CHINA

> All attempts to stir up trouble or sow discord will ultimately fail
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> FOREIGN MINISTER WANG YI ON THE 2016 RULING BY THE PERMANENT COURT OF ARBITRATION IN THE HAGUE, REJECTING CHINA'S MARITIME CLAIMS TO THE SOUTH CHINA SEA > CHINA A7

SCIENCE

Debate rages over rocks taken from moon's far side

Chinese scientists believe samples retrieved by Chang'e-6 answer key question in lunar science

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A year after China returned the first rock samples from the moon's far side, scientists are debating whether the mission has answered a central question in lunar science – and whether the country's rising scientific dominance is challenging who gets to tell the story of the moon's past.

While a team of Chinese researchers believes they may have nailed down the age of the moon's largest and oldest crater – a colossal impact basin that could hold clues to the early solar system – other scientists, mostly from the West, are unconvinced.

Some say the ancient rocks may have come from a different impact and were tossed to the landing site. Others suggest the rocks may not have come from an impact at all, but from magma that cooled slowly underground.

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>
> YANG WEI, PLANETARY SCIENTIST

"I don't think the 4.25-billion-year age is 100 per cent certain, but it's the most credible number we have so far – more reliable than model-based crater counting or meteorites with unknown origins," said planetary scientist Yang Wei of the Institute of Geology and Geophysics in Beijing.

"It's based on the only direct evidence we've ever collected and measured from the South Pole-Aitken [SPA] basin," said Yang, who was not directly involved in the study but coordinates a nationwide research effort that gave select teams early access to samples from the Chinese lunar mission Chang'e-6.

The findings, which he described as the most important among a collection of five papers submitted to the journal Nature for peer review last September, were rejected twice by a panel dominated by Western scientists.

The paper was later published in National Science Review, a China-based journal. Four others, which detailed the lunar far side's chemistry, water content and its volcanic and magnetic history, appeared in Nature's print edition last week.

A Chinese scientist familiar with the review process, who requested anonymity due to the sensitivity of the matter, said he felt some Western scientists were not ready to accept that Chinese researchers might solve such an important scientific problem.

"They didn't want China to be the one to pin down the age of the SPA basin. Maybe it stings a little," the scientist said. "But it doesn't matter. The paper is published, and time will tell."

In the National Science Review study, researchers from the Chinese Academy of Sciences focused on norite, a type of rock made of two common lunar minerals.

Radiometric dating revealed two distinct age groups of norite particles in Chang'e-6 samples. One was about 3.87 billion years old, consistent with known impact events like Apollo or Schrödinger. The other was much older: 4.25 billion years.

The researchers said this older group was likely to have come from the formation of the SPA basin, since the samples were collected from within that basin. "Our preferred SPA impact age of [around 4.25 billion years] is broadly consistent with crater-counting age estimates from previous studies," they wrote.

Clive Neal, a planetary geologist at the University of Notre Dame, said the rocks were likely misidentified – not true norites, but impact melts with a similar mineral make-up.

He noted the 4.25-billion-year age was significantly younger than what crater-counting models and radiometric data from SPA-linked meteorites had suggested.

Neal said the team may have uncovered evidence of a major impact – likely the one that created the Apollo basin, a crater believed to have formed after the SPA.

Qian Yuqi, a planetary geologist at the University of Hong Kong, said the 4.25-billion-year age was "very close to the lower limit of the SPA basin's possible age".

According to a paper Qian and colleagues published in early 2024, extensive intrusive magmatism – a slow, underground process where magma hardens without erupting – is common in the SPA basin. That means the rocks analysed by the Chinese team may not have come from an impact at all.

The five papers emerging from Chang'e-6 sample analyses revealed a previously untold chapter of the moon's history – one that, according to Yang, began more than 4.2 billion years ago when a 500km-wide asteroid slammed into the lunar far side.

The impact carved out a colossal basin and melted part of the moon's deep interior, forming what the researchers call the SPA impact melt rock.

That rock told a story not just of ancient violence, but of surprising resilience. Even after the moon's mantle was stripped of water and key elements, it somehow erupted again 2.8 billion years ago – possibly triggered by a sudden reawakening of the moon's magnetic field. "Our work has just started," Yang said.

Following the Chang'e-6 mission's return of nearly 2kg of samples from the moon's far side, the China National Space Administration has announced plans to open access to international researchers.

CULTURE



Two Xixia imperial tombs in Yinchuan, Ningxia Hui autonomous region. The site dates back to the Western Xia dynasty (1038–1227). Photo: Xinhua

SILK ROAD TOMBS LISTED AS WORLD HERITAGE SITE

Western Xia imperial complex acknowledged as ancient centre of cultural fusion and becomes country's 60th landmark to get Unesco recognition

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The Western Xia Imperial Tomb complex in northwest China has been designated as a Unesco World Heritage site – a recognition of its importance as a centre of cultural fusion and commercial activity on the ancient Silk Road.

