



THE INFLUENCE OF WESTERN CULTURE ON THE CENTRAL ASIAN STATES' AND KAZAKHSTAN'S SCIENCE



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Abstract: The relevance of the study is due to the fact that the Central Asia's culture is of great interest for modern sociological science as an object of study of intercultural interaction and as a multifaceted, complex, controversial, and dynamic phenomenon. The topic of the influence of Western culture and philosophy on the science of more Eastern regions, according to the authors, has been rather neglected. The purpose of the paper is to study the influence of Western culture on the Central Asian states and Kazakhstan's science, including philosophical, historical and cultural direction. The comparative approach was used to study materials on the development of Western science and their distribution in the foreign countries' cultures, as well as the analysis of these materials. As a result, a series of statements was deduced that confirms the influence of Western science on Kazakhstan's and Central Asia's countries' science. It was concluded that democratic ideas, educational sentiments and revolutionary movements, in Russia, had a significant impact on Central Asia and Kazakhstan.


Keywords: Intercultural exchange. Philosophical views. Historical studies. Visual arts. Cultural politics.

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Resumo: A relevância do estudo deve-se ao fato de que a cultura da Ásia Central é de grande interesse para a ciência sociológica moderna, enquanto objeto de estudo da interação intercultural, como um fenômeno multifacetado, complexo, controverso e dinâmico. O tópico da influência da cultura e da filosofia ocidentais na ciência das regiões mais orientais, de acordo com os autores, tem sido bastante negligenciado. O objetivo do artigo é estudar a influência da cultura ocidental na ciência dos estados da Ásia Central e do Cazaquistão, incluindo a direção filosófica, histórica e cultural. A abordagem comparativa foi usada para estudar materiais sobre o desenvolvimento da ciência ocidental e sua distribuição nas culturas de países estrangeiros, bem como a análise desses materiais. Como resultado, foi deduzida uma série de afirmações que confirmam a influência da ciência ocidental na ciência do Cazaquistão e dos países da Ásia Central. Concluiu-se que as ideias democráticas, os sentimentos educacionais e os movimentos revolucionários, na Rússia, tiveram um impacto significativo na Ásia Central e no Cazaquistão.

Palavras-chave: Intercâmbio intercultural. Pontos de vista filosóficos. Estudos históricos. Artes visuais. Política cultural.

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INTRODUCTION

Modern sociological science is very interested in studying Central Asian (CA) culture as a complex, multifaceted, contentious and dynamic phenomenon of intercultural interaction. CA is a densely populated and relatively modernized territory, consisting of five states: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Today, the terms "Central Asian" and "Central Asian and Kazakhstan" are used as synonymous. Since at the turn of the 20th-21st centuries, terminological discussions intensified in connection with inconsistencies between the geographical and geopolitical definitions of the region (Gontar *et al.*, 2018). The inclusion of CA's newly independent states in the world politics coincided

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with a qualitatively new stage in the development of civilization – the total globalization of the entire system of political, legal, sociocultural, financial, and economic relations and the emergence of a single information space (Strizoe; Khrapova, 2018; Doszhan, 2023). Notably, these processes could not but affect the nature of sociocultural processes, taking place in the newly formed states, and the attempts to form and implement these states' doctrines of cultural policy.

During their centuries-old history, CA and Kazakhstan have made a significant contribution to the human society's scientific life. The Tajiks' and Uzbeks', Kazakhs' and Kyrgyz's, Turkmens' and Karakalpaks', Uighurs' and Dungans' ancestors, who inhabited CA's and Kazakhstan's lands, were creative people, who produced a great deal of art. According to the historians' and the great scholar Abu Rayhan al-Biruni's testimony, one of CA's most ancient states, ancient Khwarazm, has long been a large cultural center. Two thousand years before Common Era, architecture, sculpture, libraries and fine arts were already well developed there. Even after the Arab invasion, Khwarazm remained a major center of culture in the East (Gontar *et al.*, 2018; Bikenov *et al.*, 2016).

