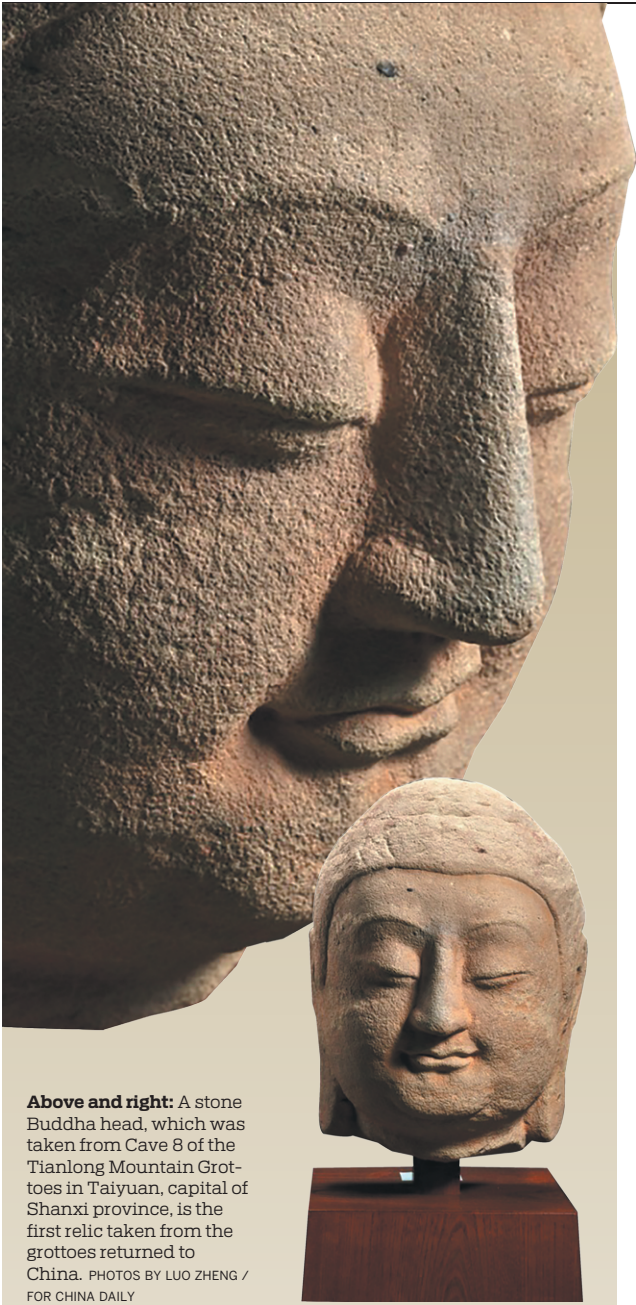


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Above and right: A stone Buddha head, which was taken from Cave 8 of the Tianlong Mountain Grottoes in Taiyuan, capital of Shanxi province, is the first relic taken from the grottoes returned to China. PHOTOS BY LUO ZHENG / FOR CHINA DAILY



A 3D model of Cave 17 at the grottoes created by Taiyuan University of Technology is seen on display. PROVIDED TO CHINA DAILY



Left and right: Interactive screens of the 3D model of the Tianlong Mountain Grottoes are exhibited in Taiyuan in June. ZHU XINGXIN / CHINA DAILY



An aerial view of the Tianlong Mountain Grottoes in Taiyuan in June. ZHU XINGXIN / CHINA DAILY

Relics: Efforts urged for future protection of heritage

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The restoration work “brings people closer to these relics, allowing more to revisit history and rediscover the original appearance of the artifacts”, said Zhao.

Unprotected treasures

The grottoes, nestled between pine and cypress trees that dot Tianlong Mountain, were built from the Eastern Wei (534-550) to the Tang (618-907) dynasties, when Buddhism arrived in China and flourished.

Originally established as a sanctuary for the emperor, the caves gradually became a site of worship for locals.

In the 18th century, however, they fell into neglect and were largely forgotten until 1908 when visiting German architect Ernst Boerschmann “discovered” the grand caves filled with Buddha statues, embossed artworks, and frescos.

