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EXODUS BY NUMBERS

Last March researchers reduced the wrathful God of the Old Testament to a pile of numbers and equations. Two scientists published a theory that explains the parting of the Red Sea during the Israelites' exodus from Egypt in terms of wind velocity and water movement.

The key to their equations lies in the shallow Gulf of Suez, where the Israelites are believed to have crossed. Only 15 miles wide but 217 miles long, the gulf sticks up from the Red Sea like a watery finger and is bounded on each side by towering mountains. These walls of rock funnel wind from the northwest down onto the gulf waters at around ten miles an hour on an average day. But, say oceanographers Doron Nof of Florida State University and Nathan Paldor of the Hebrew University in Jerusalem, if those winds stiffened into a good-size gale of about 45 miles an hour, the force would be powerful enough to push the gulf waters ahead of it, the same way you can temporarily push water to one end of your bathtub before it sloshes back. Since this particular bathtub opens into the Red Sea, however, the water goes right out the far end. If the wind blew steadily for ten hours, Nof and Paldor say, it would

clear enough water from the gulf to drop the water level by eight feet.

The Bible describes the Israelites crossing and finding that "the waters were a wall unto them on their right hand, and on their left." Nof suggests that at the northern tip of the gulf there may have been an underwater ridge – long since eroded away – that was exposed when the water level dropped. The ridge trapped some water behind it, and the Israelites then crossed with water on either side of them. Nof's equations, and diagrams that can be drawn from them, actually show a near-vertical wall after the water recedes.

"Of course, I don't think physically the water is going to be a wall," says Nof, "but it's going to have a strong slope to it." He built a small model with a fan, a tunnel, and a shallow tank of water to demonstrate the effect. It shows that the water piles up on itself as it is blown to one side of the tank.

Nof and Paldor not only explain the Israelites' escape, they also account for the pursuing Egyptian army's demise. The Bible says, "and the waters returned, and covered the chariots and the horsemen." According to the researchers, if the wind were to cease, or even to change direction abruptly, it would take just four minutes for the water to flood back into the area – leaving no time for the pharaoh and his entourage to retreat.

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