Shadow on the Silk Road

Szabolcs Felföldi*

Written sources have preserved a number of astronomical records from past millennia for us. Mostly, of course, the ones that were perceptible to anyone with the naked eye: such as shooting star swarms (i.e. meteors, meteorites),[1] the appearance of comets,[2] supernova explosions,[3] and a whole host of solar eclipses.[4]

Eclipses were probably the most significant in terms of the immediate psychological effect on humans, because the disappearance of the Sun in the daytime sky (which is the basis of life which provides warmth and light) has provoked/may have caused quite strong emotions (although the landings of meteorites or the appearances of comets were clearly ominous signs too).

We can speak of a solar eclipse when the Moon partially or completely obscures the Sun for the observer. Although the diameter of the Moon is approximately it is

* ELKH - ELTE - SZTE Silk Road Research Group

1 Meteorites falling to Earth are well known from antique and medieval sources. It is well known that the Kaaba, or the Black Stone of Mecca is also presumably a piece of an iron meteorite, but we can mention the yearbook of a Hittite ruler, namely Mursili II, which contains a story about a meteorite as well. According to the story, the Storm God "dropped his lightning" and destroyed the city of Apasa, i.e. Ephesus (Weinfeld 1983: 139, note 93; Lawson Younger 1990: 150, 208, 312, note 27; Rutherford 2020: 224). This description is identified by most of the researchers as the impact of a meteorite. Later, the stone was divinely revered in the city, where it also merged with the cult of Magna Mater. The oldest meteorite, whose exact impact time is known, is the Ensisheim meteorite [*Fig. 1*]. It landed on November 7, 1492, near the small town of Ensisheim, which now belongs to France (Rowland 1990: 19–22; Marvin 1992: 28–72; McBeath 2011: 110–120).

2 Perhaps the best known of all is the Comet Halley, which has returned several times during Antiquity and the Middle Ages as well [*Fig. 2*]. This Comet can be observed every 75 to 76 years from the surface of our planet (Yeomans & Rahe & Freitag 1986: 62–86; Hughes 1987: 349–367, Miholcsa 2017).

3 The earliest known supernova was recorded by Chinese astronomers in AD. 185 (Stothers 1977: 443–447; Zhao & Strom & Zhiang 2006: 635–640). However, the brightest explosion (in the light of which it was possible to work and read at night) took place in 1006. This could be seen from many parts of the world for months for months. Chinese sources preserved the memory of the 1054 supernova explosion as well (Breen & McCarthy 1995: 363–379; Stephenson & Green 2003: 46–52) [*Fig. 3*]. The last two supernovae, that were visible to the naked eye from Earth, appeared in 1572 and 1604 (Stephenson & Green 2002: 60–71; Ruiz-Lapuente 2004: 357–363, etc.). The last was described in detail by the renowned astronomer Johannes Kepler.

4 We have exciting data on many solar eclipses from our early written sources (Ponori Thewrewk 1999: 350–354), they may even have archaeological/numismatic evidence (Maróti 2011: 51–52).

four hundred times smaller than the diameter of the Sun, but at the same time it is approximately four hundred times closer to Earth, therefore, for the observer, the apparent diameters of the Sun and the Moon appear to be nearly identical. Thus, when the Moon is placed in a specific position between the Sun and the Earth, it is able to partially or completely obscure the Sun.[5] Due to the complex elliptical orbit of these celestial bodies, this occurs only at specified intervals at different points on Earth.

Fortunately, our knowledge of modern astronomy already makes it possible to determine former (total or partial) solar eclipses for thousands of years. Thus, not only in time but also in a geographical sense, we can describe as accurately as possible the exact extent of the areas affected by solar eclipses. All the solar eclipses of recent millennia were compiled and made available on the NASA website (Nasa Eclipse Web Site) by a famous American astronomer Fred Espenak.[6] Thus, it is not too difficult to compare this long list with the different notes and written sources about solar eclipses of historical ages. Most of the latter have been fairly thoroughly processed and analyzed. Especially those that even had historical significance because they reversed a battle or war, etc. (The vast majority of these, of course, were total, annular or hybrid eclipses.)[7]

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However more than a hundred years ago there was an eclipse that has received little attention to this day. Although this eclipse did not have a historical or even destiny-reversing role, it provides very interesting additions to the history of learning about the former Silk Road.

