

When You've Got the Blues...

Reach for Your Crayons

We lost red in the first 30 feet.

"The water starts filtering out and absorbing color immediately." Edie says. "First we lose red, then the rest of the rainbow fades away one color at a time, leaving behind a different blue at every level."

From previous discussions with Edie, I knew we would see several shades of blue. I wanted a way to remember them. Edie, being the good sport that she is, helped me use a very scientific tool — crayons. Only a box of 64 held all the blues we needed.

The dive starts in a "Sky Blue" sea. After orange disappeared at 110 feet (35 m) and yellow fades at 150 feet (50 m), the ocean turns "Turquoise Blue".

"Green has left the sea" Edie says at 377 feet (115 m). Comparing the ocean to my "Crayon-o'meter", it is "Cerulean" — bluebird blue.

It's a long way to "Blue", we find it somewhere between 600 and 800 ft (183 to 244 m), just after violet fades from the sea.

Besides the fun of comparing the blues to my crayons, what's the big deal about measuring color? I ask.

"It's an important part of an ocean animal's life — from what colors an animal sees, or doesn't see, to how it hunts and hides." Edie explains. "There are no trees, bushes, or grasses to hide behind. Most animals are exposed — top, bottom, and sides. Color and light are probably more important to ocean animals than many on land."

Because red is filtered out very near the surface, most deep-sea animals cannot see it. It's an adaptation they do not need. Most can see blue because it makes all the way down to the deep.

The ocean is a rich velvety blue called "Indigo" at 800-1000 ft (244 to 305 m).

Soon, the rainbow of color from our world is gone.

Thief of Light

As we sink further from the sky, sunlight becomes a memory. I was so overwhelmed with color changes and just the thrill of

being in the sub, I didn't notice how dark it was getting — that is until I tried to make some notes and could barely see the paper — or my hand!

The light theft started happening much earlier in the dive. By the time we reached 246 feet (75 m), the water had already captured 90% of the sun's light.

"The sun's energy is slowed by the water." Edie said. "Only 1% of the sun's energy makes it to 492 feet (150 m)." That's the deepest you'll find sea plants or seaweeds. There isn't enough energy from the sun for them to survive any deeper.

How does Edie know exactly how much light there is at a given depth? She designed, patented, and uses the most sensitive equipment for measuring light in ocean.

At 1,500 feet, the world is "Gray".

Several years ago, I rode the elevator up 103 stories to the top of the world's tallest building, the Sears Tower in Chicago. At the top, which is 1,343 feet (443 m) up, the sunlight was the same. The colors, temperature, and air pressure were also the same. I could see the

street, cars, and tiny people 1300 feet below.

But here in the ocean, about the same distance below the surface, I can only see a meager bit of light at surface (like light behind a sheer curtain). And, I can only see that light if I look straight up. It's impossible to tell if it's morning, noon, or dusk. Here, the angle of the sun does not matter.

Darkness surrounds the JSL around 2,000 feet (610 m).

"If I were to take a measurement here, we'd find there's only 0.00000001% of surface light." Edie says, "Knowing there's even a tiny bit of light is important because animals use that light to find food.

"Some deep-sea fish's eyes are ten times more sensitive to light than our own." Edie adds. "Many deep-sea animals hunt by looking up. They search the water above them for the silhouettes of their prey."

It's as if we're floating in black ink. The water has commandeered all color and light. Now at 3,000 feet (1,000 m) "Black" is the only color match left.

"The light is one 10-billionth of a

percentage of the surface level here.” Edie tells me. That’s not even a number the rolls easily off the tongue let alone the brain. All I know is...it’s darker than anything I’ve ever seen — or is that not seen? My heart pounds with excitement and fear as we float in pure darkness.

I zip up my jacket and wiggle my toes, glad for my warm socks. The temperature also drops on the way down. In the 30 minutes it has taken to reach 3000 feet the temperature dropped 21 degrees. It is now 44.6°F (7° C) outside the sub and almost that cold inside. Submersibles do not have heaters. It may be cold enough to see my breath, but it’s too dark to know.

Most deep-sea animals travel vertically every day. Edie says, “Some animals use the light to sense their depth, others use the temperature. Like the squid “Abralia sp”. It’s like a living thermometer. It changes colors based on the water temperature.”

Silent But Deadly

There is an invisible danger lurking outside the JSL. The water. At this depth, the ocean

weight is so great a crack in the sub’s hull could crush us. Like a true pioneer, though, the thrill of seeing the deep-sea is stronger than my fears.

Edie says, “We have 6.4 million gallons of water on top of us.” That’s 53,376,000 pounds of bone-crushing water (or 3,444 elephants) smashing in on every inch of the sub.

I wondered how my styrofoam cups are holding up. When we return to the surface, the cups will look like they’ve been put into a shrinking machine because the water presses in evenly on all sides.

At 35,800 feet (10,915 m) deep, Mariana Trench (in the Pacific Ocean) is the deepest place on earth. At that depth, the 392 million pounds of water would be on top of a sub. (That’s 25,290 elephants.) The force is so great, water leaking in through a pinhole crack would cut a person in half! (Of course, being sliced up by water is the least of your worries if water is leaking in at that depth!)

I wonder how small a styrofoam cup would be after a visit to the Mariana

Trench. Maybe the size of a thimble?

Though the Mariana Trench is more than 11 times deeper than where we are now, the water pressure on the JSL is just as deadly.

During our dive, the ocean changed color several times. Sunlight disappeared and the temperature plummeted. The water pressure increased to crushing weights. Being inside the JSL really brings physics to life. Edie's near-fatal experience on the Deep Rover must have been terrifying.

I start to wonder how she ever went back into the sea, then I see my first squid — and understand.

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