The group of burial sites, also known as the Xixia Imperial Tombs, officially received the designation from the United Nations cultural body on Friday, state news agency Xinhua said.

The site dates back to the Western Xia dynasty (1038–1227), which was ruled by the Tangut people, an ancient branch of the Qiang ethnic group. It is located some 30km west of today's Yinchuan, capital of Ningxia Hui autonomous region.

The 40 sq km site is home to nine imperial mausoleums, their 271 accompanying subordinate tombs, 32 flood control works sites with walls and discharge trenches, as well as a five-hectare northern architectural complex site built for purposes such as worship and management of the tomb area.

According to Xinhua, the World Heritage Committee said the site was a testament to the cultural fusion and interactions among diverse traditions that occurred during the period.

China's National Cultural Heritage Administration (NCHA) said in a Unesco nomination document the tomb complex was the largest and best-preserved archaeological site from the Western Xia dynasty, whose name came from being situated to the northwest of the Song dynasty territory controlled by the Han Chinese.

It also coexisted with the Liao dynasty and Western Liao dynasty, established by the Khitan people, the Jin dynasty founded by the Jurchen, various Tubo tribes, Uygur tribes and the Mongol empire.

The Tangut people, composed of several tribes including the Tuoba, were nomadic and lived in the valleys in parts of what are now Qinghai and Sichuan provinces.

The Tuoba rose to become the leader of this tribal alliance and surrendered to the Tang dynasty in the early 7th century. The tribe was given the surname Li from the Tang royal family, which they used until the Western Xia dynasty was established in 1038.

Later, the Tubo Kingdom, or Tibetan Empire, forced the Tanguts to relocate to parts of today's Ningxia, Gansu province and Shaanxi province. According to the NCHA, the group of tombs belonging to the Western Xia ruling class "attests to Xixia's crucial role as a distribution centre on the Silk Roads during this period".

The territory of the Western Xia was located between the Qinghai-Tibet Plateau and the southern edge of the Inner Mongolian Plateau.

> It held a strategically crucial position, controlling the vital Silk Road passage
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> NATIONAL CULTURAL HERITAGE ADMINISTRATION

It had the Yellow River to the east, while to the west stood Yumen Pass – also known as Jade Gate Pass – a strategic fortress along the ancient Silk Road.

To the south lay Xiaoguan Pass and, according to the document, the Western Xia controlled parts of the Gobi Desert to the north.

"It held a strategically crucial position, controlling the vital Silk Road passage," the NCHA said.

It added 7,100 artefacts had been excavated from the site, including architectural components, stele inscriptions, objects for daily use, weaponry and armour fragments, sacrificial animal-shaped sculptures, animal skeletons and jewellery.

The discoveries "testify to the architectural technology, ceramic manufacturing, metallurgy, stone carving and other technologies of the Xixia civilisation".

Analysing the placement of the tombs, the NCHA said the Tangut ruling class had been influenced by the ancient Chinese practice of feng shui – arranging buildings and space in an environment to achieve harmony.

"Tangut people had long-standing contacts and encounters with Han people. The siting and construction of their imperial mausoleums therefore were deeply influenced by the Chinese traditional theory of feng shui geomancy, which was profoundly used by dynastic China," it said.

It noted that the Western Xia Imperial Tombs faced southeast, with the high mountains to the northwest, and Xingqing prefecture and the Yellow River in the east.

The mausoleums face the river and are set against the mountains, with a high and open terrain. The central axis of each mausoleum aligns with a specific peak of the Helan Mountains.

The traditional mausoleum architecture of ancient China also influenced the Western Xia Imperial Tombs.

"While most buildings in the nominated property are rammed earth structures, they used to have wooden structures and bricks and tiles, thus forming an architectural style that features rammed earth structures imitating wooden structures," the NCHA said.

The site also features unusual structures, such as mausoleum pagodas, that are not seen in imperial mausoleums of any other period.

Also among the unique structures are stele pavilions with a round plan, which have thick walls built with adobe bricks and are different from common wooden stele pavilions with a square design.

The tomb chambers feature an earthen cave with a vaulted roof. Its wall surface was protected by wooden boards, which might have originated from the Tangut tradition of living in earthen houses.

"Since the conquest of the [Western Xia] dynasty by the Mongol Empire in 1227, this group of imperial burial sites has been preserved in the form of ruins until today," the NCHA said of the authenticity of the site.

In 1972, the Ningxia Museum surveyed the site and excavation began. The complex was granted the highest level of protection by the central government in 1988.

The addition of the imperial tombs brings China's total number of UN World Heritage sites to 60, according to Xinhua.

