

## HUMANS &amp; SOCIETY

# Earliest pants worn by horse riders

Oldest known trousers originated in Asia 3,000 years ago

BY BRUCE BOWER

Two men whose remains were excavated from tombs in China put their pants on one leg at a time, just like the rest of us. But these nomadic herders did so between 3,300 and 3,000 years ago, making their trousers the oldest known examples of this innovative apparel.

With straight-fitting legs and a wide crotch, the wool trousers resemble modern riding pants, says a team led by Ulrike Beck and Mayke Wagner of the German Archaeological Institute in Berlin. The discoveries, uncovered in the Yanghai graveyard in western China's Tarim Basin, support previous work suggesting that nomadic herders invented pants to provide bodily protection and freedom of movement for horseback journeys and mounted warfare, the scientists report May 22 in *Quaternary International*.

"This new paper definitely supports the idea that trousers were invented for horse riding by mobile pastoralists, and that trousers were brought to the Tarim

Basin by horse-riding peoples," remarks linguist and China authority Victor Mair of the University of Pennsylvania.

Earlier Asians and Europeans wore gowns, robes, tunics, togas or — as observed on the 5,300-year-old body of Ötzi the Iceman — a three-piece combination of loincloth and individual leggings.

A hot, dry climate helped preserve human corpses, clothing and other organic material at the Yanghai graveyard, where more than 500 tombs have been excavated since the early 1970s.

Earlier research from the region had identified a 2,600-year-old individual who wore burgundy trousers probably made of wool.

Mair suspects that horse riding began about 3,400 years ago and trouser-

making came shortly thereafter in wetter regions to the north and west of the Tarim Basin. Ancient trousers from those areas are not likely to have been preserved, he says.

Horse riding's origins are uncertain and could date to at least 4,000 years ago, comments archaeologist Margarita Gleba of University College London. If so, she says, "I would not be surprised if trousers appeared at least that far back."

The two pants-wearing men entombed

at Yanghai were roughly 40 years old and were probably warriors as well as herders, the investigators say. One man was buried with a decorated leather bridle, a wooden horse bit, a battle-ax and a leather bracer for arm protection. Among objects placed with the other body were a whip, a decorated horse tail, a bow sheath and a bow.

Beck and Wagner's group obtained radiocarbon ages of fibers from both men's trousers and of three other items in one of the tombs. ■



The oldest known trousers, including this roughly 3,000-year-old pair with woven leg decorations, belonged to nomadic horsemen in Central Asia.

## MATTER &amp; ENERGY

# Plan for hack-free data encryption

Quantum technique would eliminate snoop checks

BY ANDREW GRANT

A proposed quantum encryption technique would ensure secure communication while removing the painstaking step of checking for potential eavesdroppers. The efficient approach could form the basis of a secure quantum network for exchanging sensitive information.

Computer-generated encryption protects data such as credit card numbers and passwords from would-be snoopers. However, this encryption is breakable, and a hacker can steal information for a long time before anyone finds out.

In 1984, Charles Bennett and Gilles Brassard proposed the first quantum cryptography protocol. The approach calls for a receiver to measure the delicate quantum properties of photons in laser pulses and compare notes with the sender to establish a secret key (*SN: 11/20/10, p. 20*). An eavesdropper can also measure the photons but would leave a trail.

Masato Koashi, a quantum physicist at the University of Tokyo, was irked by the price of detecting a snoop: The sender and receiver have to divulge part of their encryption key to each other. "You cannot be certain about the quality of the final product, so you need a quality assurance measurement," Koashi says. Depending on the amount of data transferred and the integrity of the connection, establishing the key while ensuring nobody is snooping can become difficult or impossible.

Koashi and his colleagues developed

a quantum encryption approach that seems to make the potential presence of snoops moot. The scheme, detailed in the May 22 *Nature*, is similar to the 1984 version except that the receiver introduces another layer of protection by measuring two sets of laser pulses and arbitrarily choosing a time delay between measuring them.

The randomness of the photons' quantum properties and the time delay makes it nearly impossible for a hacker to determine the secret key. As a result, the communicating parties have no need to test for eavesdroppers.

Horace Yuen, a quantum physicist at Northwestern University, calls the proposal "a good start." But he warns that physicists have come up with some clever methods for quantum eavesdropping, so he wants proof that the new scheme could ward off all such snooping. ■