Foreign art historians and collectors visited the site, but it was not until 1921 that Japanese archaeologist Sekino Tadashi brought global attention to the grottoes through his photographs.

Unfortunately, international art dealers, thieves and smugglers descended on the unprotected treasure trove.

Between 1924 and 1925, thieves vandalized and looted the caves, bribing corrupt monks to break over 240 statues into fragments for sale. One of the major smugglers was Japanese art dealer Sadajiro Yamanaka who exploited the chaos of World War II to sell stolen artifacts to Western buyers.

The prized item for sellers and collectors was the Buddha head, but the statue's other parts were sometimes sold separately in another country.

About 120 statues located abroad are confirmed to be from Tianlong Mountain, making it one of the most damaged cultural sites in China, said Jia Chen, vice president of Taiyuan Cultural Relics Protection Research Institute.

“The grottoes are important cultural memories of Chinese history,” he said. “The period when the grottoes were established marks an important phase in the localization of Buddhist cave art in China.

“We can see in the grottoes that in just over 100 years, the style of Buddha statues transformed from delicate and refined to robust and rounded, reflecting the evolution of Buddhist art in China,” Jia said.

Western ‘disregard’

Wu Hung, director of the Center for the Art of East Asia at the University of Chicago in the US, addressed the issue of the taking of Eastern art by Western collectors in his 2021 Humanities Day speech.

“In the field of art there was a disregard of the integrity of an ancient site and the ‘absence of protest,” he said in a speech titled “In the Name of Art: Destruction and Reconstruction”.

Unlike in Europe, Buddhist sculptures in Asia are integral to beliefs and daily life, and are not just art, Wu said.

The destruction of relics in East Asia is tied to Western and Japanese colonial policies. The absence of protection laws and a disregard for ancient sites facilitated art trafficking amid political chaos.

“Frequently, when a group of extraordinary Buddhist sculptures was discovered in situ, the most beautiful and unique pieces were photographed and then physically removed to become prized collec-



A staff member checks digitally restored statues of the Tianlong Mountain Grottoes on display at an immersive cinema in Taiyuan in June. ZHU XINGXIN / CHINA DAILY

tions of ... museums in the West, leaving the sites as abandoned ruins,” he said.

Katherine R. Tsiang, the center's associate director, said during a Peking University webinar in 2022 that museums which acquire such artifacts often have limited information about their acquisitions. Some Buddha statue heads are even stored in warehouses and may never see the light of day again.

About 20 years ago, the center launched the Dispersed Chinese Art Digitization Project to reconnect Chinese artworks that have been spread across different global locations.

The Tianlongshan Caves Project is part of this effort. With the collaboration of nine countries in Asia, Europe, as well as the US, the project has collected three-dimensional modeling data of more than 100 statues taken from Tianlong Mountain.

In 2014, the University of Chicago, the Tianlong Mountain Grottoes Museum, and Taiyuan University of Technology launched a digital restoration project, which combines data from the sculptures with data from on-site ruins to render a more complete and accurate digital image.

Digital revival

The initial step in collecting data to construct a grotto image involves using point-cloud technology, data representation of a 3D space, to capture its geometric shape. Data records are also made of the texture of a sculpture, along with the colors and patterns inside the grotto.

The digital restorers then merge all the data to create a detailed digital model of a sculpture, representing it as it would have been seen in its original setting.

Zhao, from Taiyuan University of Technology, said, “Despite our prior experience, the digital revival of Tianlong Mountain's Buddhist sculptures presented a substantial challenge for our team.”

The mountainous terrain complicated providing power for the scanning equipment, while the grotto's dim lighting made it difficult to capture accurate textures and colors.

The massive size of the grottoes also made the collection of 3D data a major challenge.

Zhang Xiao, a professor of digital media art at Taiyuan University of Technology, said that the 3D scanning equipment was so large that it required two men to lift it, and scanning had to be performed on scaffolding approximately 7 to 8 meters high.

“Since the scanning equipment had to remain stationary, any movement would cause it to shake. This meant we often had to wait for a while before we could continue with the digital restoration,” Zhang said, adding that students frequently had

to remain on the scaffolding all day without coming down.

