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Natural and socio-cultural factors of epidemics (plague, smallpox): The example of the Adyghe population of the Northwest Caucasus

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ABSTRACT

Background. The article discusses the problem of the impact of epidemic diseases on ethnogenesis. As an ancient agricultural ethnic group in contact with nomadic and Mediterranean populations, the Adyghe were formed during periods of frequent epidemics of dangerous diseases caused by the process of animal domestication and subsequent impact of anthropogenic factors. The devastating effect of smallpox and measles pandemics was felt following the establishment of intensive trade exchange during the 2nd century CE by the Roman and the Han empires. The first plague pandemic (beginning with the "Justinianic Plague", 542–543) mostly affected the Balkans and the Eastern Mediterranean. The second plague pandemic, the so-called "Black Death" (1346–1353), which appeared in the center of the Mongol Empire, quickly spread via caravan routes across most of Eurasia. The scale of the epidemic was influenced by the pathogenic complex that had developed by the 14th century, which included humans, the bacterial pathogenic agent itself, and its carriers (large rodents especially black rats, fleas). Factors such as famine caused by overpopulation, low standards of personal and public hygiene, the prevalence of wooden buildings in cities and towns, the fur trade, etc., also had contributory effects. **Objectives.** The study set out to identify the natural and the socio-cultural factors that influenced the spread of the plague and the smallpox epidemics in the North-West Caucasus. **Methods.** The data on which this study is based are formed from collections of narrative sources (Russian, Arabic-Persian, European), archaeological and historical-anthropological works, medical and genetic studies (*electronic platforms:* eLIBRARY.RU, Academia.edu, CyberLeninka, J-STAGE [Japan Science Technology Information Aggregator, Electronic]). *Research methods*: historical and comparative, on which basis a comparative analysis of the impact of the plague pandemic of the mid-14th century centering on contact between on nomadic and sedentary ethnic groups (Mongols and Russians, Mongols and Circassians) was carried out; the individualizing comparison method, which was used to identify the specific means by which the Circassian ethnic group overcame the Black Death pandemic; the systems analysis method, on which basis the roles of pathogenic complex and anthropogenic factors in the course of epidemics were compared. **Results.** The results of the analysis show that the population of the North-West Caucasus were affected by the Black Death plague of the mid-14th century to a significantly lesser extent than the urban centers of the Golden Horde, Rus' and Europe. The serendipitous failure of the pathogenic complex in the former region was due to the following natural and anthropogenic factors: (1) the North-West Caucasus (more precisely, the entire area to the west of the Teberda River) was naturally bereft of effective carriers of the plague bacillus (marmots, gophers, etc.); (2) Matrega and Copa, the two contemporaneous Circassian towns serving as ports for the shipment of grain and other agricultural products, were located on the periphery of the Adyghe settlement area; (3) the dispersed, farmstead way of life among the estuaries and the complex network of peninsulas of the Kuban Delta, mountains and forests of the NWC contributed to the rapid adoption of quarantine measures; (4) a reliable vitamin-rich nutrition system (sturgeon and their caviar, goat meat and cheese, fruit, honey, etc.); (5) a well-developed system of hygiene and disease prevention (smallpox, malaria), whose existence was retrospectively established based on sources from the 17th–19th centuries. **Conclusion.** The plague pandemic that took place within the unified space of Mongol imperial communications had a huge impact on the historical fate of the Adyghe ethnic group, which was manifested in their paradoxical numerical growth against the backdrop of general depopulation. Against the backdrop of frequent epidemics, Adyghe developed strict and quite effective rules for preserving life and health, covering disease prevention, personal and public hygiene. Some particularly impressive practices, if not created by Adyghe folk medicine, then preserved there and later transmitted to Ottoman Turkey and Western Europe, was manifested in the original practice of smallpox inoculation.

KEYWORDS: epidemic diseases, pathogenic complex, plague pandemic, quarantine, smallpox, vaccination, traditional medicine, hygiene

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Природные и социокультурные факторы эпидемий (чумы, оспы): на примере адыгского населения Северо-Западного Кавказа

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АННОТАЦИЯ

Введение. В статье ставится проблема воздействия эпидемических заболеваний на этногенез. Как древний земледельческий этнос, контактирующий с кочевыми и средиземноморскими популяциями, адыги формировались на фоне частых эпидемий инфекционных заболеваний, порожденных процессом доместикации животных и последующим воздействием антропогенного фактора. Опустошающий эффект пандемии оспы и кори приобрели по мере того, как Римская и Ханьская империи установили интенсивный торговый обмен во II в. Первая пандемия чумы («Юстинианова чума», 542–543 гг.) наибольшим образом поразила Балканы и Восточное Средиземноморье. Вторая пандемия чумы, так называемая «Черная смерть» (1346–1353 гг.), появилась в центре Монгольской империи и по караванным путям распространилась по большей части Евразии. На масштабы эпидемии повлиял сложившийся к XIV в. патогенный комплекс, который включал человека, патогенного агента и его переносчиков (крупных степных грызунов, черных крыс, блох). Воздействовали также такие факторы, как голод, вызванный перенаселением, низкие стандарты личной и общественной гигиены, преобладание в городах деревянных построек, торговля мехом и др. **Цель исследования** — выявление природных и социокультурных факторов, повлиявших на распространение эпидемий чумы и оспы на территории Северо-Западного Кавказа. Методы. Данные, на которых основано исследование, сформированы из сборников нарративных источников (русских, арабо-персидских, европейских), археологических и историко-антропологических работ, медицинских и генетических исследований (электронные платформы: eLIBRARY.RU, Academia.edu, КиберЛенинка, J-STAGE [Japan Science Technology Information Aggregator, Electronic]). Научные методы исследования: историко-сопоставительный, на основе которого проведен сопоставительный анализ воздействия пандемии чумы середины XIV в. на кочевые и оседлые этносы (монголы и русские, монголы и черкесы); метод индивидуализирующего сравнения, позволяющий выявить специфичность, неповторимость того, как черкесский этнос преодолел пандемию «Черной смерти»; метод системного анализа — на его основе были выделены необходимые и достаточные аспекты эпидемий, их обусловленность патогенным комплексом, антропогенным фактором. **Результаты** предпринятого анализа убеждают нас в том, что население Северо-Западного Кавказа пострадало от «Черной смерти» середины XIV в. существенно меньшим образом по сравнению с городскими центрами Золотой Орды, Руси и Европы. Фатальный патогенный комплекс здесь не складывался в силу стечения природных и антропогенных факторов: 1) Северо-Западный Кавказ (точнее: все пространство на запад от р. Теберды) был лишен от природы популяций эффективных переносчиков чумной палочки (сурки, суслики и др.); 2) два города Черкесии (Зихии) этого времени — Матрега и Копа — были на периферии ареала расселения адыгов и работали преимущественно как порты по отгрузке зерна и других продуктов сельского хозяйства; 3) дисперсный, хуторской образ жизни посреди лиманов и сложной сети полуостровов дельты Кубани, гор и лесов Северо-Западного Кавказа способствовал быстрому введению карантинных мер; 4) стабильно высокий уровень обеспеченности продовольствием и сбалансированная, насыщенная витаминами система питания (осетровые и их икра; козье мясо и сыр; фрукты, сухофрукты, мед и т. п.); 5) развитая система гигиены и профилактики болезней (оспы, малярии), устанавливаемая ретроспективно, на основе источников XVII в. — первой половины XIX вв., способствовала поддержанию здоровья. **Заключение.** Единое пространство коммуникаций Монгольской империи и пандемия чумы оказали громадное воздействие на историческую судьбу адыгского этноса. Это проявилось в их парадоксальном численном росте на фоне общей депопуляции. На фоне частых эпидемий адыги выработали строгие и достаточно эффективные правила сохранения жизни и здоровья, охватывавшие профилактику болезней, личную и общественную гигиену. Особенно впечатляющий опыт если не созданный адыгской народной медициной, то сохраненный и переданный в Османскую Турцию и Западную Европу, проявился в оспопрививании.