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5 Cf. Bruce 1999; Littmann & Espenak & Willcox 2008: 7–28; Bakich 2016: 7–23 – In addition to the better known partial and total solar eclipses, there are also so-called annular or hybrid solar eclipses, however, these are somewhat rarer. We can talk about an annular eclipse when the Sun is in line with the Moon and Earth in the elliptical orbit of celestial bodies, but the Sun is a little further away from Earth. In this case, although the Moon obscures most of the Sun's disk, it does not cover the whole, thus the rim of the Sun appears in a ring shape around the silhouette of the Moon. Hybrid eclipses are even rarer than annular ones (about 1% of all solar eclipses are hybrid). Essentially, these are transitions between annular and total solar eclipses. Most of them begin as an annular solar eclipse and end as a total solar eclipse. They are created because the full shadow cast by the Moon does not yet reach the Earth at the beginning of the eclipse due to the spherical shape of the Earth. After that for a time a piece of the Earth's surface will be in complete shadow, but by the end of the eclipse the Earth will move and it will be behind the full shadow of the Moon again. By the way as the Moon continues to move away from the Earth, the apparent diameter of the Moon continues to decrease. It is estimated that in 600 million years the Moon will be so far away from the Earth that it will no longer be able to completely cover the solar disk. From then on, it will not be possible to observe a total solar eclipse from the Earth's surface.

6 *Five millenium catalog of solar eclipses* (https://eclipse.gsfc.nasa.gov/SEcat5/catalog.html – last viewed on 15th of March 2021).

7 Such could have been the Trojan War as well (cf. Henriksson 2012: 63–76, for full range of additional data see: Petriello 2016: 24–33).

There are two protagonists in our story, whose personalities, careers, and starting points could not be even more different, yet the said eclipse connected them in some way.

One of them is Aurel Stein [*Fig. 4*], of Hungarian descent but serving the British Empire, who led three major successful archaeological expeditions to the former Inner-Asian Silk Road region, the Tarim Basin and its surroundings. With this achievement, he became one of the pioneers and the most influential figures of archaeological research of the Silk Road.[8]

Stein's first expedition with the support of the British government of India took place in 1900–1901, when he reached the Tarim Basin (through the Pamirs), where he mostly discovered a whole range of archaeological sites (settlements, Buddhist shrines, etc.) around the city of Khotan.[9] This brought him world fame and the opportunity to organize another expedition, even more serious than before, covering an even larger area, and even longer in time.

Stein set out from Northwestern India in 1906 on this second journey. After 6 years he visited his previously discovered archaeological sites again and unearthed a number of new finds, then he extended his research into the valley of the Charchan river (Qarqan he – Qiemo), east of Khotan in 1907.[10] On January 13, 1907, he and his men collected artefacts at an archaeological site in the river valley (Shāh-tokhtaning-köli)[11] in their usual rhythm, but the next morning it also brought a rather surprising turn for Stein.

But perhaps it is worth quoting him as to what exactly happened:

> "Before mid-day I was back in camp, and with the sun shining brightly through the leaflet trees settled down to busy work on a long-delayed mail. It was by no means yet finished when the bitter cold, in spite of fur sitting-bag and the rest, drove me to bed about midnight. The rest in this riverine camp was badly needed for my men and beasts alike, and the peace which reigned for once around me was so ideal that I decided to make a halt on the next day and finish the most urgent writing tasks before starting for fresh work at Miran. I had no reason to regret the delay; for it allowed me to enjoy at full ease the finest revel of colours which the heavens could ever prepare by surprise. I had scarcely despatched faithful Ibrahim Beg with my Dak bag to Charklik, when, after 11 AM, a sensation of growing darkness forced me to rise from my little table and look outside the tent. The sky appeared strangely yellow and brown, and my

8 It is worth mentioning that Stein also had a fourth expedition to the area in 1930–1931. However, this failed due to the hostile attitude of Chinese officials. Although Stein reached some of the previously discovered sites, he was no longer able to carry out excavations at that time. He eventually had to leave the territory of China, to which he could never return (Blair Brysac 1997: 53–59; Meyer & Blair Brysac 2001: 382–392; cf. Felföldi 2011: 427–439).

