

WHAT COLOR AM I ?

BY JAN LUCCIOLA

That sounds like a Dr. Seuss book title.

*The question to be posed,
I would suppose,
Is What Color Am I,
Red, brown, blue, or tiedyed?*

OK, Dr. Seuss I am not. However, the question was brought to the forefront recently, though not in first person. Rather, what color is she or is she not? I received a call one night about an albino vulture found on the side of a road by a man near Forest City, PA. He was far away and, before arranging transportation, I wanted to be sure it wasn't a gull or escaped turkey or some other relatively white bird that should be directed to a center set up for such birds (which, of course, was most likely the case). One of the benefits of modern technology: phones that take and send pictures. So, I was wrong; it was, most definitely, a turkey vulture. I met the gentleman halfway and, after returning to the center, examined the bird and found her to be starving with no sign of trauma or disease. Albino or not? I thought I'd look into it.

This vulture has all white feathers, a red head with very pale patches and the same holds true for her legs and feet. Her eyes are pale blue. And therein lies the first of many rubs I was to come across in learning more about color in birds as well as determining this bird's fate.

We perceive color when light waves reach our eyes. The object the light waves bounce off before reaching our eyes determines what color we see. Looking at birds, their feathers and skin affect light creating color in 2 ways. The first: pigments in the feathers absorb particular light waves (part of the color spectrum) and reflect others. We see what is reflected. The second: the structure of the feathers bend, or refract, light affecting what parts of the spectrum are reflected to our eyes.

Taking a closer look at pigments, I found three types – carotenoids, melanins, and porphyrins. Carotenoids are reds, yellows, and oranges and they come from plants. The pigments that plants produce are then exhibited by birds that eat them or birds that eat animals that eat plants. Melanins are pigments produced by the birds themselves and produce colors from black to browns to reddish browns and pale yellows. Porphyrins also cause us to see some colors like pinks, browns, reds, and greens. This type of pigment will cause a fluorescence of bright red in ultraviolet light. Porphyrins are found in some owls, pigeons, and gallinaceous birds (e.g., turkeys, grouse, chickens).

The actual structure of the feather can also affect what color we perceive a bird to be. Some feathers are iridescent because of the structure of the barbules of the feathers. As light passes through them, they act as a prism, separating the spectrum, bending the separate color waves differently so that, depending on the angle you are to the feather, you will see a different color. As you or the bird moves, you see a different color. Think of the throat feathers of a male ruby throated humming bird.



photo by Scott Rando

Turkey vulture rescued and turned into DVRC.

Non-iridescent colors are caused by the structure of the feather also, notably the color blue. Air pockets in the feather scatter light rays and what reaches our eyes is blue in a bluebird or a blue jay or an indigo bunting.

Abnormalities in color exist as well, thus, the vulture. There are multiple variations in color due to pigment distribution or absence. Schizochroism is the lack of a particular pigment, like pheomelanin where what would be brown looks gray. Melanism involves high deposits of melanin that cause a darker than normal appearance. Carotenism occurs when the composition or distribution of the carotenoid pigments are altered. Dilution causes a muting of colors.

More than 20 years ago, DVRC had a bird that exhibited melanism. He was a melanistic red-tailed hawk. He was chocolate brown all over with white spots and beautiful tail feathers showing red with dark patches. This darker version of a red-tail is a common enough occurrence that it is known as a Harlan's hawk or the dark morph (form) of the red-tail. They occur out west and this bird, along with 2 others that had lost their home in Alaska, had been brought east to find new permanent homes. This particular bird was named Saruman and he stayed with us until his new home was arranged. He was one of the first birds that I worked with to man (acclimate to handling on the fist) and I still have some of his tail feathers.



Saruman, a dark morph red-tailed hawk.

Saruman's tail feather, left. The usual coloration, right.