КЛЮЧЕВЫЕ СЛОВА: эпидемические болезни, патогенный комплекс, пандемия чумы, карантин, оспа, инокуляция, народная медицина, гигиена

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ИСТОЧНИКИ ФИНАНСИРОВАНИЯ: авторы заявляют об отсутствии спонсорской поддержки при проведении исследования.
КОНФЛИКТ ИНТЕРЕСОВ: авторы заявляют об отсутствии конфликта интересов.
ДЕКЛАРАЦИЯ О НАЛИЧИИ ДАННЫХ: данные, приведенные в исследовании, являются результатом анализа научной литературы, представленной в открытом доступе. Ознакомиться с материалом, подтверждающим выводы этого исследования, можно через представленные в статье сноски и список литературы.

СООТВЕТСТВИЕ ПРИНЦИПАМ ЭТИКИ: утверждение протокола Локальным этическим комитетом не требовалось, так как исследование не проводилось на людях или лабораторных животных.
ВКЛАД АВТОРОВ: С.Х. Хотко, Н.А. Почешхов, Р.М. Шхачемуков — разработка концепции и дизайна исследования; Н.А. Почешхов, Р.М. Шхачемуков — сбор данных; С.Х. Хотко, Н.А. Почешхов, Р.М. Шхачемуков — анализ и интерпретация результатов; все авторы одобрили финальную версию статьи перед публикацией, выразили согласие нести ответственность за все аспекты работы, подразумевающую надлежащее изучение и решение вопросов, связанных с точностью и добросовестностью любой части работы.
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INTRODUCTION

When studying the life of an individual figure, historians often encounter details concerning that individual's various illnesses, which profoundly affect his or her personal life, education, creativity and political career. It may surprising, then, that historical science has developed without paying sufficient attention to the history of illnesses of entire peoples and populations, often ignoring such a globally significant factor in humanity's development as microparasitism.

The history of the Adyghe (Circassian) ethnic group has also tended to be considered in isolation from this factor. Meanwhile, being an agricultural people living in a zone of clashing civilizations, the Adyghe were formed during periods of numerous epidemic diseases, infections, and infestations. Thus, in the "anamnesis" of Adyghe appear all those diseases (including dangerous bacterial infections) caused by the domestication of process of animals and consequent close coexistence with their waste and excrements (smallpox, measles, influenza, typhus, bubonic plague, cholera, tuberculosis, malaria and other endemic Afro-Eurasian infections) [1, p. 295]. It is widely known that much of the horrific effect of the contact of European sailors and colonists with the two American continents' population came from pathogens they carried: up to 95% of the indigenous population of the pre-Columbian America is believed to have been destroyed by European infectious diseases [1, p. 120]. Measles, tuberculosis and smallpox are associated with cattle, while influenza is known to have been passed from pigs and ducks, whooping cough — from pigs and dogs, tropical malaria — from chickens, ducks and other birds, etc.

William Hardy McNeill (1917–2016), an outstanding historian, student and associate of Arnold Toynbee, showed that pandemics (including smallpox and measles) had a devastating effect throughout Northern Eurasia as the Roman and Han empires established intensive trade exchange both by land and sea. The first widely documented European pandemic was the so-called "Antonine Plague" in 165–180 CE, while a second pandemic of measles and smallpox occurred in Western Europe in 251–266 CE [2, pp. 179–180].

While it became traditional in European historical writings to associate all pandemics with the plague, in reality, these included epidemics of measles, smallpox, influenza, typhus, and dysentery. In close chronological proximity to the Mediterranean ones, two pandemics also broke out in China: in 161–162 CE and 310–312 CE. On the basis of their described symptoms, these pandemics were also caused by measles and smallpox [2, pp. 199–200]. Jared Mason Diamond, an evolutionary biologist, biogeographer, and anthropologist, ironically defined the development of the world trade routes as "a gift from fate to microbes." The populations of Europe, Asia, and North Africa turned into one "giant pathogenic nursery" [1, p. 309].

The first bubonic plague pandemic, which occurred in 542–543 CE, was the so-called "Justinian Plague." Its civilizational consequences, which disrupted of Byzantine expansion in the Mediterranean, included the siege of Constantinople by "barbarian" Avars and Slavs in 626 CE. Fundamental changes in the ethnic composition of the Balkan Peninsula, including the emergence of strong Slavic states (Croatia, Serbia, Bulgaria), were associated with the effects of the plague on the previous population during the middle of the 6th century CE. Chinese descriptions of the plague dated to 610 and 642 CE imply that the disease came to China from the west along the caravan routes, although a Himalayan origin cannot be ruled out.