9 Stein 1903; Stein 1907; Stein 1933, etc.

10 Stein 1921: 451–456.

11 Stein 1921: 455.

first thought was of a sand storm coming from the east to sweep down upon us. But the air was calm and not a sound to be heard.

Then I looked at the sun and saw his ball half-hidden behind a thick veil. I realized we were in for an eclipse, and by good luck it proved total in this far-off corner of innermost Asia. I shall not attempt to describe the wonderful illumination effects to which we were treated. But for a few fleecy clouds above the mountains southward the sky was clear and allowed me to watch them to perfection. Never shall I forget the deep lustrous tints of yellow and blue in the sky to the west, with the belt of intense green lining the horizon. No words of mine could paint them, nor the silvery glory of the corona, while the eclipse was complete. The waves of yellow light flitting over the wide silent landscape were weird. Tinted by them the broad glittering ice-sheet of the river, the brown belts of riverine jungle, and the lines of dunes beyond looked all alike unreal. Then, as the sunlight gradually returned, fresh life seemed to rise in the lonely strip of forest, and the birds were heard again. My men and the Lopliks had, with the prosaic nonchalance of their race, remained quietly seated round their camp fires, and not one of them troubled to ask me any questions. An icy wind sprang up in the afternoon, this time from the west, and soon forced me to lace up my little tent and seek warmth for writing by the light of candles."[12]

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So Stein and his men, as the archaeologist himself rightly perceived, experienced a total solar eclipse in the heart of Asia, on the former Silk Road.[13] After all, only then, in this case of a total solar eclipse, the crown of the Sun can be observed (that is the outside atmosphere of the Sun heated to millions of degrees), and the eruptions, which taking place its rim (the latter are called protuberances.) Stein's remarks on the color of the sky and the behavior of animals also support this.

Today, based on Espenak's calculations, we know exactly that the maximum of this solar eclipse was observed just on the southern edge of the Takla-makan desert on January 14, 1907, in a band of about 180 km, with a maximum duration of 2 minutes 25 seconds [*Fig. 5*]. However, it appears that Stein may have been on the northern edge of the band providing the total solar eclipse, as he could only see the solar crown for a few seconds. And this is much shorter than the maximum duration of this eclipse, which was 2 minutes 25 seconds. And indeed, based on the description of his route, Stein could have just been in what is now Ruoqiang County, Bayingolin Mongol Autonomous Prefecture, and this region could indeed have been on the edge of the band that provided the total solar eclipse. With these astronomical data, we can therefore determine the route of Stein's second expedition even more precisely [*Fig. 6*].

12 Stein 1912: 433.

13 Central eclipse at local apparent noon: GMT 18h 12m (*The American Ephemeris and Nautical Almanac for the year 1907*: 436).

At the same time, a particularly interesting detail of Stein's description is that neither members of his immediate entourage (such as his Turkic speaking servants[14] or his workers from the villages of the Tarim Basin) spoke about the events or asked him anything. Although it seems that Stein have explained this by the temperament of his men but that it is also possible that this natural phenomenon was not entirely unknown to them. And indeed, from Espenak's data we know that there was a total solar eclipse on May 17, 1882, and an annular eclipse on March 29, 1903, exactly in the region where a total solar eclipse could be observed again on January 14, 1907 [*Fig. 7–8*]. Therefore, it cannot be completely ruled out that Stein's workers may have seen a total or an annular eclipse of up to three or twenty-five years earlier.

The notions and perceptions of eclipse that appear in different cultures also show that as early as Antiquity and the Middle Ages, some peoples and cultures sought and found different explanations for this rare phenomenon. In some areas of the Far East, a dragon devours the Sun. While the Romans say that solar eclipses caused by the malice of various evil beings and spirits causes, Christians say that the phenomenon was caused by Satan himself.[15]

In many parts of the world, they tried to drive them away with noise and loud music. In medieval Europe people rang the church bells and covered the wells for the fear of celestial poisoning. Surely the Turkic-speaking inhabitants of the Silk Road area (including Stein's companions), may have had some idea of all this as well.

