



NATURAL ALASKA

SEA STARS

A CONSTELLATION OF
MANY-LIMBED MARVELS

by Michael Engelhard

AS YOU STROLL ALONG BEACHES near Utqiagvik, Attu, or Ketchikan, scattered gems popping brightly against sand-and-kelp backgrounds catch your eye. Some rest in pools, as if encased in clear-resin paperweights; others cling to boulders, half exposed, or dangle from overhangs, jelly-armed climbers stranded by low tide's retreat.

Kin to sand dollars, sea urchins, and sea cucumbers, these invertebrate gifts from Poseidon range from a quarter's size to a yard in diameter. With 10, 40, or the classic five arms, they prowl the craggy intertidal zone, though brittle and basket stars prefer the deepest, muddy parts of the ocean. They are not "starfish," but they depend on the sea as much as salmon or halibut do. Pumped saltwater, not blood, circulates nutrients through their bodies by way of a specialized vascular system. A mesh exoskeleton protects their internal organs. A nerve ring relays

impulses between the stars' radial nerves, coordinating supple appendages. In a pinch, they'll shed a leg to escape. An Inupiaq word for them translates as "big, old hand," and Tlingits established a clan in their honor.

At least 125 species populate Alaska's coastlines and offshore waters. Their names are poetic or downright creepy: Zeus' shield, brooding sun star, orange cookie star, Bering deep-sea pteraster; bat star, pale-toothed *Henricia*, giant

Above: The northern Pacific sea star (*Asterias amurensis*), lethal to mollusks, is now an invasive species in Alaska.



slimy star, fish-eating star (it gobbles scallops and chitons, too). They feel velvety to the touch or nubby and rubbery like Grandma's red hot-water bottle. *Don't eat me*, the glossy brilliance of many stars signals to predators, but it can work against them. They not only attract patrolling gulls, but beachcombers collect the castaways and keep them as dried curios. Billed as aquarium "cleanup crews," *Asterina* species sell online for \$10 a star.

The sunflower star, with legs arrayed petal-like around a disc, is this family's rogue. "Sprinting," it cannibalizes fellow sea stars and feeds on sea urchins, snails, and abalone. Typical echinoderms ("rough skins") travel inches per hour, but this

Top: Sunflower sea stars (*Pycnopodia helianthoides*) will eat any other small creature in their path.

Bottom: This vermilion sea star (*Mediaster aequalis*) is missing an arm.

candy-colored bruiser has been clocked at three feet per minute.

Sea star skin bumps with tiny pincers clean off debris. Spines defend them from predators. Rows of hydraulically operated tube feet tipped with suction cups for feeding and locomotion stud each arm's underside. The suckers, up to 15,000 in one animal, pry open bivalves such as clams once they've been embraced. When a victim's muscles tire, the predator, in an *Alien* move, extrudes its stomach from its mouth into the shell, liquefying up to 80 delicious mussel

morsels annually with digestive juices. Suction feet also enable sea stars to Velcro themselves to surf-pounded rocks. Flipped upside-down, they right themselves with a slow motion, "tripod" break-dancing move. Eyespots at the arms' tips respond to light, while nearby tube feet sense chemicals that betray food sources by their odor. Additional receptors register touch, temperature, body orientation, or seawater composition. Yet another function is worth mentioning. Sexual organs in each limb in the spring release eggs or sperm into the water. Suggestive of translucent lice, hatchlings then morph through different larval stages. Young sunflower stars start with five legs, growing more as they mature. Their multiple-use rays beg a question: should we call them "arms" or "legs" and the tubes "fingers" or "feet?" The slow crawlers defy mammal anatomy consistently.

Comparable to the animated broom Disney's sorcerer's apprentice chopped up in *Fantasia* and that multiplied, severed stars, sprouting new arms, survive. Fishermen discovered this after they cut them in half, finding twice as many the following year. Like Mickey's water-hauling nemesis, sea stars sometimes become a plague, wreaking havoc on mollusks or tropical reefs. One of the worst invasive species, the northern Pacific star, at home in northeast Asia, conquered Europe, Australia, Maine, and Alaska by hitching rides in ships' water ballast. The ochre star, an "indicator species" native to Alaska, conversely, points to the littoral's

wellbeing—healthy ones come in various hues and can live 20 years. Both sexes of it, and of other echinoderms, look identical.

A virus weakening sea stars' immune systems killed millions along North America's west coast recently, in the largest marine disease outbreak ever recorded. Washington's sunflower star populations plummeted more than 99 percent. The virus, dormant since the '40s and spreading by physical contact, reached Prince William Sound. Mushrooming Pacific Northwest populations' crowding could have contributed to the crash. Warming water and ocean acidification likely also mattered.

Many fishermen regard sea stars as pests fouling crab pots and long-line gear. Clam diggers loathe the mollusk-hunting competitors, valuing them only as garden fertilizer. Sea otters, gulls, king crabs, and large fish, however, feast on them, and some species, the "aquarium cleaners," provide ecosystem services, hoovering up plankton or carrion.

Beyond questions of mere utility, sea stars embody teeming diversity. Fallen celestial constellations, they confront us with beauty, with mystery. On overcast days, they flash as squirming beacons to joy. ♡

Vexed by anthropocentric perspectives and multiple designs of life, Michael Engelhard wonders if sea stars consider us to be under-limbed and sucker-deficient—cumbersome central brains constantly rushing about.