The second cultural center, in CA, was the state of Sogdia. The scholars, describing Iranian king Darius' campaigns, the Greek commander Alexander the Great, noted that the Sogdians were the owners of a wonderful culture. This is evidenced by the magnificent architectural monuments found on the Zeravshan river, the old city Penjakent's site, and stunning paintings found on the walls (Boiko; Kuleshov, 2023). In CA, there were other especially cultural states: Margiana, Parthia and Bactria (Volodin *et al.*, 2018). A large role in the development of science, especially technical education in CA and South Kazakhstan, was played by its geographical position, natural resources and climate conditions. For example, CA was forced to manually irrigate arable land in order for agriculture to flourish. This forced them to build various irrigation structures to irrigate the land. For example, the Great Khwarazm Canal was built in the first century BC. An irrigation system, along the Zeravshan River, was also developed at that time. Very complex irrigation facilities existed in Margiana, Fergana and Taraz.

Agriculture was the backbone of the country's economy. Along with agriculture, gardening, viticulture, rice growing and cotton growing were widely developed. For example, the Chinese have learned to grow grapes and alfalfa from the CA (Kerimkhulle *et al.*, 2022). The cultivation of such crops testifies to their high agrotechnical knowledge. In ancient times, animal husbandry was most developed in CA and Kazakhstan (Link, 2019). Horse breeding was especially prevalent. According to Chinese historians, old Fergana was the saigul horses' habitat. CA's ancient states, such as Khwarazm, Sogdia and Fergana, closely cooperated with China, India, the Middle East, the Caucasus and Eastern Europe, conducted intensive trade activities. CA's and Kazakhstan's location, over the large caravan route, connecting Eastern

Europe, China and India, had a significant impact on the further development of trade (Gokmen, 2019).

Large cities, in CA and South Kazakhstan, began to emerge during the 2nd and 3rd centuries. For example, the city of Samarkand was known back in the Alexander the Great's time by the name "Marakand". And data on the state's capital of Margiana-Merv can be found in books written in the 4th-3rd centuries BC. Urgenish, the old capital of Khwarazm, was also mentioned in Chinese records from the beginning of the 1st century AD. In the 3rd-5th centuries, the city of Bukhara and, in the 6th-8th centuries, Penjakent, Otrar and Taraz were the cultural CA's and Kazakhstan's centers. In CA, manufacturing industry was thriving. Even before the Arab conquest, ores were widely used there. Gold, silver, iron and copper were smelted. The production of mercury began as early as the 4th-2nd centuries BC. CA was also home to ceramics, textiles and jewellery. Western countries familiarized themselves with the Chinese paper technology through CA. In the 8th century, the best paper was made in Samarkand. Then, it was sent to Damascus, Baghdad and other cities (Strizoe; Khrapova, 2018).

CA's peoples' growth of the economy influenced their development. Monumental architectural monuments, found by archaeologists in subsequent years, testify to the outstanding development of architecture in CA and Kazakhstan (Morrison, 2019). The minarets and palaces, burial mounds and fortresses located there demonstrate the masters' unsurpassed architectural art who built them. According to Chinese historians, the fine arts were widely developed in Sogdia, Khwarazm and Penjakent (Boland, 2020). This can be clearly seen in the drawings on the walls of houses found on sites of ancient towns, such as Varakhsha and Penjakent, excavated by Soviet archaeologists. The mentioned historical monuments prove that the local population had their own art of painting. This art tried to realistically depict life. For example, the depiction of people's lives, animals and plant ornaments, as realistic and colourful as life itself (Novozhenov, 2023). Ancient historians have repeatedly noted CA's and Kazakhstan's peoples' high musical culture and their virtuosity in creating musical instruments. CA's people's art became widespread, despite the Arab invaders' conquests (Kasenova, 2020; Nurzhanov *et al.*, 2020; Zhiltsov *et al.*, 2018). For example, in 912-913, Hakim ibn Ahbas of Sogdia has visited Baghdad, where the researcher invented a new musical instrument known as shahrud. Otrari scientist Abu Nasr al-Farabi was also a great musician, wrote scientific works on music and independently created several musical instruments. Even dutar, created in CA, became widespread in European countries under the name "dombra", which later turned into guitar (De Tiesenhausen, 2019; Shohistahon, 2019).