During this period, the plague pandemic must also have affected the Caucasus. L.I. Lavrov, citing data from A.P. Runich, notes "traces of plague microbes" in a 6th–8th century CE burial site near Kislovodsk [3, p. 66; 4]. Nevertheless, there are no reports of such a devastating effect on the North-West Caucasus: on the contrary, it was during this period that the Zikhian (Kasozhian) confederation increased its territory.

The present work aims to examine the body of information detailing how population of the Northwestern Caucasus overcame the largest pandemic challenge in the middle and second half of the 14th century, allowing that region to be classified as among those areas of Eurasia that suffered from plague to a significantly lesser extent. While the plague cycle in Europe and Western Asia ended by the end of the 17th century, this heralded the beginning of the smallpox era. Meanwhile, a number of reports on the practice of variolation — or inoculation against smallpox — among the Adyghe of the Northwestern Caucasus can be dated back to the first quarter of the 18th century. In this connection, our goal is to identify the natural and the socio-cultural factors that contributed to the increased resistance of the Adyghe population to two of the world's most dangerous infectious diseases.

METHODS

The data on which the study is based were formed from collections of narrative sources (Russian, Arabic-Persian, Eu-

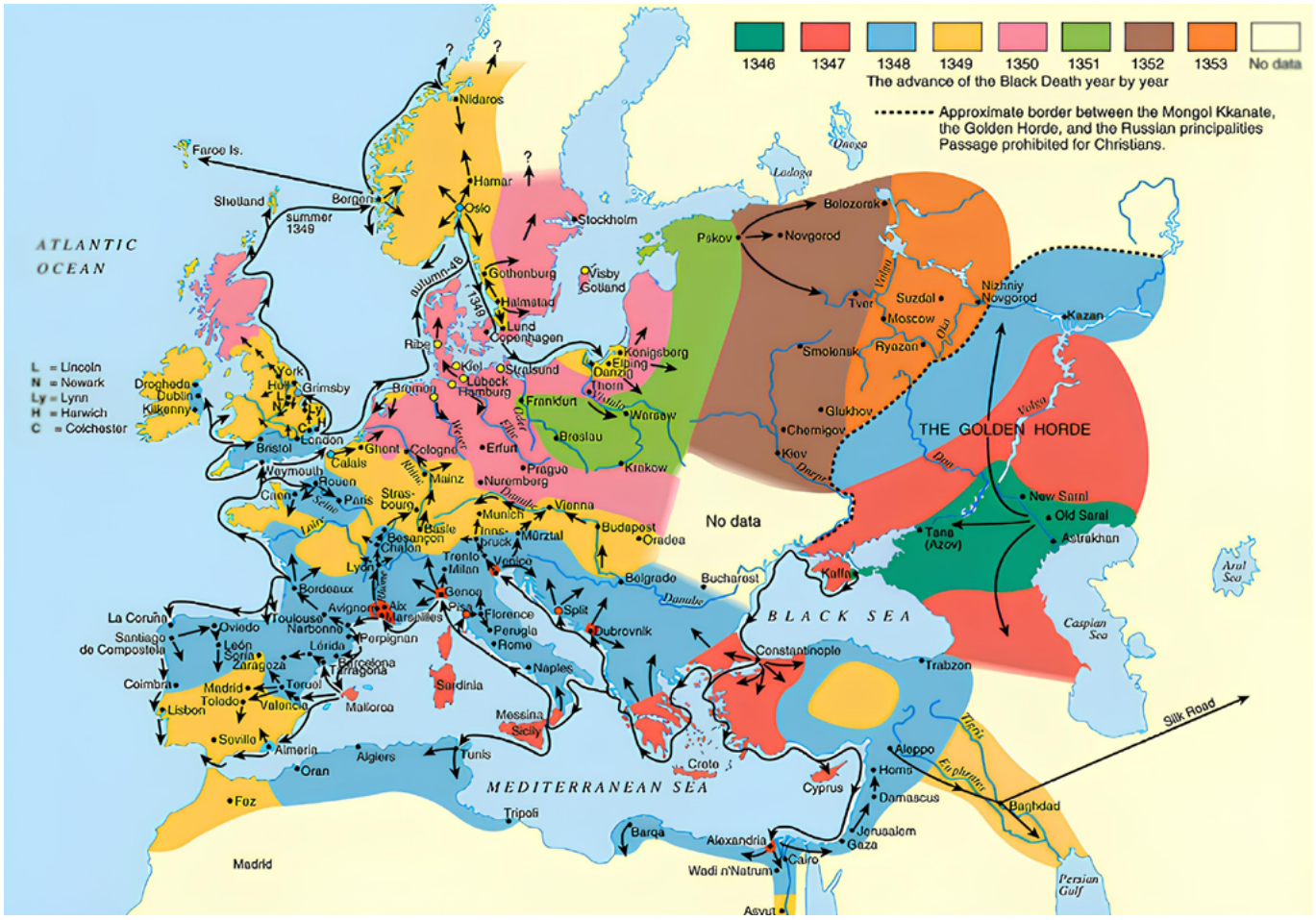

Fig. Plague spread in Europe and the Middle East, 1346–1353 CE
Note: The Origin and Early Spread of the Black Death in Italy: First Evidence of Plague Victims since the 14th century Liguria (Northern Italy), 2017.

Рис. Распространение чумы в Европе и на Ближнем Востоке, 1346–1353 гг.
Примечание: рисунок приведен по: "The Origin and Early Spread of the Black Death in Italy: First Evidence of Plague Victims since the 14th century Liguria (Northern Italy)", 2017. [4].

ropean), archaeological and historical-anthropological works, medical and genetic studies (electronic platforms: eLIBRARY.RU, Academia.edu, CyberLeninka, J-STAGE [Japan Science Technology Information Aggregator, Electronic]).

