

Oceanographers Say Winds May Have Parted the Waters

By JOHN NOBLE WILFORD

Applying an expert knowledge of wind over water, two oceanographers have developed what they say is a plausible scientific explanation for the parting of the waters that enabled the Israelites to make their miraculous escape from Egypt in the biblical story of the Exodus.

The oceanographers calculated that strong winds blowing along the narrow, shallow Gulf of Suez, a northern extension of the Red Sea, considered the likely site for the crossing, could account for the phenomenon. Steady winds of 40 knots could push enough water to the south to cause a 10-foot drop in sea level, exposing a large swath of sea floor over which the Israelites could have walked to safety.

And when the wind subsided, the scientists concluded, the parted waters could have spilled back into place in only four minutes. The pursuing Egyptian army, without time to escape the flood, could thus have been drowned in mid-crossing, as described in the Bible.

Theory to Be Published

The theory was proposed by Dr. Doron Nof, a professor of oceanography at Florida State University in Tallahassee, and Dr. Nathan Paldor, an expert in atmospheric sciences at Hebrew University in Jerusalem and visiting scholar at the University of Rhode Island's Graduate School of Oceanography at Narragansett. They discuss their research in a report to be published this week in *The Bulletin of the American Meteorological Society*.

Since 1962 there have been biblical scholars who translate Hebrew texts of the book of Exodus as saying the Israelites crossed the Sea of Reeds, a marshy area at the northern end of the Gulf or Suez, not the Red Sea itself.

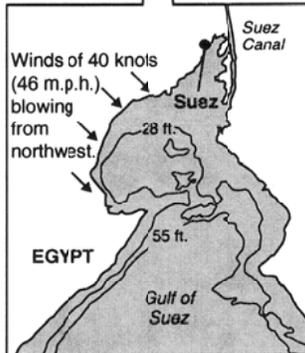
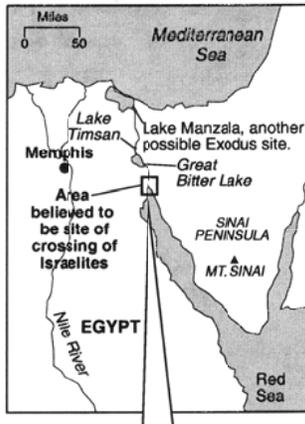
Dr. Nof and Dr. Paldor say they are the first scientists to consider the question of the parting of waters during the Exodus as a physical oceanography problem. Another explanation, based more on archeological findings, involves vast waves, perhaps generated by a powerful volcanic eruption on the Greek island of Thera.

Biblical Account

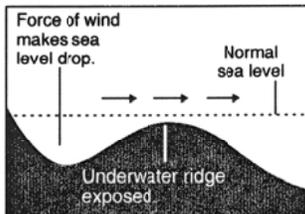
In Exodus 14:21-22, it is written: "and the Lord caused the sea to go back by a strong east wind all that night, and made the sea dry land, and the waters were divided. And the children of Israel went into the midst of the sea upon the dry

The Winds of Exodus?

A new theory explains how sustained strong winds and the shape of the seabed could have allowed the Israelites to cross while pursuing Egyptians drowned.



Scientists have shown that a strong wind blowing 10 to 12 hours could push water a mile or two from the original shoreline of the Gulf of Suez, a northern extension of the Red Sea. An exposed undersea ridge could have been a temporary bridge.



Source: Dr. Nathan Paldor

ground; and the waters were a wall unto them on their right hand, and on their left."

When the Israelites had passed safely to the other side, the Bible says that God told Moses to stretch his hand over the sea again "that the waters may come again upon the Egyptians, upon their chariots, and upon their horsemen." Moses obeyed, the pursuing forces of Pharaoh were destroyed and the Israelites began their 40 years of wandering in the wilderness during which Moses received the Ten Commandments on Mount Sinai.

Dr. Paldor said the new research focused not on whether the crossing had actually occurred, but rather on providing a scientific explanation of how it could have occurred through a phenomenon created by strong winds.

"The Gulf of Suez provides an ideal body of water for such a process because of its unique geography," Dr. Paldor said. Most scholars say the northern part of the gulf is the most likely crossing site, though some who favor theories of volcano-generated tidal waves often place it at Lake Manzala, near the Mediterranean Sea.

40 Knot Winds

The Gulf of Suez is more than 200 miles long, 12 to 18 miles wide and fairly shallow at its northern end. Winds channeled between the mountains on each side of the gulf can exert a powerful force on the sea. The scientists' study showed that a wind of 40 knots, or 46 miles per hour, blowing for 10 to 12 hours, could push water a mile or two from the original shoreline.

"Our physical and mathematical analysis shows that both values for the drop in the sea surface height and withdrawal distance for the water are more than sufficient to cause the calamity that befell the Egyptians," Dr. Paldor said.

The scientists noted that in the biblical account a strong wind is said to have blown for the entire night before the crossing by the Israelites. They also said the biblical description of the Israelites' going "into the midst of the sea upon the dry ground" could be explained by the presence of a natural ridge in the bottom of the gulf. The account of a wall of water on either side, they said, supports the theory that the wind was pushing back the water.

"Whether this theory explains the crossing or not," Dr. Paldor said, "Nof and I believe it should not affect the religious aspects of the Exodus. Believers can find the presence and existence of God in the very creation of the wind with its particular properties, just as they find it in the establishment of a miracle. Some may even find our proposed mechanism to be a supportive argument for the original biblical description of this event."

