

# THE CINMAR DISCOVERY

## Evidence for Ice Age Occupation of the Middle Atlantic Outer Continental Shelf



Five-six miles from the Virginia shore in the outer edge of the continental shelf, mastodon remains dated to 22,700±80 years ago were dredged up along with a rhyonite knife from a depth of 240 feet below sea level.



"The mastodon remains and the stone tool were discovered at the same time."  
- Thomas Green, captain of the vessel *Cinmar* out of Hampton, Virginia



Linear micro-scratches and polish on the distal end of the biface are typical of knife use. The proximal and distal microscopic linear striations typical ofhaft wear. The high ridges between flake scars are sharp and the edges of the knife are sharp. This indicates that the specimen did not experience water transport, nor was it tumbled in the surf.

### South Mountain Rhyonite Quarry



Rhyolite = 200m  
Blue line = South Mountain Quarry sample

The knife is made out of rhyolite obtained at South Mountain, Pennsylvania. This is confirmed by X-ray fluorescence or XRF comparison of the elements found in the Cinmar biface and the South Mountain sample.



Red staining on tooth root and tusk were caused by oxidation in the salt water marsh.

The size of the tooth and tusk indicate that the animal was a female. Wear on the upper third molar indicates that she died when she was 30 years old.

Upper third molar



The Cinmar knife was found with the mastodon remains, and it was likely used to butcher the animal over 22,000 years ago. If it were not associated with the mastodon the slight oxidation of the knife indicates that it had to have been deposited before 14,400 years ago in the saltwater marsh. In either case, the knife is the oldest formal artifact found in the Americas and is evidence that ice age people utilized the outer continental shelf.



Sea level at 40 years ago



Rhyolite projectile point with its surfaces smoothed by tumbling in the surf



Sea level at circa 14,400 B.P.



Sea level at circa 14,500 B.P.



Salt water marsh  
Submerged forest bog  
Fresh water peat bog

Outer Continental shelf 22,000 years ago

The mastodon was killed or died in a peat bog and was preserved by the bog's anaerobic environment.

Middle Atlantic  
Rate of Sea Level Rise from 22,000 years ago

Middle Holocene  
Pulse 1c

Meltwater  
Pulse 1b

Meltwater  
Pulse 1a

0m  
10m  
20m  
30m  
40m  
50m  
60m  
70m  
80m  
90m  
100m  
110m

2k 4k 6k 8k 10k 12k 14k 16k 18k 20k 22k

ACROSS  
ATLANTIC  
ICE

