Around the world, glaciers are melting—revealing human remains and artifacts that have been trapped in ice for thousands of years

In August 1999, three Canadian schoolteachers were trekking along the edge of a glacier in British Columbia in search of wild sheep. Instead, what they found was the body of a dead man trapped in ice.

The teachers immediately contacted the authorities. After some sleuthing, scientists determined that the “iceman” died more than 200 years ago. He was a mummy, meaning that his remains had been unusually well preserved. The extreme cold and ice had protected the man’s body from decomposing, or breaking down.

It's not every day that someone stumbles across an ice mummy—in fact, it is very rare. However, scientists say that as the average temperature of Earth’s atmosphere heats in a process called global warming, many glaciers are melting—and discoveries like this one may become more common.

ICY BUILDUP

A glacier is a huge mass of ice and snow that moves slowly over the land. Glaciers form in places where more snow falls than melts. As snow
piles up year after year, the weight of snow layers above pushes down on the layers below. This pressure converts the snow crystals into ice.

If a person’s remains—or even an object, like a stray arrow—happen to be on a glacier’s surface one year, they will eventually get trapped between icy layers. They will remain buried until melting or movement of the glacier causes them to be uncovered.

**GREAT HEIGHTS**

Most glaciers form in places of high latitude, like near the north and south poles, or in locations of high altitude, such as mountaintops. *Alpine glaciers*, which are found on mountains, are more likely than glaciers

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**ALPINE HOME:** Ötzi the “iceman” (top) was found frozen in the Alps (above) in 1991. Among his possessions was a fur hat (left).
Here are some artifacts that have been found in alpine glaciers and ice patches around the world.

Well-preserved human remains have been found in alpine glaciers around the world (see Nuts and Bolts, p. 17). The most well-known include several Incan mummies in the Andes; the English mountaineer George Mallory, who got lost while trying to scale Mount Everest; and Ötzi, a man who had been locked in a glacier for more than 5,000 years—longer than any other ice mummy ever found.

Studying human remains that had been frozen in alpine glaciers helps archaeologists learn more about past cultures. But such findings are rare. The bulk of the glacial findings have been human artifacts (objects such as tools, clothing, and hunting gear), as well as mummified animals, and piles of ancient caribou dung. “We’ve even found a fish. There’s quite an array of objects and animal remains,” says James Dixon, director of the Maxwell Museum of Anthropology in Albuquerque, New Mexico, who searches for artifacts in Alaska’s glaciers and ice patches, which are like tiny glaciers that don’t move.

Artifacts are exposed when ice at the surface of a glacier melts. In some instances, an artifact will flow with the glacier as it slowly inches down a mountain. Eventually, it will end up at the snout, or lower edge, of the glacier, just waiting to be found.

Greg Hare, a site assessment archaeologist for the government of Canada’s Yukon Territory, has found approximately 190 artifacts in 23 different ice patches. His finds have ranged from a piece of a 9,000-year-old hunting dart to objects that were used at the turn of the late 19th century during the Yukon Gold Rush.
Archaeologists have discovered well-preserved human remains and artifacts in alpine glaciers. The map below highlights the alpine glaciers where the remains and artifacts mentioned in the article were found.

Global warming is causing many of the world's glaciers to melt faster than they ever have in recent times. That's prompting a few archaeologists to scour glaciers and ice patches in an effort to identify sites that are likely to reveal artifacts as the ice continues to melt away. “It's a real new frontier in archaeology,” says Dixon. But it's also a race against time.

Once these ancient artifacts are exposed to the air, they will start to disintegrate. Depending on the weather conditions, a wooden tool, for instance, could last unfrozen for only 10 to 20 years.

“If the climate trends continue, we need to extend our surveys, and monitor, collect, and analyze as many remains as we can find,” says Dixon. Otherwise, the artifacts will be gone forever—taking with them whatever secrets of past civilizations they may hold. —Karina Hamalainen

1. What force converts snow crystals into ice to form a glacier?
   A) momentum
   B) pressure
   C) friction
   D) global warming

2. The lower edge of a glacier is called the ____.
   A) mouth
   B) tongue
   C) snout
   D) ear

3. Why is it important for archaeologists to monitor glaciers and ice patches for artifacts?
   A) The glaciers are melting due to global warming.
   B) Many artifacts could disintegrate within 10 to 20 years once exposed to air.
   C) The secrets of past civilizations may be lost.
   D) All of the above.
   E) None of the above.