The vulture, though, is the opposite of Saruman. She is missing color. The couple that rescued the bird said they had checked online and read that albinos have vision problems and their feathers are weak as melanin affects the strength of the feathers. After treating the bird and getting her set up for the night, I sat down at the computer and immediately found the same claims, probably on the same site after googling “albino turkey vulture.” Further reading said that birds can be classified as albino – having no color including the eyes – or leucistic – lacking color in certain areas. Well, every one of this bird’s feathers is white, angelically white. Her head and legs were pale pink, but once rehydrated became more red. Her eyes are a pale blue. She is beautiful. My impression of turkey vultures is that, in captivity, they tend to have an underdog look to them, keeping their heads low and looking at you over their shoulders. They have no feathers on their heads due to their eating habit of sticking their head into carcasses. They do not have the powerful, long taloned toes of raptors. Rather, they have long toes with short stubby nails. They have a wingspan close to that of a bald eagle on a somewhat smaller body. Maybe not the most picturesque bird. I don’t know if it was the association with heavenly bodies or that she was just something out of the ordinary, but I could not take my eyes off of this vulture. I feel fortunate to be one of the few to see such a unique creature. As a rehabilitator, though, I thought of what a treat it would be to watch her fly away free, to be the exception to the rule. That is, I was excited until I found that the rescuers concerns seemed to have some validity. So, I needed to find out: Do they have vision problems or weak feathers? Do the problems apply to albinos only or to leucistic birds as well? Is she albino or leucistic? After all, she does have color to her skin and eyes.



photo by Donald Quintana Photography

Leucistic red-tail.

not an albino. Some said a true albino can have color such as reds like this vulture. Finally, in my lack of knowledge but wanting to move forward developing a prognosis for the bird’s fate, I had to follow some guideline and settled with the idea there is no degree of albinism, one either is or isn’t. Then, thinking wishfully, if the bird is leucistic, maybe the vision and feather concerns would not apply. However, the bird did come in starving with no sign of trauma.

Turkey vultures have gray heads their first year, so this bird’s red head would indicate that it was an adult and it was feather perfect. One would then assume that it made it through, at least, its first migration, winter, return migration and the following summer. Therefore, the bird was not suffering from vision problems and, although it was the end of the molting season and these feathers could be a brand new set, if albino feathers weaken enough to affect survival, our vulture would not have made it to this first, if not 10th molt. To determine, then, if her survivability was promising, knowing her age would also be important if we were to find out if these assumptions were correct.

As I understand it, albinism occurs when melanin is not produced. In most embryos, of the paired genetic factors affecting albinism contributed by the parents, at least one of the pair is dominant. Alternatively, when both are recessive, albinism is expressed and the body is unable to produce the enzyme tyrosinase. When it is produced by a non-albino, this enzyme “converts a precursor substance into melanin” according to my college genetics text book from 30 years ago. However, without the enzyme to direct the production of melanin, the skin will be pale or appear pink because of the blood showing through. The eyes may be pink due to blood also. Where many state confidently that albinos have pink eyes, others disagree. “Some albinos have pale blue eyes because of reflective bodies in the unpigmented iris” (color caused by structure rather than pigment).

A leucistic individual has the enzyme needed to produce melanin. However, leucism is caused, as an embryo develops, when the melanocytes, or cells where the melanin is produced, do not migrate to all of the places they are supposed to, or at least not in the concentration they are supposed to be. Therefore, portions of the skin and feathers are white or lighter than usual. When I first Googled “albino turkey vulture,” I found pictures of a bird brought into a rehab center that is leucistic. The feathers on the bird were not the white of our vulture. They did not release that bird, stating the reasons of the vision and weak feathers. I called the center to get a clearer understanding. The woman I spoke with could not address the feather issue, but, although she said the bird could fly from perch to perch, it clearly and regularly spooked



photo by Scott Rando

Note the blue eye of the DVRC patient.

