

SALTMEADOW PRESS

Between the Tides

Marisol Vance



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BETWEEN THE TIDES.

A FIELD GUIDE TO THE ROCKY SHORE

BY

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MONTEREY, CALIFORNIA

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How to use this guide

This guide sorts the rocky shore by height rather than by taxonomy. A walker moving from the dry upper rocks toward the low water finds the animals and algae arranged in bands, and each band answers to one question: how long does it stay wet. The scheme here follows four zones. The splash zone sits above the highest tide and drinks only spray. The barnacle zone marks the reliable upper limit of daily flooding. The mid shore, dense with mussels and rockweed, floods and drains twice a day. The low shore, uncovered only on the strongest tides, holds the animals least willing to leave the water.

Read the zones in order, top to bottom, the way you would descend. Each chapter opens with the physical conditions, then names the common residents and shows how to tell them apart in the field. Measurements are given in centimeters. Where two species look alike, the guide points to the single trait that separates them without a hand lens.

Bring rubber boots, go on a falling tide, and put every rock back the way you found it. The shore keeps its order only if you leave it undisturbed.

1 The splash zone

Above the reach of all but the highest tides lies a band that the sea never floods, only wets. This is the splash zone, and its residents are specialists in doing without. Black lichens crust the rock in a tarry film so uniform that walkers mistake it for an oil stain.¹ Orange and gray lichens follow just below, painting the stone in patches that brighten after rain.

The chief animal here is the periwinkle, a marine snail no larger than a fingernail. Periwinkles graze the lichen film and the thin skin of algae that grows in damp cracks. They can seal themselves behind a horny plate and wait out weeks of dryness, breathing air the whole time. A periwinkle found high on a bone-dry rock is not lost. It is exactly where it means to be.

Nothing about this zone is generous. Water arrives as spray, food grows slowly, and the sun bakes the rock for hours. Yet the animals that endure here face almost no competition and few predators. It is a hard bargain, but a bargain still, because every zone is a compromise with the tide.

¹the black band is usually the lichen *Verrucaria*, not tar.

2 The barnacle zone

Fix yourself to the rock, and let the sea bring dinner.

Below the periwinkles, the rock turns white and rough underfoot. This is the barnacle zone, named for the millions of small volcano shaped shells that cover every exposed surface. At low tide the barnacles are shut tight, each sealed behind four plates against drying air and hungry gulls. When the water returns, the plates open and a feathery limb sweeps out to comb plankton from the current.

That limb is the clue to a strange fact of anatomy: the barnacle is a crustacean standing on its head. It cements itself down by the front of its head and kicks food into its mouth with its legs. A creature we file beside crabs and shrimp spends its whole adult life glued in place, feeding by foot.

Two species share this zone on most shores. The acorn barnacle is squat and gray, with a diamond shaped opening. The little brown barnacle sits higher and drier, with an opening shaped like a narrow slit. Both settle as swimming larvae, choosing their rock in a single decision they can never revise. Once the cement sets, the barnacle is home for life.

3 The mussel bed

Below the barnacles, where the rock stays wet a little longer, the mussels take over. They win this band by force: a mussel bed is a crowd, and the crowd is the animal's whole strategy. Packed shell to shell, each mussel shelters its neighbours from drying and from the worst of the waves, and the bed as a whole holds the rock against a surf that would tear off any single animal.

A mussel anchors with threads it makes itself, a bundle called the byssus, spun from a liquid protein that sets underwater. Lift a mussel gently and you will feel the threads resist, then let go with a small reluctance. The animal can cut them and move, slowly, if the spot goes bad, but mostly it commits to one place for life and spends its effort on holding fast.

3.1 What lives in the crowd

The bed is not only mussels. Pull one clump aside, carefully, and put it back exactly as it was:

- Small crabs and worms in the damp shelter between the shells, living off the bed's shade and leavings.
- Barnacles and young mussels riding on the backs of the old, because bare rock is scarce and a shell is as good a floor as any.
- The drills: predatory snails that bore a neat round hole through a mussel's shell and eat it from inside. Every empty shell with a countersunk hole is a drill's finished meal.

3.2 Reading the edge

The bottom edge of the mussel bed is a battle line. Below it the sea stars wait, and a sea star can open a mussel by pulling steadily until the muscle tires and the shell gapes. The mussels can live lower than they do; the stars are what stop them. The line you see is not the limit of the mussel's endurance but the reach of its enemy, redrawn a little higher or lower each year.

About the author

Marisol Vance is a marine naturalist who has spent twenty years walking the same three miles of the Monterey coast at low tide. She taught intertidal ecology at the field-station level for a decade before deciding that a good guide in the hand does more than a lecture, and she wrote this one on the rocks it describes, checking every animal against the page. She lives within sight of the water.