After the data was collected, the restoration team had to verify whether the fragments provided by the University of Chicago actually came from Tianlong Mountain and, if so, from which specific location.

Many sculptures were severely damaged when they were stolen and smuggled, Zhang said, adding that a sculpture kept by Harvard Art Museums, for example, faced significant “identity verification difficulties”.

The sculpture was in the form of thin slabs, and removing them would have caused severe fragmentation.

“Museum staff abroad attempted repairs, but the result differed markedly from the original. Verifying whether it was from Tianlong Mountain required extensive research and discussion,” Zhang said.

Zhao, the dean, said that many Buddha heads that were violently detached had shattered necks and shoulders, making their restoration extremely challenging. Sometimes, due to differing states of preservation, the head and torso appeared “unnatural” when joined together to form a digital image, he said.

Despite these hurdles, the team preserved sculptures that were in a disjointed or incomplete state. This allowed them to be connected to the original site without further modification, thereby maintaining their authenticity.

Zhao said in the final stage of the process, when the relics are being prepared for digital presentation, artists adjust the color of the overseas sculptures to match the current appearance of the grotto. Missing parts of a sculpture are also included to create visual harmony.

So far, the team has successfully digitally restored over 100 artifacts that were taken from 11 grottoes.

Legal issues

The digital restorations are also filling a cultural gap, due to the complicated legal process involved in the physical return of artworks taken from China.

In September 2020, Japan's Toei Kokusai auction house announced the auction of a stone Buddha head later confirmed to have been smuggled from Tianlong Mountain Grottoes' Cave 8 in 1924.

After negotiations facilitated by China's National Cultural Heritage Administration, the auction house and the Japanese holder of the artifact reached an agreement to donate the head back to its place of origin.

Huo Zhengxin, a professor at China University of Political Science and Law's international law school, said returning looted artifacts had pitfalls.

“Many Chinese people abroad buy looted relics and donate them back, which can sometimes play into the hands of dealers exploiting patriotic sentiments,” Huo said.

He cited the case of the Yuanmingyuan's bronze zodiac heads, which saw their value skyrocket from \$1,500 in 1985 to 14 million euros in 2009 due to high demand from Chinese collectors.

The 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Cultural Property and the 1995 UNIDROIT Convention on Stolen or Illegally Exported Cultural Objects underpin global efforts to return stolen cultural objects.

However, Huo believes their impact is limited. They do not apply retroactively, complicating the reclamation of artifacts stolen before they were adopted, he said.

In addition, countries such as former colonial powers and the US, which have major antiquities markets, have yet to ratify these agreements. Some countries even have laws such as statutes of limitations that impede the return of stolen artifacts.

Digital restoration of cultural relics, therefore, is a crucial “intermediate step” before their physical return, Huo said.

Moving forward

China's Qingdao Recommendations gained international backing following the 2nd Council Meeting of the Alliance for Cultural Heritage in Asia on June 20.

The recommendations highlight the importance of digital technology in improving information sharing and collaboration, stress the need for thorough research of the provenance of colonial artifacts, and advocate cooperation with the originating countries.

In a 2019 speech at the Dunhuang Academy, President Xi Jinping emphasized the role of technology in enabling the “digital return” of cultural relics scattered around the world, and the global sharing of cultural and artistic resources.

Since 2019, the International Touring Exhibition of the Digital Restoration of the Tianlong Mountain Grottoes has been taken overseas to countries like France and Egypt, as well as to Chinese cities such as Beijing and Nanjing in Jiangsu province, along with other locations, receiving widespread acclaim. It was last staged in Athens, Greece, in May.

Liu Yuwei, director of the Taiyuan Culture Relics Bureau, said the project is the first of its kind to reunite precious cultural relics with their original settings through virtual means.

Wei Tao, Party secretary of Taiyuan, said the event aims to foster cultural exchanges and collaboration, support the Belt and Road Initiative and enhance global cultural cooperation.

A new museum has been established near the grottoes to showcase the digital replicas. Local authorities have also invested in infrastructure improvements.

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A replica of a Bodhisattva statue is seen on display in Taiyuan. The original statue is housed in the British Museum. ZHU XINGXIN / CHINA DAILY

