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[1]Suleimenova D.K. **[2]Agatay O. M.**
[1]Scientific Institute for the Study of the Ulus of Jochi
[2]National Museum of the Republic of Kazakhstan
E-mail: Suleimenova911@gmail.com, agatayotkirbay@gmail.com

EDUCATION, LAW AND ASTRONOMY IN THE URBAN CENTERS OF THE ULUS OF JOCHI IN THE LATE FOURTEENTH CENTURY

Abstract. This paper seeks to describe the institutional structures of education and dominant practices of knowledge production in law and astronomy within the major centers of the Golden Horde in the late fourteenth century, and understand how they influenced urban life and policy. The value of this research is to avoid oversimplified notions of the Golden Horde as purely a "steppe empire" by showing how the cities boasted an enduring urban infrastructure for knowledge. The originality of this article is that it synthesizes the study of three fields-education, legal studies, and astronomy-into one single model of analysis, compares the central city with the regional center (Sarai and Bolgar) and defines the field of astronomy in practice primarily as an applied field of measurement which was necessary for the accuracy of ritual (prayer times, qibla), and law as a resource embedded within the practice of judgment and administration. The objectives of the research is to: explain the education system linked to mosques (madrasas, schools) as well as administration based on endowments; analyze the professional roles of specialists (judges, jurists, officials, religious figures and astronomers); understand the circulation of knowledge as well as the scholars' career paths; and evaluate the influence of the stability of these institutions upon the development of legal studies. The methodology is institutional history, historical-legal analysis, the history of science and knowledge practices, comparative analysis. The conclusions of the article claim that the cities in the late Golden Horde contained durable structures of education; Sarai was a major intellectual center; and Bolgar exhibits evidence of an developed practice in astronomy. Golden Horde cities played an important role in producing and reproducing knowledge which connected the fields of religion, administrative needs, and sciences application.

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Keywords: Ulus Jochi, Golden Horde, urban centers, education, madrasa, waqf, legal scholarship, astronomy, Bolgar, Sarai

Introduction

While Steppe mobility, warfare and tribute are still very prevalent features in historiography on Ulus Jochi, its city culture and intellectual life remain considerably less developed. There is, however, growing evidence of durable educational institutions, multilingual literacy and practice-oriented knowledge and learning existing within the Islamic cities of the Volga region. For exploring how knowledge could be produced, circulated and consumed in a Golden Horde city we find the latter half of the fourteenth century, a period of institutional formation following a time of extended crisis, to be a particularly insightful one. Focusing on three interrelated areas of the city experience-education, legal learning, and astronomical study-through the framework of the city and its institutional apparatus around 1375-1405, this paper will argue that Golden Horde learning cannot be regarded as merely a "court" phenomenon but is fundamentally a city based phenomenon drawing from religion, administration and scholarly mobility. It highlights the role of the city in the

knowledge ecosphere where learning from the mosque-connected environment met the professional normative and practiced know-how and learning streams that are to be discussed under legal and astronomical studies, respectively. Through the comparison of the cosmopolitan and regional experience of the capitals Sarai and Bolgar, the study seeks to contribute to a more complex image of the Golden Horde in the context of Eurasia, and especially, through a more nuanced approach to the function of the city in preserving reproducibility.

Materials and methods

This paper rests upon a combined body of primary and secondary source materials on learning and science in Golden Horde society. The study primarily draws narrative and descriptions concerning the institutional life of the urban Muslim scholar along with texts describing mosque related learning institutions-mosque, madrasa, elementary school-and texts regarding endowment funded institutional support and professional careers. Another stream of material has to do with the study of the history of practical astronomical studies in the Middle Volga (Bolgar), which were driven by the requirements for calculating the ritual times and the qibla direction and that therefore had a strong demand for an observational tradition and instrument based timekeeping. Material or epigraphical evidence of learning environments which is encountered in works discussed are used in order to obtain information about learning processes in the city-centered environment. Additional information on learning and scholarship came from modern studies which in a large part expand the primary sources by publishing new textual data in Arabic and Persian and in doing so draw more attention to older regional learning and legal traditions from the Khwarazm and Volga Bulgaria which played a role for the later Golden Horde learning and legal thought. For information regarding cities and the localization of institutional life and for the periodization and discussion of metropolises and regions use of historical geography has been particularly valuable.

