Abu-l Hussein Yaqub ibn Musa al- Ardabili, Abu Abdullah al Hussein ibn Abdullah-al-Urmawi, Abu Abdullah Muhammad ibn Bakuwei Bakuvi, Abu-l Hasan Ali ibn Haskaveyh ibn Ibrahim al-Maraghi, Musa Salmasi, Abu Abdullah Marandi, Jafar ibn Muhammad al- Hurras Abu Muhammad Maraghi can be mentioned (1,pp. 31)

Abu Bakr Muhammad ibn Ali Al-Maraghi was one of the leading linguist scholars of his period. He is author of the scientific works such as «Kitab mukhtasar fi-n-nahv» and «Kitab sharh shahavid Sibaveyh va tassiruhe». Unfortunately, these works do not exist in the present time.

Abu Jafar Muhammad ibn Musa al-Khwarizmi who was born in 780 in Khiva city was a distinguished scholar who conducted significant research in astronomy, geography and mathematics. His research based on Indian numbers, works associated with binary and decimal number systems, invention of zero led to Khwarizmi's contributions to modern mathematical science. He has matchless efforts in the formulation of Algebra by writing «*al-Kitāb al-mukhtaṣar fī ḥisāb al-jabr wal-muqābala*» (The Compendious Book on Calculation by Completion and Balancing), the first independent work about algebra. His book about numbers was translated into Latin as «Algoritmi de numero Indorum» and as a consequence information about decimal number system was learnt in Europe. Al-Khwarizmi's analyses on astronomy encapsulate calendars, calculations on the movement of the planets, preparation of astronomic tables (Zij) and etc. His studies were based on previous Eastern astronomers' scientific knowledge and ancient Greek sources. He did calculations on various attitudes of the Sun, the Moon and planets. In the work titled «Kitab surat al-ard» in which he gave his scientific opinions associated with geography, Al-Khwarizmi also made corrections to Ptolemy's some calculations, prepared various maps and tables by calculating coordinates of the important points.

The map compiled by Al-Khwarizmi was based on more precise coordinates than the one prepared by Ptolemy. In general, Khwarizmi has made corrections to the Ptolemy's calculations dealing with both astronomy and geography. Al-Khwarizmi has calculated more precisely of geographic latitudes and longitudes than Ptolemy while at the same time his calculation on the meridian circle was different from the Ptolemy's one. His writings such as «Kitab-al-amal-bil-asturlabat» and «Kitab-ar-ruhama» involve instructions for the use of astrolabe, description of the special compass to define namaz time, preparation mechanism of sundials.

Al-Khwarizmi's work of «al-Kitāb al-mukhtaṣar fī ḥisāb al-jabr wal-muqābala» was written with the encouragement of Caliph al-Ma'mun and originally was prepared as a work based on practice on solving economic issues in trade. The writing is consisted of three parts: (1) solving of linear and quadratic equations using examples; (2) practical trigonometry and (3) division of legal inheritance. By classifying linear and quadratic equations, Al-Khwarezmi defines six types of the quadratic equations.

$ax^2 + bx + c = 0$ – solving of this example indicates that:

$$ax^2 = bx$$

$$ax^2 = c$$

$$a^2 + bx = c$$

$$ax^2 + c = bx$$

$$bx + c = ax^2$$

In such equations, Al-Khwarezmi was looking for positive root therefore both sides should be with positive denominator. The author indicated two solving method of the canonical form of quadratic equations: al-jabr and al-muqabala. In the method of al-jabr, negatives change their sides and become positives, thus the equation is solved.

Additionally, he introduced the rules for multiplying of multinomials. The first part of the work was about calculation of geometrical figures' areas and volumes. In this regard, examples and practical solving methods were preferred by Al-Khwarezmi. This work was written in 820 and was translated into Latin in 1145.

Al-Khwarizmi's work of «Zij-al-sindhind» is the first work written in Arabic in this field and encapsulated 116 calendars, astronomical and astrological tables as well as 37 chapters. In the «Zij», movements of the Sun, the Moon and five planets have been indicated. In this work, at same time, sine and cosine trigonometric functions have been also given. Currently, the original version of the work does not exist. However, four copies of the translated versions into Latin in the XII century are preserved in Paris, Madrid and Oxford libraries.

Al-Khwarizmi's work of «Kisala fi istikhraj fi tarix al-yahud» is dedicated to Hebrew calendar. In general, Al-Khwarizmi is the author of lots of works in various fields and his writing are preserved in various libraries. He is the founder of the new phase in the field of exact sciences and put forward new scientific concepts and terms.

One of the famous Turkic-Muslim astronomers living in the IX century was Ahmad ibn Muhammad ibn Kathir Al-Farghani. One of the lunar craters has been named after the scientist who is known as Alfraganus in the West.