The origins of writing in Central Asia and Kazakhstan can be traced back to early historical periods, as evidenced by archival documents and archaeological findings (Palekha;

Aleksieienko, 2023). One significant piece of evidence comes from the discovery of ancient Sogdian documents attributed to Akim Divashtish in 1933. These documents were found on Mount Mug, in the Tajik SSR, shedding light on the early development of written language in the region. Akim Divashtish, whose name appears in these archival documents, was likely a prominent figure in the Sogdian society of the time. Sogdians were an ancient Iranian-speaking people who inhabited the region of Sogdiana, which covered parts of present-day Tajikistan and Uzbekistan. The documents discovered on Mount Mug provide valuable insights into the Sogdian society's administrative, economic and possibly cultural aspects. In addition to written documents, archaeological excavations in Central Asia and Kazakhstan have yielded fragments of pottery and other artifacts bearing inscriptions in various ancient scripts. These inscriptions include Sogdian, Orkhon-Yenisey and Talas-Chuy scripts. Each of these scripts represents different linguistic and cultural groups that inhabited or passed through the region over the centuries. (Zhiltsov *et al.*, 2018; Molotkina; Tarapon, 2022).

According to foreign scientists, who are now studying ancient Sogdian writings, the first Sogdian writing, Tali-Barzu, arose in the 1st century BC. If these inscriptions remain recognisable, then, undoubtedly, they will become a new link in CA's people's old culture. In ancient Khwarazm, as well as in Sogdia, there was a writing system. Its first appearance can be attributed to the 4th-3rd centuries BC. Notably, during archaeological excavations at the site of the royal palace in the city, documents were found written on wood and leather. This fully confirms the Persian scholars' data about the widespread distribution of writing in old Khwarazm. Science has developed in very early times in CA and Kazakhstan. There is some written information about this. According to the old Khwarazm scholar Biruni, the Khwarazm people's ancestors were also engaged in science. Among them were people who themselves learned and taught others. The history of science is inextricably linked with the society's social, economic and cultural history. Science emerged from the needs of the economy, technology and trade. If this is so, then, t CA's architectural monuments, irrigation systems, the successes of construction technology and the development of fine arts indicate that science, in the region, was at a high level (Massilani *et al.*, 2020; Hasanov *et al.*, 2017).

1 FEATURES OF THE EARLY DEVELOPMENT OF SCIENCE IN THE CENTRAL ASIAN STATES

The records show that the basis of CA states' economy is artificial irrigation of lands. This profession requires significant scientific and technical knowledge, especially mathematics. The fact that this happened in CA is evidenced by an irrigation system, a water supply system, water pipes and water-lifting equipment found by archaeological excavations. In this respect, CA's natural conditions and its peoples' economic existence were similar with old Egypt and Babylon. In Kazakhstan and CA, one of the branches of the economy that requires scientific and technical knowledge, especially mathematics and geometry, is architecture.

Notably, the construction of huge multi-storey mansions in Varakhsha. Construction of very complex monumental fortifications is absolutely impossible without certain practical skills and theoretical inference in the field of construction. It is undeniable that trade, which has become one of the main sectors of CA states' economy, also required the development of arithmetic (Bidaibekov *et al.*, 2019; Link, 2019).

Astronomy was also extremely advanced in the CA countries in the 5th-4th centuries BC. Even in the most ancient times, CA's scholars found and named the zodiacal constellations and main planets. Another interesting fact: the ancient world's astronomer, Ptolemy, pointed out the Samarkand city's exact latitudes. This indicates that the Sogdians could carry out astronomical observations with great accuracy. It also requires more sophisticated computational tools. The documents, such as the Khwarazm calendars (3rd century) and Sogdian calendars (7th century), found by archaeologists in recent times, can show the level of development of astronomy in CA. Biruni also said that there was a calendar system in Old Khwarazm and Sogdia (Saparov *et al.*, 2018). This was of great importance when planning agricultural work calendars. Thus, in CA, there were the foundations of astronomical science. Also, at an early stage of their development, astronomy and mathematics were closely interrelated and developed in parallel.

Geometric ornaments, on the walls of various structures, evidence the development of the geometry in early CA. This is proven by the patterns of one hall in the palace of the Khorezmshah were built according to the formula of a logarithmic spiral. Two parallel lines symmetrically intersect a square. Circles divided into several parts, the diameters of which are equal to each other, and other geometric shapes are widely used in CA art. It is difficult to conclude whether the old Khorezmians drew certain theoretical conclusions from these figures, formulated them and turned them into a conception (Shlapentokh, 2018). It is undeniable that, in CA and Kazakhstan, the development of art in early times was influenced by some external conditions, in addition to its internal economic necessity. CA's states often had political, economic, cultural and trade ties among themselves and with other countries. At the same time, Ancient Egypt, Babylon, Ancient China, India and, in later times, Greece, Byzantium, Rome and the countries of the Middle East, to one degree or another, contributed and influenced the development of art in CA (Raimbekova; Bedelova, 2018).