In approaching these subjects, this study combines institutional historical methods reconstructing the network of mosque-madrasa institutions with a focus on their economic base; historical-legal methods - researching fiqh, i.e. legal thought and learning which operated as a professional normative framework for administration and the exercise of law; and finally methods from the history of science and knowledge, focusing on astronomical knowledge as an applied scholarly practice and a system of thought which, above all else, served religious purposes. Using the comparative perspective afforded by the contrast between Sarai and Bolgar, it is possible to highlight not only the scholarly capacity of the metropolitan center of learning but also that of the regional one. In so doing, modern concepts will be avoided where possible and, in cases where appropriate, substituted by historically situated functional equivalents. For example, this study does not discuss international acts or statistics, but instead utilizes descriptions of supralocal, cross-regional normative systems or inter-state legal exchanges. Rather than describing modern international law, which cannot be meaningfully projected onto this context, the analysis focuses on juridical practices. The study centers on the normative context of the period (i.e. predominantly fiqh along with imperial or customary law) in which judicial and administrative practice developed. Where this leads to a significant number of related phenomena, a quantitative element has been added by classifying types of sources, institutional roles, instruments, objects, etc. in order to support objective conclusions.

Discussion

The historiography on Golden Horde learning and science grew from the predominantly political approach to the Golden Horde to an analysis of particular fields of learning, especially legal and astronomically related knowledge. Scholarship is now increasingly focused on the latter along with mathematics and is viewing Golden Horde as a locus of learning and Muslim culture where the fields of knowledge mentioned reached a highly sophisticated level. V.V. Bartold laid a foundational basis for the criticism of Eastern sources. Research of many topics, including the

culture of the Golden Horde has extensively relied on the collection by V.G. Tiesenhausen which remains the crucial source material collection in many fields (Tizengauzen, 1941). B.D. Grekov and A. Yu. Yakubovski expand studies on Golden Horde culture and urbanism, but learning and science was part of their history more on the conceptual level rather than as an area of separate analysis. The breakthrough into more factual research was due to the archaeological exploration of Volga cities which provided a material context for learning, connected with religious institutions-mosques and madrasas. The study of legal history started with analysis of laws as instruments and procedures, such as Yasa, and juridical traditions, and it has more recently moved onto the concept of fiqh as the main component of professional learning, and in this context scholars began research on jurists such as Husam al-Din al-Syghnaqi, Ibn al-Bazzazi and Sa'd al-Din al-Taftazani whose writings were highly recognized by the Muslim scholars world over (Pochekaev, 2019). Modern studies in exact and natural sciences have added a layer of additional sources and put forward an image of the high theoretical and methodological development in the Ulus Jochi.

In mathematics, Ihsan Fazlolu provided in-depth analysis of the oldest mathematical book on computation from Golden Horde called "At-Tuhfa fi 'ilm al-hisab", thereby strengthening an idea of sophisticated computational practice supported by a long tradition in mathematics based on the achievements of al-Khwarizmi and al-Baghdadi (Fazlolu, 2015). G. M. Davletshin and L. L. Galkin are prominent researchers in the history of astronomy who highlight the works of Masudi al-Bulghari from the beginning of the 14th century and whose studies supplement the understanding of advanced astronomy based on textual information and physical evidence such as astrolabes and sextants from the Middle Volga region (Davletshi, 2015). Scholarly learning is also closely tied up with philology and literary studies. Through studies on literary works like Kh.Yu. Minnegulov established Sarai as a major literary center, while in a separate framework R.F. Islamov emphasizes both the academic contacts and scholarly mobility between the Golden Horde and Mamluk Egypt and highlights the Codex Cumanicus as an invaluable source for the study of language practices within the highly multilingual environment of the city (Minnegulov, 2011; Islamov, 1998).

The historical geography studies by V. L. Egorov have detailed urban developments and demonstrated a period of highest development around the time of Uzbek and Janibek, when centers grew as "eastern" cities with a relevant infrastructure to support learning and scholars. My study departs from all this by not viewing learning as one field of study or one dimension of Golden Horde society but instead attempting to link it into a broader picture in which religion and politics converge with city centered learning-centered institutions, thereby producing both specific normative systems and broad forms of scholarly knowledge. Through the perspective of cities as "knowledge environments", where mosque-connected learning forms, professional normative legal learning, and astronomical scientific know-how intertwine, I will present a view where the capacity of cities and their religious and administrative framework supported reproducible forms of learning and expertise through their particular institutions and social organizations.