Al-Farghani, unlike Ptolemy and his successors, completely denies relations of the spiritual objects with astronomy and celestial bodies. By calculating volume and sizes of the cosmos and planets, he considered that celestial bodies were moving in homocentric and eccentric circles. His calculations on the celestial bodies remained the main source using by Western astronomers used until Copernic. For the first time, he gave information about the Sun's orbit and its movement on its axis, calculated the distance between the

parallels and invented the method to define Solar eclipse. He used this method to give information about solar eclipse in 842. His most famous work is called «Elements of the Astronomy». This work was translated into Latin in the XII century, into Hebrew in the XIII century, into again Latin by Jacob Christman in the XVI century, and for the fourth time into Latin by Jacobus Golius in the XVIII century. The work, which is considered that written approximately in 833, seems as a commentary of the Ptolemy's Almagest, however Al-Farghani has exhibited diverse stance in each issue. His work «Usul-al-elm al-nujum» was about stars and recognized as «Al-madkhal fi al-mejisti» and «Al-madkhal ila elm al heyat-al-aflak» and «Kitab-al-fusul-al-selasin». His another book «Al-kamil fi-al usturlab» is about preparation of asterlobe.

Abd al-Hamīd ibn Wase ibn Turk (who lived in the IX century was an eminent mathematician. Ibn al-Nadim mentioned his two records: «*Kitab- al-Jāme' fi'l-ḥesāb*» («Comprehensive book on computation») and «*Kitab al-Mo'āmalāt*» («Book of transactions») (3 pp. 281). In other sources, his books such as «*Nawāder al-ḥesāb wa kawāṣṣ al-a'dād*» («Book of rarities of computation and characteristics of numbers») and «*Kitab al-Jabr wa'l-moqābala*» («Book of algebra») are also mentioned (4, pp. 230).

Aydin Sayili states that ibn Wase was born in the first part of the IX century in Mā warā' an-Nahr (Transoxiana) during period of the Caliph al-Ma'mūn and was known both as al-Jili (because of being from Jili city) and as al-Hasib (because of being mathematician). The author of the works such as «*Kitab- al-Jāme' fi'l-ḥesāb*», «*Kitab al-Mo'āmalāt*» and «*Kitab al-Mesāḥa*» («Book of surveying») Abd al-Hamīd ibn Wase ibn Turk abu Fazl lived in Baghdad (2). His studies were similar to the Al-Khwarizmi's ones, however he wrote «*Kitab al-Jabr wa'l-moqābala*» before Al-Khwarizmi.

One of the prominent scholars living in the IX-X centuries is Sahl-al Balkhi. Being one of the students of Al-Kindi, Abu Zayd Ahmed ibn Sahl Balkhi's only book that exist today is Masalih al-Abdan wa al-Anfus (Sustenance for Body and Soul) which is a medical book. Two copies of his work still exist in the Süleymaniye Library. By defining and treatment of neurological diseases was emphasized by Al-Balkhi who put forward the notions of mental and psychological problems for the first time in the Islamic medical science. Through linking psychophysical and psychosomatic medical issues with «religious health», he has identified the terms such as «al-tibbi ar-ruhani» (covers «spiritual» diseases) and «tibt-al-qalb» (referring to medical issues dealing with the mind). Thus, Al-Balkhi divided psychology and neurology as separate divisions of the medical science and presented various treatment methods. By linking physical illnesses with spiritual illnesses, he stated that this feature should be taken into consideration during treatment period. He created classification of neurotic diseases by differentiating neurosis and psychosis for the first time and presented separate treatment method of each one. Historians and commentators such as Ibn al-Nadim, Abu Hayyan, Tovhid, al-Shahristani have provided information in their works about Al-Balkhi who is author of the works of «*Akhlag-ul-umam*», «*Aksam-u ulum il- falsafa*», «*Aksam-ul-Ulum*», «*Beyan-u Vujuh 'il Hikmet- i fi'l evamir - i va'n -nevahi ish -shariyyeti*», «*Edeb-us sultan va raiyye*», «*El- Esmā va'l -Kuna val- elkab*», «*El-ilm vat-talim*», «*Kitabun fi'l -hilaf*», «*Kitab-us siyaset- is- saghir*», «*Kitab -us -siyaset-il kebir*», «*Nazmul -Kuran*» «*Serai-ul -adyan*», «*Suvar-ul akalim-il- islamiyye*»

Development of science was propagated in the same language however in the various directions in all regions where Turkic nations lived as well as in the eastern and western regions of the Caspian Sea. Particularly, in Azerbaijan territory fiqh (Islamic

jurisprudence.), theology, poetry were the main developing science fields while in Turkestan, Khwarezm significant works in exact and natural sciences appeared. «In the X century, Arabic poetry, science and literature already earned a full citizenship in Azerbaijan. Disappearing of the some aforementioned manuscripts as well as the fact that none of the works exist by Makki ibn Ahmad Bardai who has been an impressing scholar because of the huge number of his works, do not let us to commence a serious discussion regarding with scientific environment of that period in Azerbaijan (1, pp.35).