Man spikes colleague's drink 'with truth serum'

Drug-laced concoction was used three times in an effort to steal the victim's work plan

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An employee shocked many by spiking a colleague's drink with a "truth serum" on three separate occasions in an attempt to steal his work plan.

The scheme began when a man surnamed Li, from Shanghai, came across a so-called truth serum during a business trip.

The seller claimed "just a few drops will make people tell the truth". This intrigued Li, motivating him to test its effects.

Although it remains unclear what type of company Li worked for and the significance of the work plans, he ultimately selected his colleague Wang as the test subject, intending to extract Wang's plans through the serum.

On August 29, 2022, during a dinner in Xuhui district, Li secretly added the "truth serum" to Wang's drink, mixing it with yellow wine and beer.

As a result, Wang experienced dizziness and altered consciousness, prompting him to seek medical attention on August 30 and 31.

On October 13, 2022, during another dinner in Yangpu district, Li repeated the act, once again mixing the substance with beer. Wang suffered from dizziness and vomiting again.

The third and final incident occurred on November 6, 2022, when Wang, still unaware of the danger, joined Li for dinner.

While Wang was briefly distracted, Li seized the opportunity to add the "truth serum" to his drink, camouflaging it with chrysanthemum tea and tricking Wang into drinking it.

Soon after, Wang developed dizziness and lost consciousness, leading him to visit the hospital the following day.

It was only after this third episode that Wang began to suspect foul play, recalling that he had experienced similar symptoms after their previous two meals.

Upon examination, Wang's urine and hair samples tested positive for sedatives – specifically clonazepam and xylazine, both of which are potent central nervous system depressants.

Notably, clonazepam is classified as a Class II psychotropic drug under national regulations.

Subsequent investigations revealed that the so-called "truth serum" Li administered contained both clonazepam and xylazine.

When confronted by public prosecution authorities, Li fully confessed to all three instances of administering the "truth serum" to Wang.

Recently, the Shanghai Jingan District People's Court found Li guilty of inducing drug use through deception. He was sentenced to three years and three months in prison and fined 10,000 yuan (HK$10,949).

Wang's current condition and potential long-term side effects remain undisclosed.

Prosecutors have issued strong warnings regarding hidden drugs, noting that such substances are highly deceptive, with appearances, smells, and tastes nearly indistinguishable from normal food and drinks.

SPACE

Cargo craft poised for resupply mission to Tiangong space station

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China's Tianzhou-9 cargo spacecraft is ready for launch to resupply the Tiangong space station, according to state news agency Xinhua yesterday.

The cargo spacecraft and a Long March-7 Y10 carrier rocket had been transported to the launch pad at the Wenchang Spacecraft Launch Site in Hainan province, Xinhua reported, citing the China Manned Space Agency.

"The cargo spacecraft will be launched in the near future at an appropriate time," the space agency said.

It said functionality checks and joint tests would proceed as planned, adding that facilities and equipment at the launch site were "in good condition".

According to state broadcaster CCTV, the cargo spacecraft will carry 6.5 tonnes of supplies, including consumables, propellants and equipment for medical and space technology experiments to be performed by astronauts on the Shenzhou-20 and Shenzhou-21 missions.

The supplies also include two sets of domestically developed spacesuits that can be used for 20 spacewalks over four years – an upgrade in lifespan from the previous three years and 15 spacewalks. The astronauts will also receive a set of core muscle training devices designed to help counteract muscle atrophy in microgravity.

The three-person crew aboard the Shenzhou-20 spacecraft, which lifted off in late April, are on a six-month mission. The Shenzhou-21 mission is scheduled for later this year.

During the Shenzhou-20 mission, the crew will study regeneration in planarians, a type of flatworm known for its ability to regenerate organs. The experiment could provide insights into human health issues and injuries in space.

Another experiment is expected to yield advances in biochips for vascularised brain organoids – lab-grown miniature brain models integrated with microfluidic chips. These models can be used for in-depth studies of the brain.

Tianzhou-9 measures 10.6 metres long and 3.35 metres in diameter, and consists of a cargo cabin and a propulsion cabin. Its main tasks are to transport cargo, replenish propellant for the space station, and incinerate waste from the station. It also supports the space station's orbit control and space science experiments.

The Long March-7 rocket series has sent the previous eight Tianzhou cargo spacecraft into orbit.



The Tianzhou-9 and the Long March-7 rocket at the launch area. Photo: Xinhua

The Long March-7 rocket is China's new-generation medium launch vehicle. It uses kerosene, a flammable liquid hydrocarbon fuel, and liquid oxygen as propellants.

It has a low-Earth orbit payload capacity of 14 tonnes and can dynamically recalculate its optimal flight path.

"The Long March-7 rocket is technologically mature. The Long March-7 series, including the Long March-7A, will conduct multiple launch missions," CCTV reported.

It added that the rockets would continue to carry cargo spacecraft to transport food, water, fuel and scientific equipment to the space station.

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