Research results

The capital cities of the Ulus of Jochi - Sarai (also referred to as Sarai-Batu) and Sarai al-Jadid served not only as administrative centers of the empire but also as focal points of education and knowledge. As indicated in studies of Golden Horde historical geography, early urbanization in the steppe was closely related to the political enterprise of the consolidation and institutionalization of administration, with urban construction flourishing most strikingly during the reigns of Uzbek and Jani Beg. It was the "capital city-administrative apparatus-urban infrastructure" nexus that generated the basis for the establishment of Muslim education as an institution and guaranteed the sustained demand for specialists, such as jurists, judges, theologians and specialists in exact sciences. It is methodologically crucial to draw a distinction between the two capitals. The name 'Sarai al-Jadid' is officially documented as the second capital of the 14th century, and was also present on coinage. In subsequent tradition, the city is commonly called 'New Sarai' or 'Sarai-

Berke'. This latter designation, however, presents difficulties: archaeological data do not confirm the existence of Sarai al-Jadid at the time of Berke; instead, this center appears to be founded later. In addition, Ibn Baa (1334) refers to the first capital as 'Sarai-Berke', a terminological accuracy which is critical in the history of education.

As a result, all references to mosques,qs, madrasassand 'scholars of Sarai' need to be consistently attributed to either the correct capital context. Along with increased Islamization of the ruling elite, the importance of the capital as the training center for personnel engaged in administration and jurisdiction increased. Sources and scholarly studies testify to the existence of theq as an institution in the capital (including q of Sarai and chiefq), and the involvement of jurists in juridical procedures. At the same time, the jurisdiction ofqs may have been limited to matters of a religious nature, while disputes in other areas were frequently handled by the military and administrative elite. This is significant for the history of education, since such a legal context presumed trained specialists who knew the Quran, fiqh and procedural rules. As well as the institutional aspect, scholarship points to the diversity of legal traditions in the Golden Horde. We read, for instance, about the presence of representatives of the Shafi'i madhhab in Sarai itself, and about the occasional presence of Maliki jurists visiting from Egypt, along with indications of hereditary lines of legal professionals and arrivals of lawyers from Samarqand in the capital at the close of the 14th century. Together, these elements demonstrate that the capital served as a center of normative scholarship and 'academic mobility' within the Islamic world (Amin al-Kholi, 2002:36-37). The capital as a "magnet" for intellectuals is also supported by the anecdotal evidence surrounding Ibn Arabshh, whose biography indicates the tradition of inviting scholars to the capital "from all lands" that was established during Berke's reign and turned Sarai into a "center of learning and a mine of blessings", the multitude of celebrities there surpassing even that of contemporaneous Egypt (in Minnegulov, 2011:306).

Among the list of intellectuals named in this context are Qub al-Din al-Razi, Sad al-Din al-Taftazani, Shafi'i Ibn al-Bazzazi, Kamal al-Din Khujandi, and others, names that do not appear merely as biographical trivia but rather indicate a capital environment marked by patronage, academic prestige and cross-regional contact. Beyond jurisprudence and theology, the Golden Horde capital city displays interest in exact sciences. A relevant example is the treatise al-Tuhfa fil 'ilm al-isb, a calculation work associated with the reign of Uzbek Khan. Research on this treatise claims that it is an evidence of "a high level of Islamic mathematics in the Golden Horde". From the perspective of the present article, this case study underlines an important fact: educational provision in the capital did not only constitute 'religious literacy' but also training in applied and theoretical calculating techniques necessary for administrative and economic practice. Lastly, the capital intellectual life was far from isolated. It was also fueled by connections to the Volga-Bulgar region and to the East of the Islamic world. An example will be provided in the next section, showing how astronomy was performed in Bolgar where this knowledge was largely inspired by the religious need to accurately measure time and direction for the purpose of performing Muslim prayers. Masud al-Bulghari is particularly associated with observations and calculations (e.g., for "the shortest night") as well as with the use of astrolabe, quadrant and sextant (in Davletshin, 2015:195).