One of the Turkic scholars who were considered as the most significant representatives of the science in Turkestan in the X-XI centuries was Al-Biruni. Abu Rayhan Muḥammad ibn Aḥmad Al-Biruni was born in 973 in Khwarezm and studied mathematical and astronomical trainings by Ibn-i Irak and Abdussamad ibn Hakim in the Khwarezmians' palace before going to Iran to live. Working jointly with Abul al-Wafa in astronomy, Al-Biruni subsequently began to write works in the field of astronomy under the fiduciary of the Ghaznavids. During scientific activity in Nandana city in India (currently in Pakistan) Al-Biruni learnt Sanskrit language which was helpful for him to get acquaintance with ancient Indian knowledge. He is author of 45 books about astronomy and 20 ones about mathematics as well as works such as «Athâr-ul-Bâkiya», «Niḥayet'il Emakin», «Qanun Al-Masudi» and Patanjali (which translated from Indian to Arabic). Only 27 of his series of works dedicated to medicine, biology, plants, metal products, animals and etc. exist presently. This is because of Al-Biruni's hard writing language which impeded translation into Latin.

Al-Biruni was the first scholar who accepted a radius as a unit of the trigonometry by bringing sine, cosine, secant, cosecant and cotangent in trigonometric calculations to this science field. He also put forward the idea that the Earth rotates around its own axis by calculating meridian line based on horizon line. By dissenting Aristo and Ptolemy's opinions, Al-Biruni's writings set up modern astronomy science a couple of centuries ago than Copernic. He associated the shifting of the lunar phases with various illumination of the Sun depending on the Moon's movement. Additionally, he calculated one degree length of the Earth. In general, 40 out of 80 chapters in his work about India were dedicated to astronomy.

In his work of «Kitabul-jamahir fi marifetil-Javahir», Al-Biruni calculated the sizes of twenty-three solid and six fluid substances which results were similar to the modern measurement units. He was also author a book about healing herbs and medicines that is titled «Kitab'us Saydane». Explanations in the «Saydane» which covers more than one thousand healing herbs, minerals and medicines were based on Al-Biruni's own experiments, his observations during travels and information he heard. Giving of Arabic, Greek, Syriac, Indian, Persian, Khwarezmian, Sogdian and Turkic names of the indicated herbs, minerals and the livings was main difference of this work from its previous analogies. In the work, more than 250 scholars' names were mentioned. The only Arabic version of the work was found in Bursa in 1927 and is still kept there in Kurshunlu Camii. Additionally, the version, which translated into Persian in the first part of the XIII century by Abu-Bakr al-Kasani from Farghana, exists until nowadays.

The work consists of five parts. In the introduction, by giving definitions of the terms as *saydana* and *saydanini*, the author provides information about duties of these sciences and their stance among medical sciences. In the first part, he puts forward that saydane is the Arabized version of the Indian word of chaydanini (çaydanini) and this transformation stemmed from own features of the Arabic language. Al-Biruni, using examples, indicates

that words which beginning with the letter of 'ch (ç)' have moved from Turkic, Persian and Indian languages into Arabic in which they are written and pronounced with the letter of 's'. Reflecting his linguistic abilities, one the targets of Al-Biruni's writing of «Saydane» was showing synonymous of the medicine names as well as collecting all the words together which were given in various works under diverse names. In the second part, by classifying simple and difficult medicines Al-Biruni identified simple ones as aqāqīr. Being the plural version of Arabic-origin word aqqār, aqāqīr is one of the pervasive notions in Islamic medicine. This notion is also known as «adviyayi-mufrada». Simple medicines are the ones prepared based on natural contents and excluding any additional ingredient. On the other hand, «adviyayi-murakkaba» are the medicines, which involve with various ingredients.

The fourth part of the work draws special attention in which Al-Biruni considers himself as outsider to Arabic and Persian languages. He mentions that his native language is Khwarezmian, however he writes in Arabic because of its adequacy for expressing scientific goals. Dividing his work into 29 chapters because of existing 29 letters in Arabic, the author presents Greek herb and medicine names in Arabic however also adds that Arabic do not completely reflect Greek sounds and letters. Generally, herb and medicine names have been commented in 1116 paragraphs in the work. Additionally, it seems that the author has created multilingual explanatory translation dictionary through emphasizing Arabic, Persian, Greek, Indian and Turkic names of herbs. «Out of 4500 terms given in the works, 1600 belongs to Arabic, 1100 to Persian and its dialects, 750 to Greek, 400 to Syriac, 350 to Indian, 15 to Latin, 9 to Turkic languages. Origins of the 280 terms have not been identified» (5 pp. 53). In this work, the author also indicates definitions of the terms such as abaghillis, ab-daru, abakhurus/abajurus, abanus, shajarai-ibrahim (the herb cultivated in Babyl), utrunj, ismid and etc. in different languages and others' works.