At the beginning of the 8th century AD, CA and Kazakhstan were at the feudal stage of social development (when the main economic resource was land, and it was owned by feudal lords). On the one hand, they were subject to a socialpolitical crisis. CA's and Kazakhstan's lands were divided into several small khanates, independent of each other. The largest of them were the Sogdian and Khwarazm Khanates, the Turkish, Turgesh Khaganate, and Karluk Yabgu's state. The rulers' mutual struggle for the throne greatly weakened CA's and Kazakhstan's states. In the Middle Ages, many peoples' representatives took part in the

development of Arab classical science. Scholars from CA made a particularly great contribution to Arab science. For example, academician V.V. Bartold noted “There were many writers and scholars from Muslim countries in Baghdad. But the overwhelming majority of them were from the Middle East and CA...” (Nurzhanov *et al.*, 2020). CA’s most prominent scientist, who worked in Baghdad, was the great mathematician, astronomer and geographer Muhammad ibn Musa al-Khwarizmi. The scientist was born in CA, Khwarazm, where the astronomer also received education (Zhazira *et al.*, 2018). Later, the scientist went to Baghdad. The scientist laid the foundation for the problem of algebra and gave the first idea of the algorithm. The second prominent figure of the scientific center of Baghdad, al-Abbas al-Jawhari, was native from Otrar, a South Kazakhstan city (Bidaibekov *et al.*, 2019). The great astronomer from Fergana, al-Farghani, and a scholar from the city of Merv, Ahmad ibn Abdullah al-Marwazi, they all hailed from CA. In subsequent years, scholars from CA continued to play a key role in the history of Arab science. Thus, the outstanding philosopher and polymath, Abu Nasr al-Farabi, who had a great influence on the development of philosophy in the Middle East and Europe in the Middle Ages, was born in the city of Otrar, in South Kazakhstan. The famous mathematician Abu al-Wafa Buzjani was born in the city of Khorasan (Kairbekov, 2016; Shlapentokh, 2018).

In many cities of the Near and Middle East, comprehensive schools, observatories, hospitals and libraries have been opened. Among them, the libraries of the cities of Samarkand, Bukhara Otrar distinguished themselves by the wealth of the book fund. As a rule, they were located next to the Khan’s palace or next to the mosque and madrasah. At that time, the madrasah was a religious training facility, as well as a research center. Prominent scholars were studying there. According to V.V. Barthold, the first madrasah was in the CA (in Khorasan and Maverennahr) and, then, it spread to other Arab countries (Nurzhanov *et al.*, 2020). According to the historian Narshakhi, in 937, there was a Farjek madrasah in Bukhara. And in Baghdad, which was the Muslim countries’ center, madrasah appeared only in the second half of the 11th century. CA madrasahs were messengers of science even in the 15th century. This is evidenced by the work of the Ulugbek madrasah in Samarkand. In this madrasah, people from Asia’s distant parts had the possibility to study. Along with religious readings, astronomy, mathematics, geography and the basics of medicine were taught there. But in subsequent years, the Muslim clergy turned madrasahs into solely religious educational institutions. Other disciplines were not taught there. This led to a gradual stagnation of science and culture in Arab countries, and ultimately to a decline altogether (Gokmen, 2019; Juraev, 2020).