Bolgar was one of the important centers of the Golden Horde in the Middle Volga region. At the beginning of Batu's reign, Bolghar was functioning as a temporary administrative center, and the first coinage of the Golden Horde was minted there. Both textual evidence and archaeological research indicate rapid urban growth. Bolghar also served as a major international trade center on the Volga River in the 13th-14th centuries, unmatched in that part of the river system. This economic role provided favorable conditions for urban institutions and specialized knowledge. Bolghar is most relevant for the history of science since it gives evidence for the functioning of applied knowledge in a northern Islamic city. The most developed area of natural science in the Muslim world, including Volga Bulgaria and the Golden Horde, was astronomy, for a straightforward reason: it was vital for the correct performance of Islamic worship, with its demand

for precise measurement of time and direction. For this reason, questions concerning time and direction were particularly relevant in Bolghar, which, as described by travellers, occupied a "northern outpost of Islam". In the summer months the extremely short night complicated the fulfillment of the five daily prayers, raising questions and stimulating observation. Some travellers came here specifically to experience and study the local peculiarity of the short night. The accounts clearly show not only the problem but also the technical solutions applied. The use of an astrolabe, quadrant, and sextant for the precise calculation of time is described in sources, as is the functioning of a similar system in Bolghar. The responsible person is Masud al-Bulghari, whose calculations concerning the length of the shortest night are substantiated with observation made using astronomical instruments. Furthermore, the text clearly indicates Masud working with students, sharing both the measurements and observations, including conducted outdoors and in the north of the city. This part is significant for the paper as it highlights not only the practicality of the astronomically based knowledge but also the existence of an environment of learning in which practical experience is shared with students and passed down. Therefore, Bolghar can illustrate how the Golden Horde conception of "science" was applied, urban and linked to institutions. It satisfied a religious need, but its functioning was based on trained specialists, proper equipment and procedures, which makes Bolghar a good regional complement to the capital-centered picture of Sarai and strengthens the main argument about the potential for the reproducible educational and scientific practices at the urban centers of the Golden Horde.

Education system and the religious-legal institutions in the Golden Horde and the Crimean Khanate were based on a developed net of mosques and madrasas, which were financed by the state and private means (Davletshin, 2015:194-198).

In Golden Horde cities the large-scale building of monumental religious buildings commenced as early as Berke Khan and in itmosque, minarets and madrasas were erected extensively. Madrasas functioned as higher educational institutions, in which educated specialists for state administration and for the judicial system were prepared.

One of the most famous centers in the Crimea was madrasa Zynjirli (Zincirli), established by Khan Mengli Giray I in 1500. The institution has no parallels for the duration of uninterrupted work and has served as a center for over 400 years. Another most important madrasa located in Old Crimea was Inji-bek Khatun madrasa at the zbek mosque, dated to 1332/33, then in Bakhchisarai (Egorov, 1985: 30-31).

Elementary schools (maktabs) are very often located next to mosques. Bakhchisaray, madrasas of many quarters (mahallas) exist such as madrasa in Qadi-Mahalla or madrasa in quarter Ismikhan Kadyn.

Waqf (charitable endowment) was a major financial source for the educational and religious institution. A large part of waqf was the land endowment; the wealth of Zynjirli madrasa consisted of about 5,000 desyatinas of waqf lands and the profit of which was divided between the provision of students and the needs of institution. Commercial endowments also held an important place in waqf, with Khan and elites donating their shop, houses, coffee houses or whole settlements. Profit from coffee-house at Gzlev, for example, was endowed for the maintenance of mudarris (head teacher) of madrasa Mengli Giray, not only was the staff provision made such as for teachers, Imams, but also a number of communal services (fountains, cheshme for ablution) were provided by means of waqf.

Management of urban quarters and religious life consisted of a clear hierarchy; the Imam and muezzin, not only religious representatives but the former was also an official representation for the quarter and was the official witness at legal issues between citizens. Qadi (judge) had restricted jurisdiction; in the Golden Horde qadis ruled on issues with religious character, whereas civil law matters were dealt by Emirs under Yasa. In Crimean Khanate qadis were appointed by officials of high rank Qadi-Asker, the mutawalli managed the revenues derived from mosques, madrasas and

maktabs and the mudarris taught in the madrasa, this was generally obtained through specific waqf properties (Egorov, 1985; Pochekaev, 2020: 745).