When analyzing the problem, *basic scientific methods* applying in historical and ethnological studies were used: *historical and comparative*, on the basis of which the comparative analysis of the impact of the plague pandemic of the mid-14th century on nomadic and sedentary ethnic groups (Mongols and Russians, Mongols and Circassians) was carried out; the *individualizing comparison method*, which is used to reveal the specific ways in which the Adyghe ethnic group overcame the pandemic of the "Black Death"; the method of *systems analysis*, on which basis pathogenic complex and anthropogenic factors were compared in terms of their epidemiological roles. Here, the pandemic process was considered in terms of a system that includes a number of subsystems: evolution of the pathogenic complex; anthropogenic aspects of the epidemic (including factors such as the level of the interstate communications; sanitary and hygienic traditions and knowledge; immunological development; general health, nutrition, etc.); features of the biocenosis and ecology of the region affected by the epidemic.

The *retrospection* method was also used to verify the development of the process under study in accordance with reliably established historical records. Within the framework of retrospection, historical data concerning the periods adjacent to the reconstructed period were obtained. The section of the article devoted to personal and public hygiene was based mainly on the application of this method.

RESULTS

The second plague pandemic of 1346–1353 CE and the depopulation of Eurasia

A relatively large amount of historical information about the Northwest Caucasus is dated to the era of Mongolian conquest (Golden Horde). This period coincides with the second pandemic of bubonic plague, which broke out in 1346–1353 CE. This coincidence provides the minimum conditions for analyzing to what extent that territory appeared to be a part of the

area of the Black Death pandemic (Latin *Atra mors* — a metaphorical name that became established in the literature during the 17th century).

The infectious agent of the bubonic plague is the plague bacillus *Yersinia pestis*, named after its 1894 discovery by A. Yersin, a bacteriologist from the Pasteur Institute. (The bacillus was originally named *Pasteurella pestis*; its renaming into *Yersinia p*. took place in 1967.) This pathogen, which can also cause plague pneumonia and septicemic plague, tolerates low temperatures rather well, but is quickly destroyed by boiling or contact with disinfectants. There are three biovars of *Yersinia p*.: biovar *antiqua*, which caused the Justinian Plague; biovar *medievalis*, which is associated with the Black Death, and biovar *orientalis*, which is associated with the third pandemic (1855, China, India) and the most recent plague outbreaks.

A group of genetic researchers [5] demonstrated in 2022 that with high probability the Black Death started from the area of Kara-Dzhygach village (modern Kyrgyzstan) in 1338–1339 CE and that the spread of *Yersinia p*. was connected with trade contacts [5, p. 723]. In the course of that study, the genomes of the plague of 1338–1339 were compared with 203 modern *Yersinia p*. genomes and 47 historical genomes obtained from sites across Eurasia. The results showed that the plague strain that devastated northern Kyrgyzstan in 1338–1339 was the ancestor of all the other 14th-century plague genomes that have ever been sequenced.

The Black Death would claim over 50 million lives from China to England. From that number, around 25 million died in Europe, whose population had declined from 73 million (1300) to 50 million by 1350 and then to 45 million by 1400. Thus, the consequences of the pandemic significantly affected the development of the world civilization over a period of more than a century and a half. The unprecedented mortality also resulted in very large-scale cultural transformations for the survivors [6, p. 10]. G. Duby marks 1348 as the last year in the history of the French Middle Ages [7, p. 341–342].

The Black Death was the beginning of a long plague cycle that lingered as late as 1700 [8, p. 102]. Infection with bubonic plague occurred, as was shown in 1898 by P.-L. Simon (an employee of the Pasteur Institute), through the flea *Xenopsylla Cheopis*, which is a parasite associated with black rats *Rattus rattus* [9, p. 11].

Like humans, black rats are easy prey for *Yersinia p*. The species is an excellent climber, which allowed the disease to be transported along mooring ropes from one port to another. Infesting the walls and roofs of domestic homes and warehouses, they contaminated food with their excrement, but more importantly, spread the infected fleas parasitic upon them. The first Mediterranean pandemic is thought to have been mainly spread by black rats. The chronology of the first plague cycle was from 542 to 767.

William H. McNeill asserts the possibility that black rats were initially infected with plague by wild rodents, "in whose burrows the plague bacillus *Pasteurella pestis* resides on a permanent, stable basis" [2, p. 190]. Two such locations are identified during the first centuries CE: (1) at the foot of the Himalayas between India and China; (2) in the region of the Great Lakes of Central Africa [2, p. 190]. According to McNeill, the Eurasian steppe corridor (from Manchuria to the Northern Black Sea region) became a plague area only in the 14th century as a result of the migration of the plague bacillus with Mongols, who carried the infection with their animals and equipment when invading Yunnan and Burma (from 1252). At that time, Mongols did not yet have a fear of that disease and so had not developed basic precautionary rules (for example, not to touch a slowly moving animal) [2, pp. 235–236]. Thus, the conquerors brought the plague bacillus to their steppes, where it took root in local rodent populations to become an endemic phenomenon. In 1331, 90% of the population of Hebei province in China lost their lives to the plague. In 1345, the epidemic engulfed the main cities of the Golden Horde — Sarai and Astrakhan. By the winter of 1345–1346, the Jochid troops had brought the infection to the walls of Caffa; from there, the disease spread on Genoese ships to Europe [10, p. 138].

Epidemiologists formulate the concept of the pathogenic complex to include humans, pathogenic agents and their carriers. Such a complex, which is bio-cultural in its nature, includes such indicators as population density, health status (a population weakened by hunger suffers from any epidemic to a much greater extent), ecological niche, soil morphology, solar radiation, type of housing, clothing, etc.

The gradual retreat of the disease was connected with the replacement of wooden houses with stone ones (following large urban fires), improved living conditions and increased cleanliness, and the removal of small domestic animals out from living quarters: i.e., with the elimination of "those conditions that allowed lice to swarm in houses" [8, p. 97]. Salvation was achieved through flight, quarantine, fumigation, disinfection, burning of household objects, avoidance of contact, adherence to new rules of communication (for example, it was forbidden to stand in such a way that the wind from a suspicious stranger blew on person), prevention of mass gatherings in churches and at funerals [8, p. 101]. E.E. Berger notes that "it was to the plague that Europe owes the appearance of a quarantine service and the foundations of urban health care" [11, p. 337]. Ship crews were kept in quarantine for up to 40 days. General sanitary measures, such as quarantine, were certainly well known to the highlanders of Caucasus [12, p. 151]. As stated by E.A. Sheudzhen, as the "armor of civilization" improved, people became less dependent on the rhythms of threatening disasters (floods, droughts, epidemics) [13, pp. 49, 64].