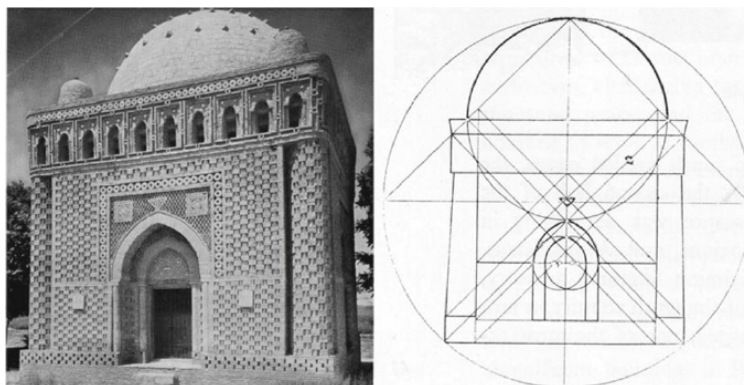
1.1 BUKHARA CITY'S ARCHITECTURE

The city of Bukhara and the adjacent regions later became a center of science and culture. Bukhara had a wonderful library and a rich book market with Greek and Roman philosophers' scientific books from Heraclitus to Galen. The paper used to write these books was imported from Samark, which, at the time, was the hub for paper production. It is known that Khwarazm, CA's second ancient state, was also the ancient cultural center. After the abolition of Arab rule, art and education had also increased there. The city of Urgench, at that time, was one of the largest cultural centers in CA. There was one of the richest libraries in the world. Khwarazm cities took care of science and invited scholars from other cities. Thus, during the reign of the Second Mamun Shah (1010-1017), a scientific center, called "Mamun Academy", was opened. It was headed by the great scholar of that time, Abu Rayhan al-Biruni. Outstanding scientists of that time, such as Abu Nasr ibn Iraq, Abu Ali ibn Sina, Abu Sahil Massih, Abulhasan ibn al-Hummar, ibn Muskawayh and others, were actively involved in the academic affairs (Zhiltsov *et al.*, 2018).

One of the members of the "Mamun Academy", Abu Ali ibn Sina, has written a work, under the title *The Canon of Medicine*, in 1025 CE. Ibn Sina, also known as "Sheikh-ar-raisi" or "the father of scientists", studied astronomy, physics, chemistry, zoology, biology, geography, poetry, music and other sciences. The author was a real polymath, who proficient in all the science of that time (Kasenova, 2020). The second most prominent CA scholar was Abu Rayhan al-Biruni (973-1048). The scientist was born in Khwarazm. Biruni has elevated CA's science to a new level. In the book *Monuments of Past Generations*, the author talks about the ancient people's life who inhabited CA's and Persia's lands (Nurzhanov *et al.*, 2020). Biruni, for the first time in history, found the weight of minerals and metals. In the same way, for the first time, Biruni expressed the opinion that the Karakum desert was once the seabed. As for Abu Nasr ibn Iraq, the third member of the "Mamun Academy", the author was an outstanding mathematician of that time. Biruni himself, who was the head of the Academy, was a student of Abu Nasr. During the Samanite era, literature and art, along with other sciences, have flourished. At that time, the famous Tajik poet Abulhasan Rudaki (858-941) lived and wrote wonderful works. If Ibn Sina was once called "the father of scientists", then, Rudaki was called "Adam of poets." The scientist served in the Samanid palace for some time. But, then, the Samanid dynasty fell under the emir's wrath, and the author was punished by blinding. A. Rudaki spent the last years of life in yard. The mathematician lived there and wrote outstanding works.

During the Samanid dynasty, architecture has flourished in CA. This is evidenced by the architectural monuments preserved from that time. One of them is Ismail Samani's mausoleum in Bukhara. This monument occupies a special place in CA's history of architecture (Figure 1).

Figure 1 – Ismail Samani's mausoleum in Bukhara



Source: Makhmatkulov, 2018

Indeed, during its construction, all the techniques and art of architecture, before the Arab era, were used. Consequently, it was built on the basis of the latest achievements of old architecture before the Arab tradition. Traditionally, it is the four-walled house, the roof of which is covered with a dome, which does not have a particularly decorated front gate. The side is framed in the same way. Ornaments, patterns, or inscriptions, typical for a Muslim culture, are not present. In the construction of the mausoleum, all the possibilities of brick were used to the fullest. Such picturesque architectural houses, ceremonial palaces and monuments existed in CA's and Kazakhstan's cities, particularly in Samarkand, Urgensh, Otrar and Taraz.

2 REVIVAL OF CENTRAL ASIA'S CULTURE AFTER DECLINE: SPECIAL ASPECTS OF THE HISTORICAL PROCESS

2.1 SAMARKAND CITY'S ARCHITECTURE AND FAMOUS PERSONALITIES

CA's and Kazakhstan's peoples' such a growing culture, which flourished in the 9th-11th centuries, entered the era of stagnation in the 13th-14th centuries. After all, the Mongol invasion, which began in 1218, and its two-century domination did not allow science and art to develop. The Mongols were persecuting scientists, burned their libraries and destroying their schools. At this time, the cultural center shifted towards the South Caucasus, in Azerbaijan. CA's and Kazakhstan's peoples' art and culture, stagnant during the Mongol invasion, began to revive at the end of the 14th century. Because, at this time, the Mongol yoke over CA and Kazakhstan has ended. Moreover, the heads of state from local feudal lords made every effort to strengthen their state and improve their cities. One of them was Timur the Lame. For instance, Timur the Lame wished to establish Samarkand as the world's greatest and most beautiful city and make it the capital.