In the mythology of Turkic-speaking peoples (e.g. Chuvash, Oghuz, Kipchak), there was a cosmic demon, an evil spirit, or a witch to whom the solar and lunar eclipses were tied. According to this image, the demon absorbs the Moon and the Sun. The Chuvash, for example, envisioned the *vupăr* as such a creature. To drive away the *vupăr*, the Chuvash threw burning logs of wood or ash into the sky, shouted, and tried to scare it.[16] Apparently, unfortunately, we can no longer reconstruct whether Stein's companions believed in the appearance of the *vupăr* in connection with the solar eclipse.

At the same time, it is very strange that Stein, who usually took many hundreds of photographs during his expeditions, did not take a photograph on this particular celestial phenomenon. This could be because Stein might have been completely

14 Aurel Stein always took Sikh surveyors (Rai Rām Singh, Rai Bahādur Lāl Singh, etc.) from the *Survey of India* on his expeditions to Inner Asia. They helped Stein with his cartographic tasks a lot, but they also had a role as an excavation technician. He also employed a Chinese secretary (named Jiang Xiaowang) for his second expedition. But his accompanying staff (cooks, service staff, etc.) was recruited from Pashtuns, Kashmiris, and mostly Turks. He usually recruited his excavation workers from the settlements closest to the archaeological sites. In the Tarim Basin they came from the local Turkic-speaking population (Stein 1912: XIV, 10–12, etc.; Stein 1921: IX–X, etc. cf. Walker 1995).

15 In some regions, according to the Hungarian folk belief, roosters were responsible for all this: according to the widespread idea in Transdanubia, roosters eat the Sun (Jankó 1902: 406; Ujvári 1980: 222), in other regions, a mythical creature called *markoláb* is responsible for this (Diószegi 1968: 217–251; Bálint 1980: 442).

16 Dallos 2019: 419; Dallos 2020: 127–128; cf. Karakurt 2011: 215.

unexpected by the eclipse, and by the time he could have set up his camera, the phenomenon was over.[17]

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The other protagonist of our story was not unexpectedly affected by the rare astronomical phenomenon, in fact, this is why he traveled to the Silk Road region of Central Asia. In contrast to the Hungarian-British Aurel Stein, he was Russian. His name was Sergei Mikhailovich Prokudin-Gorsky [*Fig. 10*].[18]

This talented scientist and inventor belonged to one of the oldest Russian noble families. At the St. Petersburg University he was a pupil of the world-famous Russian scientist Dmitri Mendeleev. Perhaps it was Mendeleev who awakened in the young Prokudin-Gorsky an interest in chemistry. In the last years of the 19th century Prokudin-Gorsky came up with a new passion which would bring him worldwide fame: color photography.[19]

In 1898 he became a member of the Photographic Section of Imperial Russian Technical Society and spoke *On Photographing Falling Stars* (Meteor Showers) at one of the meetings of the Society. Photography more and more captured Prokudin-Gorsky's interest, not only in a scientific, but also in a practical way. In 1901 Prokudin-Gorsky opened his photo studio in Saint Petersburg.

In 1902 Prokudin-Gorsky worked with Adolf Miethe, the main specialist on the so-called color separation method in Germany. Using his superior knowledge in chemistry, Prokudin-Gorsky created his own recipe for sensitizing the emulsion needed for this special camera, which led to the most advanced, life-like transmission of natural colors at that time.

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17 Among Stein's photographs there is one depicting the explorer's camp, which was taken on January 13, 1907 (he probably saw the natural phenomenon here, in front of his tent), but we do not know any photo of this eclipse taken by Stein: „Tent with Ibrahim [Beg] at Jigdagil-öghil, 13 January 1907" (Falconer_2006a: 237 – International Dunhuang Project [*Fig. 9*]). In his monumental scientific work, which deals with the material of the expedition (*Serindia*), Stein does not even mention the solar eclipse (cf. Stein 1921, 455). It is not mentioned in his other work summarizing the events of his three great expeditions either (cf. Stein 1933). And although *The Times* also reports in detail about Stein's journey, this detail is not mentioned in the articles published there (cf. Wang 2002).

18 For the life of Prokudin-Gorsky and for his photo collection, see: Brumfield 1990, 243–255; Adamson & Zinkham 2002, 107–143; Garanina 2003, 7–28; Minachin 2003, 31–47; Leich 2017, 223–230; Brumfield 2020.

