

Low Tide

By Charles Miess



“ . . . we have salt in our blood, our sweat, and in our tears. We are tied to the ocean. And when we go back to the sea, whether it is to sail or to watch it, we are going back from whence we came.”
 John F. Kennedy (Newport R.I., September 14, 1962)

Life awoke to the sea’s temporal rhythm, scientists believe, about two billion years ago. From simple chains of molecules, to cells, to more complex forms, living things slowly and haltingly filled the oceans. For an enormously long period, they flourished and evolved in the sea, while the land remained hostile and barren. And yet, the fertile juncture of land and water was an attraction for many organisms. Here, splashing against rock, life-giving oxygen enriched the water. Here the energy of the sun penetrated, leading to photosynthesis and the manufacture of sugars, and the development of eyes to see. Here the moving water mixed the nutrients for diverse plants and animals to feed and grow. Here in the shallows, they had protection from deep-sea predators. Here, life abounded. And here lurked imminent death—low tide.

People once thought of the ebb and flow of the tides as the breathing of the earth. It wasn’t until Sir Isaac Newton established the concept of gravity, and we looked toward the heavens that we knew it was the moon. The moon pulls the oceans until the water bulges. At the same time, the oceans bulge on the opposite side of the planet due to centrifugal force as the moon and earth swing around a common point. This point, offset a few thousand miles from the earth’s geometric center, causes the earth to wobble much like the wobble of an adult as he swings a small child around in a circle. With ocean bulges on each side of the planet, a point on the earth experiences two tide cycles each day.

To a lesser extent, the sun also affects the tides. With about half the gravitational attraction of the moon, it reinforces or opposes the moon’s effect. When the sun and moon are lined up, whether on the same or opposite sides of the earth, the tides are highest and lowest. These we call spring tides and they occur only during the full and new moon.

With the sun at right angles to a line drawn between the earth and moon, the effects oppose and tides are not nearly as high or as low as spring tides. We call these neap tides, and they occur during the first and last quarter of the moon (when half the moon’s face is illuminated). NASA took the photograph below from about four million miles away near the time of neap tides around the world.



The sea is reluctant to reveal her secrets. Even today, we know little about the depths of the oceans and the creatures that flourish in that dark, mysterious place that extends over much of our planet. Thanks to the moon and the tides, however, we have a first hand glimpse of life in the shallows. And thanks to the tides, we have learned much about deep-sea creatures. The giant squid, for example, was never seen in its natural habitat until last year by Japanese researchers in a deep sea submersible.

For centuries, this enormous creature, known to attack both ships and whales, was as much a monster of myth as science. What little we knew about it came from a few dead specimens cast ashore by the tides.

Low tide is a time for exploration. It is a time to satisfy those ancient longings that Kennedy spoke of in the beginning quote. Just below the low-tide mark, burrowing sea cucumbers, sand dollars, ghost shrimp, eels,

and other creatures that cannot stand exposure to sunlight and air, make their home. At various levels between the low and high tide line—depending on their tolerance to the air and

sun—anemones, blue mussels, barnacles, and limpets flourish. Above the high tide mark in the splash zone are the rock crabs, periwinkles, and blue-green algae. Further up dwells the ghost crab—a fascinating animal in the process of changing from life in the sea to life on land. With legs no longer suitable for swimming, it avoids the water whenever possible. Yet, it still must go to the sea from time to time to fill its gill chambers and breathe oxygen from the water of the ocean.

Low tide is a time of awe, inspiration, and beauty. Yet, it is fraught with peril. Millay probably captured this feeling best in her poem ‘Low-Tide.’”



Low-Tide

These wet rocks where the tide has been,
Barnacled white and weeded brown
And slimed beneath to a beautiful green,
These wet rocks where the tide went down
Will show again when the tide is high
Faint and perilous, far from shore,
No place to dream, but a place to die, —
The bottom of the sea once more.
There was a child that wandered through
A giant's empty house all day, —
House full of wonderful things and new,
But no fit place for a child to play.

Edna St. Vincent Millay

The danger for us that Millay spoke of is exactly the opposite of the danger for ancient life that inhabited the tidal zones. We risk drowning in water; they risked drowning in air. Just as necessity is the mother of invention, adversity is the driver of evolution. Organisms in the tidal zone gradually built up a tolerance to the air during low tide, and some started to break their ties to the sea as the ghost crab is doing today. They developed biological clocks, synchronized with the alternating environment, and they learned to cope with the rhythm of the tides. Then, after a billion and a half years of confinement and adjustment, some of them crawled away from the sea—never to return.

And so, it was not the earth breathing, but the earth's barren sister, the moon, that rocked the cradle of life. The tides came and the tides receded for eons of time. Ironically, it might have been the lifeless moon that weaned us from the womb of our mother to go off and inhabit the land and do wondrous things. Without the tides, life would have evolved much differently. Without low tide, we might never have been conditioned to forsake our ancestral home. Except for low tide, we might still live in the sea.