Timur the Lame attracted skilled architects and experienced engineers from the conquered countries, such as Iran, Azerbaijan, Baghdad and others, and also built mausoleums and minarets, madrasahs and mosques in Samarkand. But of those picturesque buildings, only the destroyed walls now remain. At the same time, they still attract with their beauty of architectural construction and brilliance. Samarkand craftsmen, following the Persian tradition, developed a new Samarkand style of architecture. Among the buildings in Samarkand, Shakh-i-Zinda (1394), Gur-e-Amir (1495), Bibi-Khanym Mosque (1399), Ulugh Beg (1494) and Registan are especially impressive in their beauty (Figure 2).

Figure 2 – Vivid examples of architecture in Samarkand



Shakh-i-Zinda



Gur-e-Amir



Bibi-Khanym Mosque



Ulugh Beg



Source: Makhmatkulov, 2018

Muhammad Torgai Ulugbek (1390-1449) later became responsible for most of the construction in Samarkand. The scholar was engaged in mathematics, astronomy, history and poetry. M.T. Ulugbek wrote the history of four Chingiz's uluses. Prominent scientists of that time, such as al-Kashi, Kazi-Zade Rumi and al-Kusshi, also participated in its construction. Ulugbek also opened a large madrasah where the scholar taught children. On the signboard of madrasah, there was an inscription: "The pursuit of knowledge is the duty of every Muslim man and woman". During Ulugbek's time, CA's poetry developed at a new pace. The poets Sakkaki and Atai testify to this. The famous artist Bekzad, who became "Raphael of the East", also showed mastery (Massilani *et al.*, 2020; Bai *et al.*, 2018).

After Ulugbek's death, Samarkand began to lose its former glory. At the time, the Timurid dynasty had moved their horde to Herat. Sultan Husayn Bayqara's school of arts was opened there. Baykara was Ulugbek's cousin, a knowledgeable person and one of the outstanding contemporary poets. Sultan Bayqara took care of the prosperity of science and literature. The great Uzbek poet, Ali-Shir Navai (1441-1501), was a Sultan Baiqara's comrade and wisacre. Ali-Shir was an outstanding public figure of that time, a prominent scholar, a sage, a wonderful musician, a talented artist and an unsurpassed master of the artistic word. Ali-Shir was the first, in CA's history, who wrote a poem in the old Uzbek language. The Navai era was the pinnacle of Uzbek literature. At this time, such famous poets, as Lutfi (1369-1465) and Jami (1414-1492), lived and created their outstanding works. In CA, medicine, mathematics, astronomy, architecture, history, poetry and ceramics were widely developed. The art of making coloured glass, and growing grapes and alfalfa was also first invented by CA scientists. This art later spread to China. The creator of architectural structures and ceramics, in CA, was one of the masters from CA itself.

Kazakhstan's southern and southeastern regions, constantly developing political and economic relations with CA, experienced the rise in science and culture at that time. In many ways, this was noticeable during Karakhanids' time, the first feudal state on Kazakhstani land. In the 10th century, along the Syr Darya, there were the cities of Taraz, Balasagun, Merke along the Otrar, Sairam, Syginak, Turkestan, Talas, Shu rivers. The cities' growth contributed to the development of architecture, ceramics, handicrafts, etc. One of the medieval Kazakhstan's largest cultural centers was the Otrar valley along the Syrdarya river. In this region, covering an area of 300 sq. km, there were more than fifty old cities and towns. This region is filled with traces of main canals and ditches. The largest of these cities, Otrar (the Arabs called it "Farab"), was one of the largest cultural, scientific and political centers not only in South Kazakhstan, but throughout CA. In peacetime, Otrar's population exceeded 70 thousand. It also housed one of the richest libraries in the East. In addition, Karl Brockelman's five-volume "History of Arabic Literature", written in German in 5th century, mentions al-Sighnaq's names. In the same paper and in other historical studies, there are such scientists' names, as al-Turkstani, al-Kipshaki and Ibn Turk from the Syr Darya. Al-Turkstani, for instance, was

a mathematician of the 14th century. In St. Petersburg, there is a handwritten copy of the treatise *Arithmetic* (1356).