Unlike untreated pneumonic plague, bubonic plague allowed a small percentage of those infected the chance of recovery. In such cases, long-term immunity was developed. Moreover, according to one of the authoritative French medievalist historians R. Fossier (1927–2012), healthy "islands" existed in the "ocean" of infection due to various serendipitous factors. One of these factors is the blood group: R. Fossier confidently wrote that "a person with the third blood group is immune to the plague bacillus, and where this group was prevalent (for example, in Hungary), the plague did not rage at all or almost did not" [14, p. 20]. The historian returned to the thesis to qualify that "some people could have been predisposed to acquiring serological immunity to the infection," and that the

prevalence of the third blood group among "peoples of either purely Celtic or Asian origins, like Hungarians, may explain the "blank spots" on the epidemic map" [14, p. 34]. However, some regions of Europe certainly suffered much less: Navarre, Milan, Silesia, Bohemia [15, p. 193]. In their article on immunological aspects of immunity to plague and Familial Mediterranean Fever (2020), K.A. Glatter and P. Finkelman also came to the conclusion that there could have been increased resistance to the plague in a number of populations [16].

The Black Death and the Peoples of the Mongol Empire

The problem of the impact of the Mongol Empire on the changing balance of infectious diseases was formulated by McNeill [2, pp. 221–243]. Indeed, the anthropogenic factor is obvious: the unification of the Eurasian steppe world created new opportunities for microparasites that "traveled" with trade caravans and armies. Transmission of infection was ensured by fleas that parasitize humans, horses, pigs, dogs, cats, rodents, foxes, hares, etc. The success of the flea as a vector of diseases is facilitated by its high fertility, impressive lifespan (up to 500 days), and possibility of a very long egg-larva-pupa-imago development process (from 16 days to a year). Most importantly, plague microbes do not kill this ectoparasite [17, p. 93–101]. Although the plague pathogen in the rodent–flea–rodent chain was considered as the main mechanism of natural plague's functioning transmission in 20th century epidemiology, in recent years it has become clear that plague microbes are capable of creating a bio-pellicle, which can persist for a long time in the soil and in nematodes' organisms, and which are able to penetrate insect's body [18, p. 52–53].

Ibn al-Wardi, who became a victim of the plague in 749 AH (1348/1349 CE), stated that the epidemic began in 747 AH (1346/1347 CE) "in the lands of Uzbeks," which then included Crimea, and then spread to the Balkans and Asia Minor [19, p. 530]. A Russian chronicler recorded the fact of the widespread pestilence (plague) in 1346, listing Besermyans, Tatars, Armenians, Georgians, Jews, Italians, and Circassians among the affected peoples [20, p. 108].

The pandemic provoked a protracted political crisis in the Ulus of Jochi, known in the Russian chronicles as the Great Confusion (21 khans succeeded each other on the throne between 1359 and 1380). The highest mortality rates naturally befell the urban concentrations in the Volga region and in the Northern Black Sea region [21, p. 33]. One of these was Shakrak, a stronghold of Mongol power over the Circassian population. The city, which was mentioned in 1320 by Abu-l-Fida in his encyclopedia when describing the internal structure of the Ulus of Jochi [22, p. 207], was located in the area of the present-day village of Ivanovskaya, which is approximately 20 km from the Kuban River. The time of this city's existence was localized by specialists as occurring between 1290 and 1364. It was characteristic of the initial phase of the Great Confusion and the process of disintegration of the Jochid state that such cities ceased to exist [23, p. 138]. Here, it is important to understand that the Golden Horde's control over Circassia from 1238 onwards was not total but coexisted with the indigenous political hierarchy, which was headed by a great prince [24, p. 73].

Thus, one of the most obvious consequences of the plague was the severe depopulation of the nomadic core of the empire, (so-called Dasht-i Qipchaq). Sarai's military and administrative control over Circassia was weakened to such an extent that practically ceases to be traced in the narrative sources. The strengthening of Circassian power taking place at this time can conversely be assumed to have been accompanied by its demographic growth. The same scenario took place in the relations between the Horde and Rus'. The Russian population, which was at that time quite dispersed in forest settlements, did not suffer such a terrible blow as the nomads. Nevertheless, the plague did affect Rus' later, extending over more than a hundred years in the form of a series of outbreaks. Thus, the "great pestilence" covered almost the whole North-Eastern Rus' in 1418–1419 [25, p. 189]. The effect of the disease was aggravated by a famine and the invasion of Edigey in 1408. A Russian chronicler described the sequence of disasters as follows: first plague, then a famine: "There was a famine after that great plague" [25, p. 189]. Then, disasters (famine and plague), whose effect were mutually reinforcing, continued in 1421, 1422, 1431, 1436, 1442, and 1445. After this, an internecine war occurred (1425–1453), which recalls the connection between the Black Death and the Great Confusion. S.A. Nefedov describes an *eco-social crisis* taking place in the territory of Muscovite Rus' [25, p. 196].

The growth of human trafficking in the Black Sea basin, initially provoked by the Mongol wars, intensified under the influence of the chaos and depopulation, caused by the plague pandemic [26]. Labor, soldiers, and women were much in demand. B.Z. Kedar emphasizes that "depopulation certainly contributed to the export of Black Sea slaves to the cities of Italy, which were experiencing an acute shortage of labor." Additionally, "the Mamluk army of Egypt was greatly weakened by periodic plague outbreaks, and this led to the sultans asking their Genoese suppliers of slave soldiers to make up quickly for the losses" [27, p. 14].

