Shulgan-Tash (Kapova Cave) is located in Southern Urals, 4000 kilometres from the main concentrations of Ice Age parietal art in Western Europe.

The cave is a two-level structure of chambers, corridors and galleries connected by passages, while a third level is occupied by a subterranean river Shulgan, which pours out of the cave in a torrent, while the still surface of the Blue Lake close to the entrance always impresses visitors.

Cultural remains and paintings have been recorded in two levels of the vast cave-system. Until today, the actual number of known paintings has been vague, varying from 50 to almost 200. This uncertainty is due to the numerous red patches, partially or almost completely covered with calcite deposits; it is often difficult to assess whether they are intentional paintings or just spots of colour caused by touching the wall.

The images were made with red paint, and vary from almost orange to a dark mulberry colour, sometimes with black touches. They include extinct species of Ice Age animals. There are mammoths, horses, rhinoceroses and other zoomorphs (probably bison, bull or deer – some identifications are still controversial). There are several “signs” in the shape of a trapezium, and other geometric forms.

Fig. 1. Mammoth at the chamber of Drawings was painted on the west wall with the employment of its specific relief (photo by A. Pakhunov).

Palettes and hoards or caches of a coarse mixture of pigments have been found hidden between stones in the cave. These may contain up to c. 400 gm of material, which is too much for simply making wall paintings. It is highly likely, therefore, that pigment was actively used for other purposes, and one can only speculate about the activities that occasionally took place inside between 16,000 and 14,000 years ago (in uncalibrated radiocarbon dates, based on charcoal from the cultural layers).

The composition of the red pigments from the cultural layer and hoards contains red ochre or haematite, and the same has been found in the parietal paintings (Pakhunov et al, 2016). Through analyses of the pigment from one of the palettes in the Chamber of Chaos, it has been established that the main component of this paint was goethite heated to more than 240 C° to form haematite (Podurets et al., 2016).

The first Upper Palaeolithic paintings in Shulgan-Tash (Kapova Cave) were discovered in 1959 and in the 1960s-70s Otto Bader from the Institute of Archaeology of the Academy of Sciences invited restorers to chip off the calcite deposits in the Chamber of Chaos. The calcite deposits were up to 10 cm thick, whereas 3 - 5 mm can be enough to make paintings barely visible. This is now well known thanks to work at the Grande Grotte of Arcy-sur-Cure in France where parietal art remained hidden by calcite until the 1990s, when restorers started to work on the cave art with the same technique as was used this year in Shulgan-Tash (Kapova). Eudald Guillamet, earlier he was involved in the Grande Grotte of Arcy-sur-Cure project, was
invited to Shulgan-Tash in 2015 to share his experience of rock art restoration. After two years of work more than 800 graffitis on an area of about 120 square meters were removed, that enabling the new recording of the images in the cave (Pakhunov, Devlet, 2017).

Fig. 2. Chamber of Chaos. During the restoration works the figure of the camel was uncovered (photo by A. Pakhunov).

A period of uncontrolled visits had resulted in major decay in different parts of the Shulgan-Tash cave, some of which were covered with painted and engraved graffiti. Nowadays the Government of Bashkortostan makes effort to ensure that access to the Republic’s cultural heritage is controlled in the most appropriate way. In 2012 the site was included on UNESCO’s World Heritage Tentative List. Currently, the Government of Bashkortostan is supporting a programme of graffiti removal and the restoration of several rock art panels in peril. This systematic work is currently continuing, but has recently resulted in the revelation of a painting of a Bactrian camel which was under the calcite (Devlet et al, 2018).

Experts from the Institute of Archaeology of the Russian Academy of Sciences in Moscow, in collaboration with the staff of the Research and Production Centre for the Protection and Management of Tangible Cultural Heritage from Ufa, documented the striking results with the use of UV- and NIR-imaging, photogrammetry, and RTI.

The Bactrian camel is about 60 x 55 cm, and is drawn in red. On the first glance, one may assume that the camel image is made in two colors, while on the preliminary studies the visual difference between the dark and light paint within that image is due to the state of preservation on the edges of the figure – the charcoal was washed down with water back in prehistoric times. The paint of the better-preserved central part of the image contains the charcoal in the mixture with red paint – it was recorded using the infrared photography and microanalytic techniques.

The dark red pigment in the central part contains some black spots, while at the sides it fades to a lighter orange-red without visible traces of black particles. This difference between the dark colours in the centre of the camel’s body and the front and back parts originates from different states of preservation rather than the use of different paints. It is known that the parietal art in Shulgan-Tash was painted either with haematite-based pigments or with red ochre. Apparently, natural minerals were used to produce haematite paint, while the red ochre could also be obtained as a result of firing raw material. The analysis of specimens
from the camel image suggests the use of paints containing specific haematite particles that did not originate from the hoards, but which resemble those in crayons that were found during excavations in the Chamber of Signs.

Since 2014, the Republic of Bashkortostan has been consistently implementing the program aimed at improving the state of preservation of the Shulgan-Tash (Kapova) Cave and giving better access to accurate information on the cave art. This program entails visitors’ graffiti removal from the cave walls, a project launched in 2015 and preceded by consultations with Russian and European experts. The method was previously tested while removing graffiti in the French Cave of Rouffignac as well as other rock art sites.

**Bibliography**

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