2.2 THE FAMOUS PERSONALITIES OF THE REGIONS OF OTYRAR, BALASAGUN AND SEMIRECHYE

The city of Otyrar was Abbas al-Jawhari's, Khorezmi's, Fergani's and Mervazi's birthplace, as well as the other members' one who belonged to the "House of Wisdom" and to the observatory in Baghdad during the 9th century. Abbas al-Jawhari participated in astronomical observations in Baghdad in 829-830, and in Damascus in 832-833. On the basis of these observations, a work, under the name "Mamun's Astronomical Tables", was written. Abbas Al-Jawhari studied mathematics. For example, he wrote a treatise called *Euclid's Perfection of Foundations*. This treatise is still unknown to us. Only Nasireddin Tusi, in work on parallel lines, cites a large passage from al-Jawhari. This passage indicates that Abbas al-Jawhari was the first of the Eastern mathematicians to criticize Euclid's theory of parallel lines. The scientist was trying to prove the fifth postulate. For this, al-Jawhari concludes: "If two straight lines intersect with the third straight line and form equal-parallel cross angles, then this involvement will be appropriate when crossing any straight line" (Bai *et al.*, 2018). Al-Jawhari proves the theorem on the center line of three angles and a theorem indicating that, from any point inside the corner, a straight line can be drawn that intersects both walls of the corner. The latter theorem was used by Adrien-Marie Legendre to prove the fifth postulate in 1800. Abbas al-Jawhari's ideas on parallel lines were later developed by Nasireddin Tusi.

The second prominent scholar from Otrar is Abu Nasr al-Farabi (870-950). The scientist was the world's largest philosopher and polymath of the Middle Ages. The scholar was the most famous among the philosophers in the Arab world. Therefore, the researcher was the second teacher after Aristotle. The scholars' teaching had a great influence on the development of science. al-Farabi's book *The Birth of sciences* (938) was the main textbook in higher educational institutions of the East for centuries. The third outstanding scholar from Otrar is Ismail al-Jawhari. Perhaps the scientist was related to Abbas al-Jawhari, who lived before. Some evidence suggests that Ismail was al-Farabi's nephew. Ismail al-Jawhari traveled extensively in the Eastern Caliphate. The researcher's command of the Arabic language allowed him to write *The Book of Language Correction* (978), an explanatory dictionary with approximately 40,000 Arabic words. Ismail al-Jawhari died in 1002.

In the peoples' cultural history, who were of Turkic origin and inhabited Kazakhstan, a resident in the city of Balasagun, Yusup Has-Khadzhib, occupies a special place. In 1069, the author wrote a book in the Uyghur language, called *Kudatgu bilik*. This book, also known as the "Knowledge of Happiness," is a timeless masterpiece that delves into profound themes of governance, fame and the relentless pursuit of happiness. This book offers invaluable

insights into the art of leadership and governance, exploring the qualities and virtues that contribute to effective rule and a society's well-being. Through its eloquent prose, *Kudatgu Bilik* takes readers on a journey through the complexities of fame, highlighting the pitfalls and challenges that come with public recognition. It examines how fame can both elevate and burden individuals, shedding light on the importance of balance and humility in the face of adoration and scrutiny. At its core, the book is a contemplative exploration of the human quest for happiness. It offers wisdom on how to find true happiness within oneself, emphasizing the importance of inner contentment and self-awareness over external achievements and possessions (Nusipalikyzy *et al.*, 2020). Among CA's and Kazakhstan's religious groups, Khoja Akhmet Yassawi (1103-1166) occupies a special place. The author was born in Sayram, a district of South Kazakhstan. The researcher studied in Merv, received a religious education and came back to the country. However, the scholar became a harbinger of Sufism, engaged in both the preaching of religion and poetic art. The scientist writes a book of poems and proverbs, called "Divan em Hikmet (Issakova, 2015).

Together with Kazakhstan's southern regions, the Semirechye region also had close ties with CA. Because the trade route, between CA and China, often passed through this area. This led to the widespread development of trade, development of art and education, and the scientists' emergence. Thus, one of CA's prominent scholars of the Middle Ages, the famous linguist Mahmud al-Kashgari, was born and raised in Semirechye region, in the vicinity of the Issyk-Kul.