19 „In 1861 the English physicist James Clerk Maxwell accomplished an amazing experiment: he photographed the multi-colored band three times through the Green, Red, and Blue filters. Lighting the negatives received through the same filters, he was able to obtain color images – the world's first color photos. This technique was called Color Separation (or Three-Color Photography), but it took another 40 years of hard work by the best European scientists, including Prokudin-Gorsky, to make it possible to correctly transmit all natural colors, catching all their subtle shades. The glass plates needed to be covered by a special emulsion of complex composition, making them equally sensitive to the entire color spectrum." (https://scrapushka-nsk.ru/en/sergei-prokudin-gorskii-cvetnye-fotografii-sergeya-prokudina-gorskogo/ -– last viewed on 15th of March 2021).

From 1905 he started with this camera his famous project to capture in color the territory of Russian Empire and publish these photographs as the first color photo postcards in history of Russia.

It was in 1900 when he became a member of the Russian Geographical Society as well. Therefore it was not surprising that he joined a scientific expedition to the region of the Silk Road at the request of the Society in 1906. The purpose of this Russian expedition was to observe and to photograph a solar eclipse that made news all over the world.[20]

For example in September of 1906, *The New York Times* wrote the following, "The next total eclipse of the Sun takes place on Jan. 13, 1907, and will be visible in Central Asia. The best region for observing the eclipse is available by means of railways recently constructed in Russian territory. On this railway and about two-thirds of the way from Tashkent to Samarkand lies Jizah, only a few miles from the exact line of central eclipse."[21]

That is why members of the expedition, including Prokudin-Gorsky arrived in the territory of what was then Russian-Turkestan, that is, today's Uzbekistan at the end of December 1906 on the new railway line mentioned in the newspaper article.

According to Prokudin-Gorsky's surviving photo album and other records [*Fig. 11*], the solar eclipse occurred on January 1, 1907, at New Year's Eve. So the data of Stein and the Russian photographer do not match. Maybe Stein would have overlooked the date? Would the astronomical event really have taken place two weeks earlier? Or was Prokudin-Gorsky the one who was so wrong?

The answer lies in the calendars used by the two stakeholders. While Stein calculated according to the Gregorian calendar, Prokudin-Gorsky continued to use the Julian calendar, as Russia had not yet switched to the Gregorian calendar at that time. By the beginning of 1907, the Julian calendar had already shown a two-week shift from the Gregorian calendar.

The expedition thus arrived prepared and in time for the point in the Russian Empire from which this eclipse could be viewed as best as possible. At the time of the

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20 Of course, total solar eclipses hade been photographed before. The first occasion on which photography was used at an eclipse of the Sun was on July 8, 1842, when Professor Majocchi, at Milan, attempted to obtain Daguerreotype pictures of the corona. The failure at Milan in Italy did not deter A. H. Busch and J. Berkowski from a similar attempt at Konigsberg on July 28, 1851. After the latter successful attempt, solar eclipses were photographed in various parts of the Earth almost every few years (Common & Taylor 1890: 203–205; Barnard 1898: 214; Schielicke & Wittmann 2005: 128–147). The novelty compared to previous pictures would presumably have been provided by Gorsky's color photography technique.

21 Stein had already embarked on his second expedition in the spring of 1906, and in the autumn that year he already had been in the heart of Inner Asia, by the time the above mentioned article of *The New York Times* published. At the same time, it is truly a coincidence that Georges Méliès, one of the most prominent figures in early cinema, shot one of his best-known short films, *L'Éclipse du soleil en pleine lune*-t (*The Eclipse, the Courtship of the Sun and Moon*). This nine-minute film is about an eclipse and the observation of this natural phenomenon in a humorous form (Malthête 1981: 280; Cornea 2007: 14; Solomon 2011: 150; the movie can be viewed here: https://archive.org/details/EclipseDeSoleilEnPleineLune – last viewed on 15th of March 2021).

eclipse they were at Cherniaevo Station in the Tian-Shan Mountains above the Saliuktin Mines on Golodnaia Steppe. That is in the east of what is today Uzbekistan, near its eastern border with Tajikistan.

