

Wait and hope for the coastal sunset's flash of green

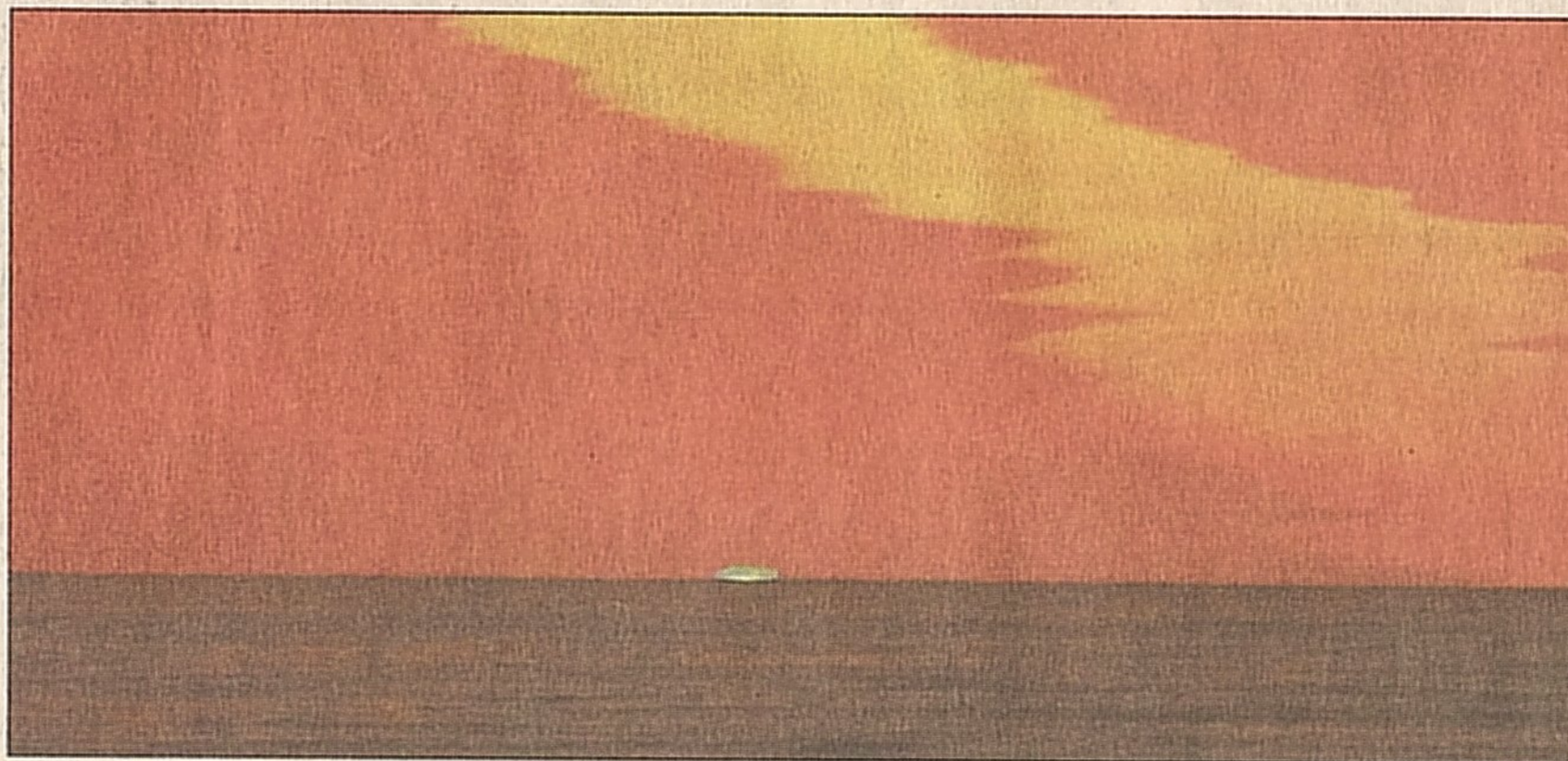
Skygazing | A trick of nature makes it possible — sometimes — to see a bright green gleam over the ocean

By **BEN LARSON**
THE OREGONIAN

Shadows lengthen on the nearly deserted Lincoln City beach, and the day's reserves of warmth and light are waning. But the setting sun may still have a trick up its sleeve.

If conditions are right, the few who remain in the chill salty air will catch a glimpse of the day's last breath: a brilliant flash of green light that shines over the water at the moment when the sun slips behind the vast expanse of the Pacific.

The elusive atmospheric phenomenon can appear under all kinds of circumstances, but sunsets off the Pacific coast of the United States create the



MILA ZINKOVA

A green flash shows just above the horizon at sunset near Santa Cruz, Calif. Observing the flash can be tricky because it's visible only briefly and the setting sun's rays can be harmful to the eyes.

perfect setting for a particular type of green flash.

"I was traveling around the world — Antarctica, Indonesia, the Arctic — but

I'd never seen one," said Mila Zinkova, a California-based freelance photographer who specializes in photographing atmospheric phenomena. "Then I

realized that I could see green flashes in San Francisco."

The emerald-colored flash has to do with the way the Earth's atmosphere bends or refracts rays of light from the setting sun.

"The amount that the light bends when it goes through the atmosphere depends on the color," said James Butler, a physics professor at Pacific University in Forest Grove. "The red gets bent a different amount than the green, so it separates those wavelengths."

Color-dependent refraction, called dispersion, extracts a tiny sliver of green from the upper edge of the sun. Most of the time, the naked eye can't distinguish the narrow green strip from the neighboring pool of reds and yellows.

That's where the ocean horizon comes into play. When the sun is low in the sky and the water is warmer than

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the air just above it, the atmosphere can magnify the refracted colors. "The atmosphere acts like this distorting lens that makes the thin green line smear out," Butler said.

The optical acrobatics don't stop there. The atmosphere takes that shred of green light, flips it upside down and projects it just beneath its upright counterpart. The effect, known as an inferior mirage, caps off the magnified green line, creating a bright green oval that forms and dissipates within the blink of an eye.

At most, the flash endures for a few seconds. But when the water is warm, the air is cool and the coast is clear, the green rim of the sun reveals itself for a lucky few to see. These conditions tend to converge on Oregon in September.

"Lots of sightings are reported by sailors out at sea," said George Taylor, head of the Oregon Climate Service at Oregon State University, who noted that he's never seen the

flash.

Human optical anatomy adds another layer of complication for those hoping to catch a glimpse of the transient green ember.

"The brightness of the yellow part of the spectrum saturates your photoreceptors and bleaches out the red and yellow," Butler said. "That leaves just the green part of your sensors that are still operating."

This bleaching effect can give a false impression of green that isn't really there. Even when the flash is real, catching it on film is a problem.

"It's very hard to photograph a green flash, because usually it gets overexposed," said Zinkova, explaining that with the right camera settings it's possible to get a picture from anywhere along the Pacific coast, including Oregon. "One time, my picture was published together with this picture of somebody from Oregon; it was the same sunset on the same day."

In Lincoln City, the moment of truth comes when the tip of the sun winks out. The horizon goes dark without a trace of green. But as a deep violet color blossoms in the low-lying clouds, disappointment seems as far away as a spot of light at the end of the Earth.

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