In the 6th-7th centuries, especially in the 9th-12th centuries, in connection with the cities' appearance on the Kazakh land, architecture has widely developed. Previously, local peoples built houses from clay, stone, wood and reeds, but later they began using burnt bricks. Palaces, mosques, madrasahs and cemeteries were built from red bricks. Tajiks and Uzbeks, Uighurs and Dungans, who migrated from CA and Kashgaria, had a great influence on the development of construction equipment in Kazakhstan. Such outstanding architectural monuments, in Kazakhstan, include Babadzha- Khatun's (10th century) and Aisha- Bibi's (11th century) mausoleums in the vicinity of Zhambyl, Burana tower (11th century) in the vicinity of the Tokpak village, Khoja Ahmed Yaswawi's (14th century) mausoleum in Turkey, and the burial grounds Alasha-Jochi khan, in Ulytau and Kozy-Korpesh-Bayan Sulu in Ayagoz. All of these are single or multi-domed houses built in the classical style of oriental architecture. Their walls were decorated with various ornaments. Many of these monuments were created by craftsmen from the local population (Saparov *et al.*, 2018; Veress; Szigethy, 2018).

In the 15th-16th centuries, CA's and Kazakhstan's art began to decline again. The reason for this was, firstly, CA's khans' internecine wars, and secondly, the cruel order due to religious fanaticism. Scientists who could not bear this, including people like al-Qusshy, and Meryem Chelebi, had to flee to other countries. Moreover, if earlier CA's khans, to a

certain extent, cared about science and helped it flourish, and some (for example, Ulugbek) were directly involved in scientific work, then CA's rulers, in the 17th-18th centuries, avoided it. The governors themselves, striving to follow the path of science, neglected such exact sciences as mathematics, astronomy and medicine, and were engaged only in the humanities, such as history and poetry. The prominent Kazakh scientist, Sh. Valikhanov, noted "The khans of CA, like their ancestors, did not study science, did not write memoirs, but only entertained themselves with fight". This kind of leadership, carefree dishonour, foreshadowed the prosperity of science and art in CA (Saparov *et al.*, 2018).

In conclusion, the scholars' historical accounts and the cultural achievements in the region of Otyrar, Balasagun and Semirechye, in Kazakhstan, highlight a rich intellectual and artistic heritage that spanned centuries. From astronomers, like Abbas al-Jawhari, and philosophers, like Abu Nasr al-Farabi, to linguists, such as Mahmud al-Kashgari, and Yusup Has-Khadzhib Khadzhib's literary work in *Kudatgu Bilik*", these individuals and their contributions left an indelible mark on the development of science, philosophy and culture in Central Asia and beyond. Despite periods of decline and challenges, their legacy endures as a testament to the enduring quest for knowledge, wisdom, and the pursuit of happiness in the diverse and culturally rich tapestry of the region.

CONCLUSIONS

Central Asia's and Kazakhstan's cultural history is rich and storied, characterized by periods of flourishing intellectual achievements and artistic expression as well as eras of decline. From ancient times, the location of the region, along major trade routes, fostered economic and cultural exchange that helped spur advancements in fields like astronomy, mathematics, architecture and linguistics. Cities, like Samarkand, Bukhara, Khiva, and Otrar, emerged as major hubs of learning and culture over the centuries. The polymaths' intellectual curiosity, like Al-Biruni and Ibn Sina, led to innovations in diverse realms of knowledge. Poets, like Rudaki and Navoi, produced literary masterpieces that are still revered today.

While foreign invasions by forces, like the Arabs and Mongols, disrupted the progress of science and culture at various points, Central Asian scholars often found ways to preserve, synthesize and build upon knowledge. Enduring monuments of architecture and art, across the region, provide a tangible link to this rich history. The modern Central Asian states' cultural identities have been shaped over centuries by both indigenous and foreign influences. As globalization and integration continue, the challenge will be balancing modernization with preserving the best of their intellectual, linguistic, and artistic traditions. If its human capital is nurtured, Central Asia has much to offer to human knowledge and progress in the 21st century, as it did in past centuries. The cultural achievements of the past, properly

safeguarded, may continue to inspire new generations of Central Asian thinkers, artists and leaders to contribute to the advancement of human civilization.

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