Unfortunately, however, the Russian expedition had no luck, despite the fact that they were made with the most advanced technology of the age, due to the thick and closed clouds it was not possible to take photos of the solar eclipse itself.

Therefore, the expected sensational picture, the first color photo of a total solar eclipse, could not be taken in the end. Although the eclipse could not be recorded, members of the expedition were photographed. It depicts nine members of the group of scientists as they view the sky with binoculars in the foreground of a yurt set up on top of a snowy hill [*Fig. 12*].

Undoubtedly, the color photo could have been taken with Prokudin-Gorsky's new camera but the device in this case was not handled by him, since he is also visible in the picture. He is the second from the left who is just adjusting one of the binoculars.

Although this expedition was unsuccessful from an astronomical point of view, it became of unique significance for the study of the Silk Road. This is mainly due to Prokudin-Gorsky. Probably it was there that Prokudin-Gorsky began to realize that the most important purpose of color photography is not just postcard views, but documenting the natural, architectural and ethnographic variety of the Russian Empire and the world of the ancient Silk Roads. Therefore, the Russian photographer set about capturing as many things as possible from everyday life of Western-Turkestan at that time.

The Russian photographer with these dozens of color photos captured the unique atmosphere of the ancient Silk Road, which has finally disappeared at the beginning of the 20th century [*Fig. 13–14*].

Although he was not the first to strive for this,[22] but he was the only one whose color pictures almost bring to life this special world that we known earlier only from black-and-white photographs. These pictures bring this lost world much closer to the man of today. Thus it all happened almost at the last minute, because in October 1907

22 Perhaps the most important of these is the famous *Turkestan Album* (*Turkestanskii Al'bom*) from 1871–1872. That is an extremely valuable series of photographs of old buildings, everyday life and former inhabitants of Russian-Turkestan. It was commissioned by the first governor general of the region, Konstantin Petrovich von Kaufman, and several prominent orientalists of the era, including Alexander Ludwigovich Kun of Hungarian descent, also worked on it (Kaufman 1872; cf. Morrison 2009).

a strong earthquake happened in Turkestan,[23] causing serious damages in many old monuments.

Prokudin-Gorsky finally returned once more to West Turkestan in 1911 to continue his series of photographs of the landscapes, buildings and inhabitants of Central Asia, but the rapidly modernizing world of the former Silk Road had already begun to disappear by then. This process was finally accelerated and concluded a few years later by the Bolshevik Revolution and the establishment of the Soviet Union.[24]

But Prokudin-Gorsky could no longer see this, as he emigrated to Norway in 1918, then to France in 1920, where he eventually died in 1944. His unique collection of photographs was finally offered by his son in 1948 to the American Library of Congress, making it a universal public treasure of mankind.

So these few minutes of this eclipse, that is, the shadow of the Moon on the Silk Road, connects symbolically the two main characters of our story. It was a natural phenomenon that connects the Hungarian-British researcher Aurel Stein, a pioneer of the archaeology of the former Chinese-Turkestan, with Sergei Mikhailovich Prokudin-Gorsky, a photographer of the colorful world of the former Russian-Turkestan.[25] Exactly at the time of the so-called "Great Game", when the British Empire (which supported Stein) and the opposing Imperial Russia (which was behind Prokudin-Gorsky) waged an extensive early Cold War with each other to increase their influence over Central and Inner Asia.[26] Thus, with a little exaggeration, Stein and Gorsky can also be considered rivals at that time according to official opinion. One of them represented Russian imperial interests, and the other provided a wealth of information from the Silk Road area for a possible future British expansion. But I believe that today only the scientific values of the two gentlemen's activities matter. They have done a great deal individually to give us a better understanding of the complex phenomenon that is disappearing at the beginning of the 20th century, namely the ancient Silk Road.

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23 This was the Qaratog (Karatag) earthquake. It occurred on 21 October near Qaratog (Karatag) in the border area between Uzbekistan and Tajikistan (former Russian Empire). The shock had an estimated surface wave magnitude of 7.4–7.5. Estimates of the death toll range were between 12.000 and 15.000 (Kondorskaya & Shebalin 1982: 216–217; Umurzakov 2012: 240, 245–246; cf. Kulikova 2016: 77–79). It was the deadliest earthquake all over the world in that year. According to the reports „A grandiose misfortune encompassed… the whole world on the southern slope of the Gissar Range... The misfortune resulted from a series of average earthquakes. In terms of the size of the affected area, the extent of damage, and in the number of victims. The region of greatest destruction primarily encompassed the southern slope of the Gissar Range. ... The earthquake hit the mountains, destroying all the mountain kishlaks (villages in Central Asia)" (Kondorskaya & Shebalin 1982: 526).