Education consisted of classical works alongside living traditions of education. A crucial element was ijaza (formal authorization for teaching a specific book given by a teacher), the students, granted an ijaza to teach or interpret a certain work, became professionally qualified. Written tradition was very important; scientific activity included writing treatises, as well as commentaries upon earlier books, as well as books and texts attached to madrasas and mosques libraries that could store hundreds of manuscripts on the subjects of law, theology, sciences. Oral traditions were kept at the same time as knowledge of law and custom was transmitted in elite family or popular judges (biys) lineage, including Chinggis Khan's biliks (Pochekaev, 2020: 741-742).

The academic sphere was a multilingual, representing close ties with all Islamic world. Arabic was language of religion and learning; it was necessarily mastered by ulama and qadis. Persian was used for literary work; it was common language for poetry and some written works. Turkic was the language of the state in its documents, for instance khan's yarliks, and also popular language. First translation of the Quran into Turkic language was created in 1362; specialized dictionaries for studying languages were created to meet requirements of studying languages. Codex Cumanicus (1303) including Turkic, Persian and Latin vocabulary is a famous example of such work (Minnegulov, 2011:306-307).

Legal education in the Golden Horde relied on the combination of Mongol imperia traditions, Islamic figh, and actual government needs; two main channels of legal thinking emerged, one imperial Mongol and another Islamic legal one. Imperial Mongol component was based on the Yasa and sayings of Chinggis Khan, which was not studied as professional knowledge, but as part of membership of an elite class or an ethnic or family group. Knowledge of Yasa norms for example was expected on a yearly basis for Emirs of tumens and thousands, and was also taken into account when selecting a Khan. Muslim legal thinking established a specific scholar community with its own tradition. Islamic juridical tradition was grounded on already existing regional schools in Khwarazm and Volga Bulgar, and juridical learning researchers often point out on influence of pre-Mongol education on subsequent development of law in urban context in the Horde. Peak of development of juridical knowledge occurred in the first half of the 14th century, during reign of zbek Khan who adopted Islam. Qadis became seated next to Imperial judges (darughachi/"dzarguchi"), the client may appeal to either court. It indicates mixed legal situation, with duality of law, as a subject and field of scientific study, and as a mechanism of control. Nevertheless it is stated that while a Qadi was focused primarily on religious matters, a great many civil disputes are resolved by military and administrative class, reflecting the complex system (Pochekaev, 2020: 742-743).

Administrative knowledge was centered on high officials and central apparatus, while the move from the "nomadic" character of the state to the bureaucratic administration grew steadily. Position of beglerbeg may combine functions of commander in chief, minister for foreign relations and also as supreme judicial authority as diplomatic messages from Mamluk Egypt indicated. Head of the central executive body, divan, was vizier, a powerful advisor to the Khan controlling the state finances and collecting tribute. This administration necessitated use of chancery culture; in this layer of professional scribes (katibs) acquired professional knowledge and skills on official documentation, khan's yarliks became the highest legal documents that the state produced, meaning actual implementation of law depended on professional staff and documents, and formal character of state functioning. (Egorov, 1985:70-71).

Another aspect of legal scholarly activity in the Golden Horde was the influence of mobility and interregional exchange. The jurists of the Golden Horde actively corresponded with the scholars in Egypt and Syria. Many scholars of the Golden Horde came to teach in and study in Cairo and gained repute there. One of these is mentioned in sources by his name Al al-Dn al-Sary, who was

the first professor of hadith at the mosque of Sultan Barqq. This demonstrates not only the fact that Sarai was not only a receiver of Islamic learning but a producer of jurists with reputation competitive enough with major centers in the Islamic world. General image of Sarai as an attractive center for learning and scholar-activist seems in line with the broader trends of mobility and renown.

At the center of this was the structure of mentoring.The primary instrument for such endorsement was the ijaza, formal license from a teacher allowing a student to teach or write commentary on legal works. This process ensured the continuity and control of a certain level of legal skills, while perpetuating the traditions of past jurists and scholars.

The typical output of a scholar-jurist was commentaries on previously authored, already classic works, for example on al-Marghnn's al-Hidya. These commentaries circulated, and remained useful throughout subsequent generations of legal experts and law students. Thus legal erudition served both as an answer to local demands and as part of the greater Islamic learned world.

In general, the learning of administration in the Golden Horde had shifted from Chinggisid elite traditions to state system where professional learned activity of jurists contributed to efficient function of the state administration and courts. The Yasa and biliks of the Great Yasa helped preserve the cohesion and stability of elites and political order while fiqh fostered a professional class of law-experts that drew upon older regional traditions of jurisprudence as well as upon wider international Islamic world. All these were elements of legal-administrative system in late Golden Horde (Pochekaev, 2020: 743-744).

