**Headline:** The Art of Building a Human-Hawk Relationship

**Teaser:** Sy Montgomery built a relationship with a hawk and learned about nature, life and love.

By Sy Montgomery

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**Tags:** Book, Animal Rights, Activism, Science, History, Opinion

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**[Article Body:]**

One of the defining characteristics of birds is the crucial role and astonishing acuity of their vision. Flight, after all, demands excellent eyesight. For birds that hunt on the wing, the eyes are developed to an extraordinary degree: an eagle riding a thermal at 1,000 feet can spot its prey across a distance of nearly 3 square miles. In this regard, raptors are remarkable birds. They have developed the avian sense of sight to perfection. The vision of some raptor birds, like eagles and hawks, is the sharpest of all living creatures.

All birds’ eyes are huge in proportion to their bodies. A human being’s eyes take up only 2 percent of the face; a European starling’s account for 15. A great horned owl’s eyes are so enormous relative to its head that if human eyes were comparable, they would be the size of oranges. Birds’ eyes are so important to them that, like various reptiles, sharks, and amphibians, they have a transparent or translucent third eyelid, the nictitating membrane, to protect and moisten the eyes while retaining visibility. Vision literally sculpts birds’ every movement: one reason birds seem to move in such a jerky manner, as cassowary expert Andy Mack explained to me, is that the bird is actually keeping its head remarkably still, thanks to an extremely supple neck, while the rest of its body is in motion, in order to allow it to focus on what it sees in exceptional detail.

In birds of prey, the eyes weigh more than the brain. The two eyes are twice as large as the brain itself. They need to be huge. They are packed with receptors, some types of which humans don’t have at all. Raptors have not merely two (as we do) but six types of photoreceptors in each eye. Because of this, birds are thought to be able to experience colors that humans cannot even describe. Their retinas, unlike ours, contain few blood vessels. Instead, a thin, folded tissue called pecten, unique to birds, brings blood and nutrients to the eye without casting shadows or scattering light in the eye as blood vessels do.

Most birds, like most mammals, have a single area within the eye of perfect vision, called the fovea, where cone cells, which detect sharp contrast and detail, are most concentrated. A raptor’s eye has two foveae. One is for lateral vision, the other for forward vision. A human eye has 200,000 cones per square millimeter in the fovea. Sparrows have twice that. Raptors have about a million.

Raptors see in such fine detail that humans need microscopes to begin to imagine it. They also have a wider field of vision than we do, thanks to the second fovea, as well as better distance perception than other birds. Most birds’ eyes lie at the sides of the head so that when they look at something, they use one eye at a time. With forward-facing eyes, raptors have binocular vision like ours, but better. Fields of view of the left and right eye overlap, allowing the brain to compare the slightly different images from each eye and instantly calculate distance.

And there is something else about a raptor’s vision, something more difficult to describe. “These birds don’t think the way we think,” master falconer Nancy Cowan tells us. “They don’t learn the same way we do.” Because of our differing brain circuitry, birds capture at a glance what it might take a human many seconds to apprehend. For all birds, but especially these, seeing is not merely believing; seeing is knowing. Seeing is being. That is what I see in the monstrous, devouring eyes of Jazz, a four-year-old female Harris hawk: the windows to a mind completely different from my own.

“It’s instinctive,” says Cowan, who runs the New Hampshire School of Falconry. “It’s not spiritual. A falcon is at once the stupidest thing you’ll ever deal with—and the most instinctively developed thing you’ll ever deal with.”

Instinct gets short shrift among most humans. We value thinking instead and dismiss instinct as the machinery of an automaton. But instinct is what lets us love life’s juicy essence: instinct is why we enjoy food and drink and sex.

Thinking can get in the way of living. Too often we see through our brains, not through our eyes. This is such a common human failing that we joke about the absentminded professor or the artist so focused on an imagined canvas that they walk into a tree.

But Jazz won’t smack into a tree. We are out in the field across the street now, and Cowan unclips the jesses that keep Jazz tethered to my glove. “Let her fly,” says Cowan. I give Jazz a brief toss from my glove, and she sails into a pine. She looks down at us. Now I am worthy of Jazz’s interest. She knows something is about to happen. For the first time, I am bathed in her sight. It’s a baptism, and feels momentous, transforming. “Now call her in,” says Cowan. She takes a piece of cut-up partridge out of a baggie in her pocket and places it between the thumb and forefinger of my glove. “Jazz!” she calls. I extend my left arm and look up. A huge, powerful bird flies toward me.

Not everyone would like this, I realize. An exceptionally brave biologist with whom I have worked in Southeast Asia, hiking in search of bears among forests littered with unexploded ordnance, confesses he would be scared. It’s a genetically programmed human reaction. Birds like this once hunted and killed our ancestors. A famous fossil hominid, the so-called Taung child, discovered in South Africa in 1924 and described by Raymond Dart, bears the marks of this predation. When I was in college, we were taught that this long-dead australopithecine child must have been killed by an ancient leopard. Now, from careful reexamination of the skull, we know that the death blow dealt to the brain came from the talons of an ancient relative of the crowned hawk eagle—a raptor that still hunts large monkeys in the same manner today. Our kind has rightly viewed birds like Jazz with caution for more than 2 million years. No wonder so many people flinch in their presence.

But as Jazz’s talons reach for my glove, my heart sings.