In the second half of the 14th century, Circassia emerged as the main donor population of the Mamluk mobilization system. This was probably the result of several factors: the close location of the main centers of such mobilization (Tana and Kaffa); the Islamization of the ordinary Turkic population in the Ulus of Jochi, which set legal limits on the trade in young Kipchaks; probable depopulation in the western, Black Sea regions of the Ulus of Jochi and — conversely — the preservation of the demographic balance in the Adyghe area. In his article on the plague and its impact on the Mamluk Army, D. Ayalon describes the Black Death as constituting one of the key reasons for decline in the Turkic Mamluk population [28, p. 67–68]. When describing Circassia as a province of the Ulus of Jochi, the Cairo historian al-Qalqashandi characteristically noted that Circassians made up the majority of the Egyptian army for the simple reason that "they constituted the majority of the slaves imported [to Egypt]" [29, p. 74]. H. Barker noted the remarkable physical qualities of the Circassian Mamluks: "Circassians were stereotypically perceived as being physically stronger than the Turks, courageous and always ready to strike the first blow, as well as having a strong sense of group solidarity ("asabiyya")" [30, p. 97].

During the later Burji dynastic period during which Egypt was dominated by former Circassian slaves (1382–1517), no fewer than 16 plague epidemics occurred [31, p. 60]. The European-Indian trade centered on Alexandria ensured that Circassian sultans bathed in luxury despite the rapid decline in the empire's population. Against the backdrop of the plague, grandiose architectural (religious and educational) complexes, caravanserais, covered markets, palaces, fortresses were built, and crafts and encyclopedism flourished. Under Circassian rule, Cairo became the setting for the plots of *A Thousand and One Nights*, but the bitter reality consisted in constant devastation from plague. The desire to acquire adult slaves, preferably those who had already been through a war in their homeland, was due to the possibility that all the young recruits concentrated in the military schools could die in a matter of days.

From this evidence, the losses due to plague in the Adyghe settlement area can be cautiously assumed to have been significantly lower than among the nomads. This scenario is connected with the favorable natural and geographical features of the North-West Caucasus, along with its adjacent steppe zone, which was not included in the habitats of effective carriers of the disease — marmots, gophers, gerbils [32, p. 41–106; 33, p. 286].

According to the remark of G.G. Tkhagapsova, a specialist in the field of folk medicine and ecological traditions of the Adyghe, the fact that the Adyghe did not stock up on flour, instead limiting themselves to small portions prepared in hand mills, could have been of fundamental importance. Developing this observation, the probability can be stated that grain reserves were also relatively small and reliably prevent from access to rodents.

Based on the retrospective method, the presence can be assumed on the territory of an Adyghe estate during the 14th century of wicker, log or plank barns for grain storage, which would have stood on high support pillars. Flat wide stones placed on the pillars sufficiently high from the ground supported the structure of the granary under a roof made of straw, boards or shingles. In this way, grain was stored dry, ventilated, and inaccessible to rodents [34, p. 641]. Such retrospection is appropriate given the high conservatism of the Adyghe culture and the continuity of its population. Similar barns on pillars with insulating slabs are known in ancient Spain from the turn of the 2nd and 1st millennia BC.

Each settlement and most households consumed their own products, as well as exchanging surpluses with those areas that suffered from crop failure, epidemic or war [35, p. 95]. There were also good opportunities for selling agricultural products to foreign markets in Circassia during the 13th–18th centuries.

The resistance of population to diseases was also influenced by nutritional factors, including the availability of food, its nutritional balance, and compliance with certain hygienic preparation requirements. Considering the problem of the relationship between hunger and epidemics, F. Braudel cites a very typical Tuscan folk saying: "The best cure for malaria is a well-filled pot" [8, p. 95].

G. Interiano notes that the diet of Circassians of the Kuban Delta included sturgeon [36, p. 51]. Sturgeon caviar and meat are highly nutritious. The caviar in particular contains a rich set of complete proteins and polyunsaturated fatty acids, including Omega-3, as well as serine, lysine, leucine, phosphorus, potassium, magnesium, iron, sodium, zinc and vitamins A, B, C, D, E. This food has long been famed for its medicinal properties including normalization of blood pressure and rejuvenation of skin.

The main animal in the herd of Circassians was goat [37, p. 221], the beneficial nature of whose milk and meat for health was recognized by the people of that time. In particular, this is indicated by the Adyghe proverb: "Mel zykheva nekhere bzhen zykhepk'a" ("[The broth] into which the goat jumped is preferable to that in which sheep was cooked"). Even more significantly in the context of the present topic, according to the observations of N.D. Russev, "the smell of goat was considered a very effective remedy against infection, repelling plague carrying fleas"[1].

The Adyghe food system is recognized as very balanced, supplementing an abundance of bread and meat with fruit all year round [38, p. 126]. A very important element of that system was the large-scale procurement of dried fruit, which fully provided the population with vitamins. Stocks of dried fruit in the Abzakh storerooms are often mentioned in sources since the period of the Caucasian War: "Fires in the saklya, scattered things, scattered dried pears and apples, an abundance of poultry" [39, p. 35]; "what God sent during the day: corn, wheat, peas, dried pears, in a word, everything that a soldier managed to seize in an aul" [40, p. 180]; "But what surprised us most of all was the appearance at such a time (early March, author's note) of a multitude of apples, oranges, pears, potatoes, cabbage, etc." [39, p. 235].

The idea that it is necessary to regularly eat pepper, onions, and garlic was well established in folk hygiene. "The peaceful Circassians, inhabitants of Kuban swamps on the left side," as the historian of the Cossacks I.D. Popko noted, "protect themselves from scurvy by an extremely abstinent and active lifestyle, as well as through eating plenty of pepper, garlic and onions. A mother who wants to get rid of a child bothering her, will put an onion in his hand, and he will eat it without anything, with a comforted and cheerful look, like a gingerbread cookie" [41, p. 41]. Such a diet is believed to reduce the risk of severe malaria and practically eliminate the incidence of scurvy.

Hygiene standards

The main method of resisting epidemics was quarantine, avoiding communication, and regulating contacts if they could not be avoided completely. In that regard, well-studied institutions and traditions such as hospitality, can be reinterpreted. A guest house, where a guest would stop right off the road, was transformed into a "hospital" if necessary. The guest was examined, helped to undress, and his clothes taken for cleaning. Washing of face, hands and feet was a mandatory procedure carried out with participation of the host's daughters [36, pp. 130–131].

[1] Russev N.D. *Noseless Gatekeeper of the Epochs: "Black Death" in the West and East of Europe.* (In Russ.) URL: http://yakov.works/history/14/2/350russ.html (Accessed: 16.08.2024).