The astronomy was one of the most essential sciences in the ulus Jochi.The primary reason was practical- Muslims needed accurate calculation of the prayer times daily, as well as calculation of the direction of the qibla (Mecca). A major center of learning, Bolgar on the Northern border of the Islamic world, was known to have possessed a special function concerning the observation of timekeeping at the cathedral mosque. In the early fourteenth century, this responsibility was held by astronomer Masd al-Bulghr, who is depicted as one of the chief responsible for setting the prayer times. The same work lists several concrete actions that took place. Masd and his students made observations not only in Bolgar but also in the areas farther to the north. The astronomical equipment of Masd was stated to include an astrolabe, a sextant, and a quadrant. It is also mentioned in connection to his knowledge of calculation of astronomical events such as eclipses and celestial body's trajectories beforehand. The astronomy existed not only on a practical level. Theoretical works on astronomy existed; there is one connected with the name of Kemal al-Dn al-Turkumn written in 1354 in Gulistan that served as commentary to the work of al-Chaghmn from Khwarazmian lands. Archaeological evidence of astrological-astronomical culture also exists; it is a tombstone of the astrologer named Urus Khoja, a native of Crimea (late 14th century). A hemisphere on top of the tombstone bears small dents said to represent the constellation of the stars. Astronomical knowledge also manifested in literary texts. In his "Suheyl and Guldursun" Saif Sarai includes a phrase "the Earth circling the Sun" as a figure of speech or a poetic metaphor; and although the phrase is often interpreted by the popular science literature as an argument for an advanced stage of astronomical awareness of Saif Sarai, in scientific study of the text it is safer to consider it as literary trope to emphasize prestige of astronomical jargon among intelligentsia. Another literary mention of cosmology occurs in Qutb's poem. Modern scholars interpret his text as an expression of constant movement within the universe, where each star constitutes an individual world; this can be understood as an interesting glimpse into the assimilation of cosmological thinking into learned textual cultures, even though it is not a scientific work in the formal sense (Davletshin, 2015:194-198).

The level of theoretical mathematics reached in Golden Horde was high; the scholars closely adhered to classical Islamic traditions of mathematics, founded by the works of al-Khwarizmi and others. A key example of mathematical text produced within the Golden Horde context is the work called At-Tufa film al-isb, possibly written during the rule of uzbek Khan (1313-1342) as a treatise

on applied mathematics (or computation). Mathematical analyses of this work stresses high theoretical level of mathematics reached by its author. This text contains classifications of numbers and algorithms of calculation of square and cubic roots (even of irrational numbers). At the same time the mathematical practices had their practical applications in measurement, calculation and geometry, bordering algebra (Fazlolu, 2015: 98-99).

Urban institutions were a source and focus of medical practice and training in Golden Horde. Research focusing on bimaristans (hospitals) in Golden Horde demonstrates that such institution may have existed in the major centers, though indirectly. This is analyzed as a manifestation of the Islamic urban model. Exchange with the Mamluk Egypt which had already well-established, large medical institutions contributed to this trend by reinforcing existing patterns of learning and scholarly practice across a wider range of territories (Islamov, 1998:96-97).

The multicultural and multilingual nature of education also provided its tools. For example, a common reference to this phenomenon is the Codex Cumanicus, written in 1303, which is a Latin-Persian-Cuman language manual associated with the Crimean peninsula, designed to facilitate communication between speakers of those languages. This exemplifies the need for linguistic tools for the purposes of trade, diplomacy, and missionizing work.

Legal learning or fiqh continued to be among the strongest fields of academic activity and production of commentaries and scholarly works, circulating across the greater Islamic world. The mention of reputable jurists associated with Sarai confirms this idea about the Golden Horde's place in international learning networks (Minnegulov, 2011:306).

Overall, scientific and learned work within the Golden Horde appears to have been a synthesis of the Volga-Bulgar, Khwarazmian, and broader Arabic-Persian traditions, which were nurtured by the institution building (mosques, madrasas, waqf), professional networks (timekeepers, jurists, scribes) and the mobility across states (interregional and beyond) in urban settings. Hence, the Golden Horde seems to have been an active contributor to and participant in a wider, established network of learning of its era, rather than only a regional power center.