Additionally, Al-Biruni imprinted his name to the world science by writing books such as «Kitabut-tahkik ma`lil-hind», «Kitabüt-tefhim fi evaili sibaat-it-tencim», «Tahdid ü nihayeti`l-emakin li-tashih-i mesafetil-mesakin».

Increasing importance of the Arabic in the science and literature in the XI century and Bahmanyār ibn Marzubān, Khatib Al-Tabrizi and other scholars wrote their works in this language. Abu-l Qanaim ibn Hussein al-Mushili al Azerbaijani was very prominent faqih who lived at the same time. His contemporaries such as Abu-Bakr Urmavi, Abu-l Hasan Badil ibn Ali ibn Badil al-Barzandi, Abu Iskhac Shirazi, Abu Omar Osman ibn al-Musadda ibn Ahmad al-Darbandi, Abu-Ruh al faraj al Khuvayyi, Abu-t tayyib Nueym al-Urmawi, Hussein ibn Jafari ibn Salmasi, Abu Hafs Omar ibn Ali ibn Ahmad Zanjani were prominent faqih scientists well-known in the East. M. Mahmudov who conducted research on these pundits mentions that «these ones not only constrained themselves in national levels, but also they learnt and taught knowledge by travelling to the central cultural centres of Muslim scientist of that time. Azerbaijani scientists created significant works in all fields of theology as well as contributed to thriving of mental life» (1, pp.79)

Amin ad-Din at-Tabrizi who lived in the XII century was ibn-Fadla's student besides teaching at Nizamiyye and Nasiriyya madrasas. He was also author of three volume book about fiqh which is titled as «Sumt-al favaid». Abu-l-Fadl Ismayil ibn Ali ibn Ibrahim al-Ganjavi worked as faqih and muhaddis.

Abu-l Fattuh Yahya ibn Habash ibn Amirak who was born in the Suhrawardi city in the suburbs of Zanjan, was one of the preeminent scholars and known as «Sheyh al-Maqtul» and «Sheyh al-Ishraq». Known also as Shahāb ad-Dīn Suhrawardī, the

philosopher was killed by fitva (judgment) given by Aleppo faqihs. He founded Ishraqi school (Illuminationism) and was authors of «Kitab hikmat al-ishraq», «Hayakal al-Nur», At-tahvihat al-lavhiyya val-l arshiyya, «Risala fi itiqad al-hukama», «Kitab al-mashari' wa'l-motarahat», «Alwah-i Imadi». «Kitab al-moqawamat» and «Al-Maarij»

One of the XII century's scholars Ayn-al-Quzāt Mayānejī (Hamadani) was author a number of works regarding with the religion. His risalats (letters) such as «Baghiya al-bahs as mana albas», «Shakava al-Garib» and «Tamhīdāt» (Preludes) were dedicated to philosophy and theology.

One of the Azerbaijani scientists living in the first part of the XII century was Yusif ibn Tahir Khoylu. In his work of «Sharh at-tanhir» he wrote some comments on Abu-l Ala-al Maarri's diwan of «Saqt az-zand»

Shamsaddin Muhammad ibn Ashraf al-Husayni as-Samarkandi who was prominent astronomer and mathematician lived in the XII century in Samarkand conducted research in the field of logic, philosophy, fiqh and exact sciences. He was a follower of the Eastern thinkers and other scholars who lived in the same century. In his work of «Risala fi adab-al-baht», he linked philosophical thoughts of ancient Greek philosophers with the Eastern thinking by applying dialectical judgment and intellectual analysis. Besides creating a star catalogue during 1276-1277, he also prepared an astronomical summary as a commentary to Claudius Ptolemy's work of «Almagest».

In his work of «Eshkali-el-thesis» in which 35 assumptions which given in the first and second parts of Euclid's work of «Elementa», he has approved Euclid's fifth postulate. He also did not accept serious the ones in the East who ignore this postulate. Generally, Sh. Samarkandi cited Ibn al-Haytham, Omar Khayyam, al-Govhari, Nasir al-Din al-Tusi, Asir al-Din al-Abkhari in his works (6; 7). As-Samarkandi's works were reflected in a number of manuscripts, including Qadi-zada al-Rumi's comments. He worked under Nasir al-Din al-Tusi in Maragheh observatory and also was prominent chemist, physician, mechanician, astronomer and mathematician Al-Khazin's student (8).

As accentuated, in the Islamic scientific history, not depending on writing in any of languages, there were a significant number of historical Turkic scholars whose works became main sources for the shaping of scientific language and style in Turkic languages in the following years.

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