A. de la Motraye, an important author in the history of Adyghe folk medicine, noted cleanliness in cooking (cutting up carcass, selected pieces of which then were washed several times in spring water) [36, p. 133]. He also made a remark about the obligatory airing of bedding: "after they get up, not a single unmade bed is visible" [36, p. 131].

The theme of cleanliness was also mentioned by the Polish traveler J. Pototski: "The general appearance of their dwellings is pleasant; they stand in a row, surrounded by fences; one can feel the desire to keep them clean"; old Shabas' house is "remarkably clean" [36, p. 233]. P.-S. Pallas, a German scientist in the Tsar's service, in 1793 noted the cleanliness of Kabardians in their houses, streets of villages, their clothes, and cooking [36, p. 219]. He wrote about the Temirgoy people as being "rich and clean" [36, p. 223]. In 1837 J. Bell stayed at the Indaroko estate in the Pshada valley in a "very clean guest house" [35, p. 98]. There were many similar reviews that create the impression of a highly directed activity on the part of the population to keep their settlements clean.

Folk hygiene knew about means for fighting fleas. J. Longworth, who spent the night in the still unfinished house of a rich commoner in Tsemez region, noticed that the floor was covered with fresh leaves (it was not mentioned which ones) "to drive out fleas" [42, p. 262]. The Explanatory Dictionary of the Adyghe Language contains the lexeme "бжыдзэгъалIэ" [bdzhidzegal'ə] — "grass used to kill fleas" — unfortunately, without specifying its botanical name [43, p. 26]. In 1855, L. Oliphant was pleased to note the quality of beds and the complete absence of insects in them [44, pp. 22–23].

Folk hygiene developed very clear rules aimed at preventing malaria: placement of dwellings on hills and mountain slopes; trees should not shade the dwelling; ventilation provided by the design of the house; a constant fire in the hearth to keep the room disinfected; consumption of only fresh water from a spring or river (yesterday's water was considered harmful); if necessary, forced treatment of malarial sites was carried out in early spring and in late autumn (on the Circassian coast the malarial season covered the period from early June to late September, with its peak in mid-August); consumption of spicy food, generously flavored with pepper (it was normal to eat a pod of the hottest pepper with nothing else) [45, pp. 38–39, 51]. I.N. Klingen mentions a "lifestyle unusually strict adapted to this" as the main reason for the low incidence of malaria [46, p. 47]. He also notes that the Circassians and coastal Abazins carefully maintained the beds of rivers flowing into the sea (there were about 80 of them), preventing them from becoming swampy. While coastal forest areas were protected, at the same time they were actively thinned out, including with grazing numerous herds of goats and sheep, which ate all the undergrowth [46, pp. 46, 48].

A.O. Makhvich-Matskevich describes the organization of an Abadzekh estate's space in which nuclear families lived separately from both the head of the large family and the remaining households. Slaves also lived with their families in separate buildings, which were no different from the master's. On the territory of an estate, there could be up to 15 houses. All cattle and poultry yards (cowsheds, sheepfolds, goat houses, chicken coops) were located separately. The only animal that could be localized nearby was the horse. One or more horses were generally stabled behind the wall of the living quarters but under the same roof [47, p. 3]. However, separate stables were also erected, despite the main livestock being kept on pasture all year round.

Thus, in cases of illness (fever), a highlander had little contact with other members of his extended family; here, the organization of quarantine was facilitated by the fact that his children could be taken in not only by their parents, but also by their extended families.

As obligatory element of the housing and settlement complex were latrines. Constructed of wattle and daub, round in cross-section, with thatched roofs, these made a most favorable impression on travelers [36, p. 219]. A separate latrine was arranged for the guest yard, comprising an independent fenced-off sector adjacent to the owner's yard.

The most effective prevention consisted of strict upbringing. Children were treated like adults albeit not fully developed due to their mental and physical abilities. They were not picked up in public, were not caressed, and were taught the value of work (for peasants) and military affairs (for nobles). The practice of atalychestvo — the practice of giving up one's offspring to be raised by vassals or kunaks (clients) from among other "tribes" or estates — testifies to their readiness to steadfastly endure the loss of a child due to illness, accidents (for example, during horse riding), military attacks, etc.

Ph. Aries drew attention to the very cold-blooded attitude towards childhood, which period was very short, and following which a little human became equal to adults, "sharing work and games with them." If a child died, the general rule was not to pay too much attention to it — "after all, another one would soon appear in his place" [48, p. 9].

The general health of the Adyghe population (more broadly, Abkhaz-Adyghean) was considered in Spartan terms. G. Interiano wrote that a baby was taken out into the cold and washed with cold water [36, p. 47]. In the solitary burial mound "Il-2", in the burial of an Adyghe warrior-rider, "Schmorl's nodes were recorded on the skeleton, comprising traces of physical stress on the upper half of the body, both in childhood and adulthood (the relief of the upper limbs was highly developed). From the recorded caries and tartar can be assumed a high proportion of plant components in the diet. […] No traces of infections, chronic hypothermia or traces of metabolic disorders on the bone material were found" [49, pp. 162–163].

For most of his life, a highlander might not suffer from colds at all. J. Bell noted with surprise how his friend Shamuz Shupako (a first-rate Natukhay nobleman) had no experience of illness ("he has so little experience of illness") and did not understand why a man should not be in the cold wind when he had a fever [35, p. 76].

The idea of such rationality based on a combination of ancestral knowledge with that borrowed from other peoples in order to counteract epidemics does not seem far-fetched. The highlanders of Caucasus were capable of breeding grain and industrial crops, adopting valuable experience related to crop rotation, animal husbandry, crafts, and medicine.

In the Circassian folk medicine of the 17th–18th centuries, an advanced method for **preventing smallpox**, which took over from plague during that era, is known to have been practiced. The Circassian method consisted of inoculating small children with the disease from a patient who was in the recovery stage. The weakened smallpox bacteria produced two necessary effects: a mild course of the disease and development of appropriate immunity by the body.