Conclusion

Overall, this study shows that education and science in the Golden Horde cannot be treated as a marginal by-product of political history or as a rare “court phenomenon.” In the late period (c. 1375–1405), the cities of the Ulus Jochi sustained a durable system for producing and reproducing knowledge, grounded in Islamic institutional infrastructure and shaped by the practical needs of governance and religious life.

A key mechanism was the urban constellation of mosque–madrasa–waqf, which provided personnel, texts, teaching routines, and material support for learning. Within this environment, professional scholarship took shape: fiqh generated normative expertise for courts and administration, while imperial traditions (the Yasa and biliks) continued to function as a framework of elite legitimacy and political order. The legal culture of the Golden Horde thus appears not as a competition between two incompatible systems but as a working synthesis adapted to a multiethnic polity governing vast territories.

Exact and applied disciplines above all astronomy and computational mathematics developed as urban practices closely tied to ritual requirements (prayer times and qibla orientation) and administrative demands. The case of Bolgar demonstrates that, even on the northern edge of the Islamic world, observation, measurement, and teaching contexts formed a level of competence consistent with broader standards of Islamic science. The metropolitan milieu of Sarai, in turn, intensified the concentration of scholars and strengthened participation in transregional intellectual exchange.

Consequently, the Golden Horde should be understood not only as a military or nomadic empire but also as part of Eurasian circuits of knowledge - an intellectual bridge between the Volga region, Khwarazm, and Egypt. Treating cities as “knowledge environments” makes it possible to

integrate educational institutions, legal scholarship, and scientific practices into a single interpretive model and to explain more precisely how cultural resilience, administrative effectiveness, and religious normativity were sustained in the late Golden Horde.

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[1]Сулейменова Д.К., [2]Ағатай Ө. М.
[1]Ұлыс Жошы ғылыми зерттеу институты,
[2]Қазақстан Республикасының Ұлттық музейі
E-mail: Suleimenova911@gmail.com, agatayotkirbay@gmail.com

XIV ҒАСЫРДЫҢ СОҢЫНДАҒЫ ЖОШЫ ҰЛЫСЫНЫҢ ҚАЛАЛЫҚ ОРТАЛЫҚТАРЫНДАҒЫ БІЛІМ БЕРУ, ҚҰҚЫҚ ЖӘНЕ АСТРОНОМИЯ

Аңдатпа. Мақалада XIV ғасырдың соңындағы Алтын Орданың ірі қалалық орталықтарындағы білім беру институттарының құрылымы мен құқық және астрономия салаларындағы білім өндірудің негізгі тәжірибелері қарастырылып, олардың қалалық өмір мен басқару жүйесіне ықпалы талданады. Зерттеудің маңыздылығы Алтын Орданы тек «көшпелі империя» ретінде сипаттайтын жеңілдетілген көзқарастардан бас тартып, оның қалаларында білімді өндіру мен таратуға қызмет еткен тұрақты инфрақұрылымның болғанын көрсетуімен айқындалады. Жұмыстың ғылыми жаңалығы білім беру, құқықтану және

астрономия салаларын бірыңғай талдау үлгісінде біріктіруінде, орталық және өңірлік қалаларды (Сарай мен Бұлғар) салыстыруында, сондай-ақ астрономияны діни рәсімдердің дәл орындалуын қамтамасыз ететін (намаз уақытын, құбыланы анықтау) қолданбалы өлшеу саласы ретінде, ал құқықты сот жүргізу мен басқару тәжірибесіне енгізілген ресурс ретінде қарастыруында көрінеді. Зерттеудің мақсаттары: мешіттермен байланысты білім беру жүйесін (медреселер мен мектептер), сондай-ақ вакфтық басқару тетіктерін сипаттау; мамандардың (қазылардың, құқықтанушылардың, әкімшілік қызметкерлердің, діни қайраткерлердің және астрономдардың) кәсіби қызметін талдау; білімнің таралу жолдары мен ғалымдардың мансаптық траекторияларын зерттеу; осы институттардың тұрақтылығының құқықтық білімнің дамуына ықпалын бағалау. Зерттеудің әдіснамалық негізін институционалдық тарих, тарихи-құқықтық талдау, ғылым мен білім тәжірибелерінің тарихы және салыстырмалы талдау құрайды. Зерттеу нәтижесінде кейінгі Алтын Орда қалаларында орнықты білім беру құрылымдарының болғаны, Сарайдың ірі зияткерлік орталық қызметін атқарғаны, ал Бұлғарда дамыған астрономиялық тәжірибенің белгілері сақталғаны анықталды. Алтын Орда қалалары діни білімді, әкімшілік қажеттіліктерді және қолданбалы ғылымдарды өзара байланыстыратын білімді өндіру мен қайта жаңғыртудың маңызды орталықтары болды.

