

“The Least Light”

In Jackie Higgins book *Sentient: How Animals Illuminate Human Senses*, the author explores the extraordinary sensory powers of our animal friends to help us understand the same powers that lie dormant within us. In addition to the BIG FIVE senses known by preschoolers everywhere – sight, hearing, touch, taste, feeling - she considers hidden senses like balance (comparing cheetahs and ballerinas) and body awareness (comparing octopi and Aristotle). There are some fascinating revelations: did you know humans outperform dogs in detecting some odors and we could train ourselves to locate bakeries with **our** noses! Definitely, Jackie Higgins' *Sentient* sheds light on the remarkable sensory abilities of animals, prompting us to recognize the untapped sensory potential within ourselves.

In terms of light – our theme for this Advent season – her book highlights some exciting developments. Some of you may already know this, but miles beneath the ocean's surface, various species of fish have evolved to capture any and all photons of light making their way to the oceanic depths.

Have you heard of bioluminescent fish whose organs produce their own light – a soft glow from specialized cells which they can control to create patterns or mimic their surroundings. There is also the fact that deep-sea fish often have incredibly large eyes, acting like visionary satellite dishes helping them to gather as much available light as possible. The largest known eyes are the size of dinner plates and belong to the deep-sea squid.

Or have you heard of the spookfish whose light-tracking eyes have taken on a tubular shape so that it looks like there are two telescopes protruding from the side of its head. There's more: reflective layers behind the retina, shiny, see-through heads that burst when brought up

from the depths. All of these biological changes are meant to give the fish their very best shot at capturing the smallest particles of light that make it down into the photon-restricted environment of the deep sea.

Now, humans, we know do not have bulbous eyes or photoluminescent cells. But we are, studies prove, astonishingly sensitive to light. Rods and cones are photoreceptor cells located in the retina that are responsible for detecting and converting light into electrical signals that are interpreted by our brains.

Now, rods in particular are highly sensitive to light and primarily responsible for our vision in low-lighting conditions. And guess what? We have more **rods** than cones and they are distributed more widely throughout the retina. Rods cannot see color, but studies have shown they are evolutionarily amped. They use two neural pathways instead of one to optimize our vision in different lighting conditions. And our rods are coated with a pigment called rhodopsin that is **more** receptive to light than the opsin cousins found in our cones. In all, our ROD system, our seeing light in the dark system, is around a thousand times more photosensitive than our other ways of seeing. In other words, our body is built to help us to see light **everywhere**.

The passage from Isaiah today is from the portion of the text that reflects on the people's exile from Israel. It has been a difficult time and they have endured much. And the prophet offers encouraging words here: Comfort, Comfort, my people. God will speak and you will hear God. God will move and uneven places will be leveled. God will act and things will be okay. God's glory will be revealed and all flesh will see it.

In 2016 a team of scientists at the University of Vienna took up an experiment to determine "the bare minimum of light" required by a human to see. The lead scientist was a man named Mr. Vaziri whose team developed a process to test how many photons a human could

detect. A photon is the smallest possible particle of light energy. To set up the experiment, they developed a chamber about the size of a phone booth that was highly engineered so that not a single photon of light could get through. And then they set up a light emitting machine that targeted the subject's eye at an angle that would impact the rods. Remember the part of our eyes responsible for seeing in the dark? They would be tested here. It took them one and half years to build out the room and the single photon light-emitting machine. Mr. Vaziri was a subject in the trial himself. And he said, "It was a disorienting space – a kind of darkness that one does not typically experience."

The experiments went on for weeks and months with more than 30,000 trials exposing human eyes to a single photon with the hopes of discovering whether or not humans were wired to see the smallest possible emission of light. For all subjects, they spent 40 minutes sitting in the dark chamber to adapt to the darkness and reach maximum sensitivity before anything began. Then the volunteer pressed a button and fired the photon. Collating the data, the scientists discovered that the probability at which a human can register a photon is just above chance. In other words, friends, there **is** always light.

I'm grateful to scientific experiments in this technologically advanced age. That make me sound smart, and perhaps prove something to people who are looking for more than the ancient stories of a well-worn faith tradition. But I believe this experiment describes what people of faith have known for years. It uncovers a story that we have long told as our gospel good news.

In the beginning was the Word, and the Word was with God, and the Word was God. He was in the beginning with God. All things came into being through him, and without him not one thing came into being. What has come into being in him was life,^[a] and

the life was the light of all people. The light shines in the darkness, and the darkness did not overcome it.

When Vaziri asked his subjects to describe their experiences of deciphering a single photon in an amazing darkness, the volunteers offered various perceptions. “If you’ve ever looked at a dim star in the night sky and one second you see it, but the next second you don’t... it’s kind of like that.” One said, “It is a feeling at the very threshold of your imagination – a feeling that there could have been something but you aren’t entirely sure.” Another, “It’s more like **a feeling** of seeing something, rather than really seeing it.” In conclusion, our author says, “We are finding words to reassure children who fear encroaching shadows and nighttime. It seems we have astonishing potential for vision in the darkest of places.”

Our scripture writer, Comfort, comfort my people. While the presence of light may not always be evident in our lives and the world around us, we can see it and our innate ability to perceive it remains ingrained within us. At times, we may only catch a fleeting glimpse or envision a flicker. Yet, we believe, even as we navigate through the shadows that envelop our world. Deep within our souls, hearts, and bodies, the Word resonates. Reminding us of the Advent witness to a surprising hope: "A Light Shines in the Darkness. And the Darkness Did Not Overcome it." There is always light. And all flesh shall it together.

To God be the Glory. Alleluia. Amen.