The existence of such a practice among an illiterate people, living as if in a protracted Middle Ages, is an excellent illustration of the idea of the unity of the world history. Claude Adrien Helvetius (1715–1771) wrote: "How much we owe to the frivolous Circassian woman who, wishing to preserve her beauty or the beauty of her daughters, was the first to decide to inoculate herself with smallpox! How many children have been rescued from the jaws of death by smallpox inoculation! Perhaps there is not a single founder of a monastic order who would have rendered such a great benefit to the world and thereby deserved its gratitude" [50, p. 255].

S. Riedel noted that this type of inoculation was practiced in Africa, India and China long before the 8th century, but it was the Circassian method that was transmitted to Europe via Constantinople: "In 1670, Circassian traders introduced variolation to the Turkish "Ottoman" Empire. Women from the Caucasus, who were in great demand in the Turkish sultan's harem in Istanbul because of their legendary beauty, were inoculated as children in parts of their bodies where scars would not be seen. These women must also have brought the practice of variolation to the court of the Sublime Porte" [51, p. 22]. The most important circumstance determining the interest in slaves from Circassia and thus distinguishing the Circassian population itself was a clean face with healthy skin, devoid of smallpox scars [51, p. 22]. Here it is appropriate to recall the statement of the Arab encyclopedist al-Masudi of the mid-10th century about the Kasog Circassian people: "Among the tribes of these places there is no people of more refined appearance and cleaner faces" [52, p. 206]. Thus, it is quite possible that the practice of smallpox inoculation already existed in the North-West Caucasus during the early Middle Ages.

Aubry de la Motraye, a French diplomat in the service of the Swedish king Charles XII (who sought refuge in the territory of the Ottoman Empire), visited Circassia (the areas of settlement of the Zhaneys) in 1711. He described in detail the method of smallpox vaccination: variolation was performed on a girl with three tied needles in five places: in the stomach, in the left breast, on the navel, in the right palm and in the left ankle; at those points, smallpox pus brought from a sick child, mixed with blood and covered with dry leaves and a bandage made from the skin of a newborn lamb; then the infected patient was kept warm and given a cooling herbal decoction to drink; meals consisted of only porridge prepared from caraway flour with two-thirds of water and one-third of sheep's milk. With proper care, the disease proceeded in a mild form and recovery occurred on the 5th–7th day [36, pp. 142–144; 53, pp. 74–75].

Motraye's book was published in 1723 in London. Even prior to that, his description of the method was met with a great interest and sent by Charles XII from Bender to Stockholm, i.e., no later than in 1713 [54, p. 20]. The most common understanding is that European society learned about the Circassian practice of variolation from reading the "Turkish Letters" of Mary Wortley Montagu (1689–1762), who was the wife of the British ambassador to Turkey. Recounting her travels through Turkey in 1716–1718, she described the method on April 1, 1717, in her letter XXXI sent from Adrianople [55, pp. 59–63]. The Ottoman/Circassian method of variolation she described remained the only means of smallpox vaccination until its qualitative transformation by the British doctor Edward Anthony Jenner (1749–1823) during the 1790s: Jenner's vaccination innovation was based on the cowpox virus, which was harmless to humans [51, p. 24]. François-Marie Arouet Voltaire (1694–1778) was also interested in the question of the origin of vaccination: in his Philosophical Letters (letter 11, "Smallpox Vaccination"), he convincingly traces the path of the Circassian method through Constantinople and Madame Montagu to London [56, pp. 100–103].

By the 1830s, Circassians had lost the art of smallpox inoculation: sources of that time speak only about magical rites and incantations [54, p. 22]. It is not possible to establish the exact reasons for such a relapse into irrationality. The explanation that this was due to Islamization does not seem compelling since many societies on the coast of Circassia and in the mountains remained committed to ancient pagan cults in combination with elements of Christianity. The Zhaneys, among whom A. de la Motraye recorded smallpox inoculation, rapidly decreased in number in the 18th century; by the first third of the 19th century, only a few of them remained. It is also possible that humanitarian losses during wars could have had an impact.

CONCLUSION

The coexistence of man with microparasites has determined the entire course of the history of civilization, from the agrarian Neolithic revolution with its accompanying processes of animal domestication (which ensured mutations of diseases) to the invention of antibiotics and associated epidemiological knowledge, which seemed to have prevented pandemics of acute epidemic diseases — at least, until the recent Covid pandemic.

The plague pandemic of the 14th century changed the course of the world history, provoking global geopolitical, economic, social and cultural transformations. These included peasant wars, the accelerated emancipation of peasants in Europe, a sharp weakening of the Golden Horde, and the growth of the power of the agricultural peoples.

The urban population of Europe first achieved the level of self-reproduction only at the beginning of the 20th century: until this point, in order to compensate the regular losses from diseases of overcrowding, cities required a constant influx of healthy people from rural areas. Prior to the advent of modern scientific medicine, people had very few rational and effective mechanisms for containing diseases or weakening their devastating impact. Until this time, the main mechanism or set of practices and empirically generalized knowledge was folk hygiene.

In the single communication space of the Mongol Empire, which was connected with the same global space of the Mediterranean, the plague pandemic had a huge impact on the historical fate of the Adyghe ethnic group. This was manifested in their paradoxical numerical growth against the background of general depopulation. Such a conclusion, which however remains hypothetical, is based on two indirect arguments that reflect quite obvious processes: (1) the territorial growth of Circassia following the pandemic; (2) the impressively large-scale presence of Circassians in Egypt and Syria during the last third of the 14th century and throughout the 15th century.

With a sharp expansion of the range of plague carriers (steppe rodents) in the 14th century, it is likely that the Northwestern Caucasus and adjacent steppe remained a space devoid of harmful rodent vectors due to the characteristics of its biocenosis. Accordingly, the fatal pathogenic complex that gave rise to the plague pandemic did not obtain a significant form there. Anthropogenic and cultural factors of the Northwestern Caucasus may also have contributed to the least harmful manifestation of the deadly potential of *Yersinia p*.

Against the background of frequent epidemics, the Adyghe people developed strict and quite effective rules for preserving life and health, covering disease prevention, as well as personal and public hygiene. A particularly impressive experience, if not created by Adyghe folk medicine, then certainly preserved and retransmitted to Ottoman Turkey and Western Europe, was manifested in the practice of smallpox inoculation.

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