Алғыс: Зерттеу Қазақстан Республикасы Ғылым және жоғары білім министрлігі Ғылым комитетінің гранты негізінде қаржыландырылды (IRN BR24992878) XIII–XV ғасырлардағы Жошы Ұлысының этносаяси және әлеуметтік-экономикалық тарихын зерттеужобасы аясында.

Кілт сөздер: Жошы Ұлысы, Алтын Орда, қалалық мәдениет, білім беру, медресе, вакуф, құқықтану, астрономия, Болғар, Сарай

[1]Сулейменова Д.К., [2]Агатай О. М.
[1] Научный институт изучения Улуса Джучи
[2] Национальный музей Республики Казахстан
E-mail: Suleimenova911@gmail.com, agatayotkirbay@gmail.com

ОБРАЗОВАНИЕ, ПРАВО И АСТРОНОМИЯ В ГОРОДСКИХ ЦЕНТРАХ УЛУСА ДЖУЧИ В КОНЦЕ XIV ВЕКА

Аннотация. В статье рассматриваются институциональные структуры образования и доминирующие практики производства знаний в области права и астрономии в крупнейших городских центрах Золотой Орды конца XIV в., а также анализируется их влияние на городскую жизнь и управление. Значимость исследования заключается в преодолении упрощённых представлений о Золотой Орде как исключительно «степной империи» посредством демонстрации существования в её городах устойчивой инфраструктуры, обеспечивавшей накопление и передачу знаний. Научная новизна работы состоит в синтезе трёх исследовательских направлений -образования, правоведения и астрономии - в рамках единой аналитической модели, сопоставлении столичного и регионального центров (Сарай и Булгар), а также в интерпретации астрономии преимущественно как прикладной дисциплины измерения, необходимой для точного исполнения религиозных предписаний (определение времени молитв, киблы), и права как ресурса, интегрированного в практику судопроизводства и управления. Целями исследования являются: характеристика системы образования, связанной с мечетями (медресе, школы) и функционированием вакфов; анализ профессиональных функций специалистов (судей, правоведов, чиновников, религиозных деятелей и астрономов); изучение механизмов циркуляции знаний и карьерных траекторий учёных; оценка влияния устойчивости данных институтов на развитие правовых знаний. Методологическую основу исследования составляют институциональная история, историко-

правовой анализ, история науки и практик знания, а также сравнительный анализ. В результате установлено, что города поздней Золотой Орды обладали устойчивыми образовательными структурами; Сарай выступал крупным интеллектуальным центром; а Булгар демонстрирует свидетельства развитой астрономической практики. Города Золотой Орды играли важную роль в производстве и воспроизводстве знаний, объединявших религиозную сферу, административные потребности и прикладные науки.

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***Ключевые слова*:** Улус Джучи, Золотая Орда, городские центры, образование, медресе, вакуф, правоведение, астрономия, Болгар, Сарай

Information about the authors:

Dinara Kaisarovna Suleimenova – Ph.D., doctoral student, Researcher of the Research Institute for the Study of Jochi Ulus, Astana, Kazakhstan

Otkirbay Mıltıqbayuli Agatay – PhD, Senior Research Fellow, National Museum of the Republic of Kazakhstan

Авторлар туралы мәлімет:

Динара Қайсарқызы Сулейменова – Ph.D докторант, қызметкер Жошы Ұлысын зерттеу ҒЗИ (Астана, Қазақстан)

Өткірбай Мылтықбайұлы Ағатай – PhD, аға ғылыми қызметкері, Қазақстан Республикасының Ұлттық музейі, Астана, Қазақстан

Информация об авторах:

Динара Кайсаровна Сулейменова – Ph.D., докторант, научный сотрудник НИИ изучения Улуса Джучи (Астана, Казахстан).

Уткирбай Мылтыкбайулы Агатай – PhD, старший научный сотрудник, Национальный музей Республики Казахстан, Астана Казахстан

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