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*D-Day's lunar connection—
moon phase and tide
considered in
planning of 1944 Normandy
Invasion*

Moon Watch

“The Tides of War”

Buffed by strong winds, they flew across the English Channel late that summer night. At a quarter past midnight on June 6, 1944, British and American commandos parachuted from their planes and landed on the rugged coast of Normandy—territory that Hitler’s army had occupied for the past 4 years. Using flares and radar beacons, this first wave of men marked landing fields, paving the way for other airborne troops to control strategic bridges and road junctions.

D-Day—the beginning of the end of World War II—had begun.

By dawn, some 5,000 ships carrying more than 200,000 soldiers had arrived. Some of these men would drown, others would die in battle. But after months of rehearsal and more than a year of detailed planning, the effort to liberate France was in full swing.

Why June 6? The answer has almost as much to do with astronomy as with military tactics, notes astrophysicist and history buff Bradley E. Schaefer of NASA’s Goddard Space Flight Center in Greenbelt, Md. “People often think of astronomy as an ethereal, academic pursuit of heavenly objects,” he says. “But in times of war, considerations such as the phases of the moon can have a very tangible influence.”

British Prime Minister Winston Churchill had vowed to liberate France ever since June 1940, when the country surrendered to German forces in just 6 weeks and the British suffered a devastating defeat at Dunkirk. In 1942, a strike force of Canadian soldiers came ashore at the port of Dieppe, but the attack proved disastrous. The German army and air force, or Luftwaffe, killed or captured thousands of the invading troops. That experience helped convince General Dwight D. Eisenhower and other Allied leaders that any attack must begin on the beaches rather than in a port town, which the enemy could defend more easily.

That realization was not lost on Field Marshal Erwin Rommel, the German commander of North Africa who spearheaded efforts to fortify defenses along the Atlantic coast. From Cherbourg to Calais, Rommel created a veritable wall of death to greet any Allied troops crossing the English Channel.

Like the quills of a porcupine, massive logs and steel beams tipped with land mines studded the coast. Huge obstacles designed to waylay tanks consumed nearly all the concrete Germany and its occupied territories could produce. Using twisted steel girders known as hedgehogs, metallic devices known as dragons' teeth, tall wooden spikes, and other barriers, Rommel hoped to impale Allied landing craft or blow them to bits. "The war will be won or lost on the beaches," Rommel told an aide.

In the meantime, pressure mounted for the Allied forces to attack. After fighting the Germans in Russia for 3 years without significant help from the United States or Britain, Stalin desperately needed relief—the opening of a second front. After much deliberation, Eisenhower decided he would deploy sometime in June the massive armada that had transformed much of England into an army base. Mindful of the booby-trapped beaches, Eisenhower knew he had to attack at low tide just after dawn, when the full extent of Rommel's deadly Atlantic Wall would be exposed.

(In contrast, says Schaefer, many Allied landings in the Pacific took place at high tide near dawn. High tides typically minimize the strip of exposed land a soldier must cross.)

The need for a low tide on the channel, determined by the moon's tug on the Atlantic, narrowed the choice of invasion dates in June. Conditions would be right on just 6 days that month—June 5 to 7 and June 19 to 21.

But the Allied forces had a further constraint. The night landings of paratroopers and glider troops, which would precede the dawn attack by ship¹, required a bright moon. Pilots needed a brightly lit landscape in order to land the troops on target. The soldiers themselves needed light in order to regroup and commandeer bridges and road junctions behind enemy lines.

Only once a month does a low tide at dawn coincide with a bright moon, Schaefer notes. That June, a full moon at low tide would occur on the sixth. The invasion could thus take place on June 5, 6, or 7. Eisenhower chose June 5.

Allied forces set out for the Normandy coast on June 3. But on the following day, one of the worst storms in decades struck the channel. Troops aboard large, heavy vessels fared relatively well. Those on flat-bottomed landing craft, however, were pitched and tossed mercilessly. Water lapped at gunwales, and men became so violently seasick that they threatened to jump overboard.

Eisenhower worried less about the soldiers' nausea than the prospect of cloudy skies. Just as astronomers require clear weather to view the heavens, the troops needed clear skies for an effective air attack. Moreover, the sea had to be calm enough that the surf on the beaches would not hamper the landing craft.

¹ and begin by midnight