24 After his travels in Central Asia, Prokudin-Gorsky worked on several other expeditions in Russia, and he eventually took thousands of pictures over the next few years all over Russia. Eventually, Tsar Nicholas II appointed him royal photographer.

25 Aurel Stein and Prokudin-Gorsky were born one year apart (Stein in 1862, Prokudin-Gorsky in 1863) and died exactly one year apart (Stein in 1943 and Prokudin-Gorsky in 1944).

26 Cf. Morgan 1981; Hopkirk 1990; Meyer & Blair Brysac 2001; Sergeev 2013.

Figures

Figure 1. The Ensisheim meteorite from Sebastian Brant's first Basel broadsheet

Figure 2. A panel from the Bayeux tapestry showing people looking at Halley's comet

Figure 3. Henrik III (1046–1056) and a new „star" (probably a representation of supernova 1054)

Figure 4. Marc Aurel Stein (1862–1943), Hungarian-British scholar/explorer

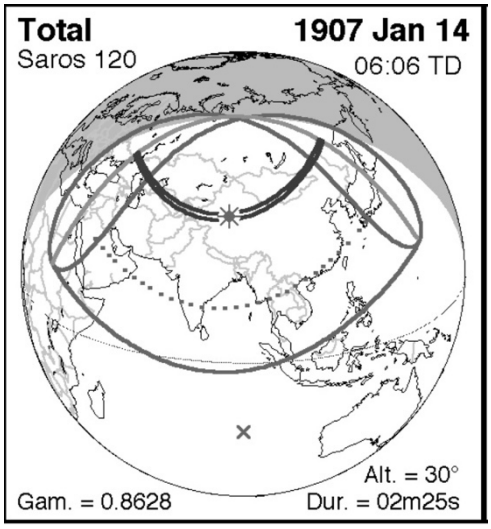

Figure 5. The geographical extent of the total solar eclipse that occurred on January 14, 1907

Figure 6. Map of Chinese-Turkestan during the third expedition of Aurel Stein (1913–1915)

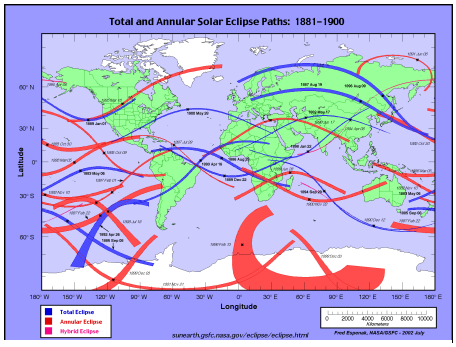

Figure 7. Total and annual eclipses paths: 1881–1900

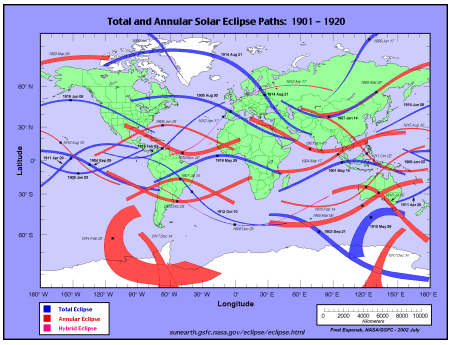

Figure 8. Total and annual eclipses paths: 1901–1920

Figure 9. Aurel Stein's photograph: „Tent with Ibrahim [Beg] at Jigdagil-öghil, 13 January 1907"

Figure 10. Sergei Mikhailovich Prokudin-Gorsky (1863–1944) Russian photographer

Figure 11. A page from Prokudin-Gorsky's photo album

Figure 12. Color photo of the expedition of the Russian Geographical Society during the January 1907 eclipse

Figure 13. Prokudin-Gorsky: The prison of Bukhara (1907)

Figure 14. Prokudin-Gorsky: Camel caravan near Samarkand (1907)

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