Leucism is something you may have seen, especially in deer if you live in an area where they are common. Known as piebald deer, you can see deer with white where there would normally be tan. Bill and Stephanie occasionally saw a leucistic red-tail over the course of several years on the drive to the Lehigh Valley. It was not all white, but certainly had white where there would ordinarily not be. Some of the sources I read called this partial albinism. Others said an albino is all or none, including the eyes. If the eyes are pink as well as the rest of the body being extremely pale to white, then the individual is an albino. Otherwise they are

at things in its surroundings. Our vulture, at first, did not land accurately and confidently when flying from perch to perch and would walk and fly into walls. Not so any more. That could be the function of time served in her enclosures as she adjusted, or her misses (or direct hits) were just a matter of panic movements in a foreign environment. According to Dr. Teresa Wright, MD, FAAD, FAAP, in *The Genodermatoses* in human medicine, albinos suffer from severe vision disabilities. They have significantly reduced visual acuity, suffer from photosensitivity, strabismus (crossed eyes), and nystagmus, which, according to the American Optometric Association, “is a vision condition in which the eyes make repetitive, uncontrollable movements, often resulting in reduced vision.” The former two impairments do not affect our vulture. The first two problems, visual acuity and photosensitivity . . . ? David Sibley of the *Sibley Guides*, on his site sibleyguides.com, says “Melanin serves some critical functions in vision and in protecting the eye from UV radiation, so full albino birds can’t see well and for that and other reasons don’t survive long in the wild.”

As far as the weak feathers and melanin’s role in the strength of the feather, one source pointed out that birds with a great deal of white in their feathers, their flight feathers tend to have dark colors at the tips, the site of each feather that is more subject to wear and tear. I thought, even birds that are not white exhibit this; one of the field marks Bill mentions every year when going over individual species recognition is the marker-like outline of the broadwing hawks’ wings. I didn’t find an explanation for melanin’s role in strengthening the wing, but a few sources claimed that it affects the feathers. Andrea Alfano, writing for Audubon.com, says that “Melanin is also essential to a bird’s feathers: It makes them strong and durable.” A rehabber with an albino crow tells us that its feathers are certainly easily



A feather dropped by the rescued white turkey vulture.

broken. Then how could this bird be so feather perfect? I went back to her age for this.

The following is an assumption on my part, but what if her head was red from the carotenoid pigments that, as stated earlier, are not affected by albinism. Maybe those

pigments are always there, but masked by melanin in the first year, causing the gray head. Once they mature, the gray is not expressed and only the carotenoids are visible, thus the red head. If our bird, though, is the albino I think she is with the allowance of blue eyes and red skin, then she could be a first year bird, but with a red head. It would make sense that this bird is a youngster. She could have come in starving because it was late enough in the year, September 10, and she was now on her own, where as previously she had been fed by her parents. She could still be feather perfect at this point without much wear and tear.

DVRC member Scott Rando made a point using the photos he took of the bird during the DVRC Hawk Watch, comparing them to headshots of adult turkey vultures. As adults, the skin right in front of their eyes seems to be covered in bumps, while the young appear to have smooth skin at the same site. This bird has smooth skin in front of her eyes. Therefore, if she is a youngster, which was decided to be the case, and albinos can have red skin and blue eyes, then she is an albino. As an immature bird, then, she does not have the proven track record of survivability we thought she had believing her to be an adult.

Another factor affecting her chances of survival in the wild came into play when the woman with the leucistic vulture mentioned the issue of social isolation. Turkey vultures are gregarious by nature. They roost together and migrate together in large numbers, in the hundreds and, by some accounts, the thousands. In smaller groups, they feed at the same site. These groups are known by various names including committees, venues, wakes, and volts. Vultures in one area will group together come migration time. On a daily basis, they find the same tree or nearby trees to roost in for the night. They will also exploit the same carcass. What happens, though, if you don’t look like the others? Often, you are shunned. For our vulture, that could affect her ability to feed. Due to this likelihood, as well as the aforementioned issues, we decided she was not a good candidate for release. Various resources in my research said that it was rare for albinos to reach adulthood in the wild due to so many challenges. As much as I hated to see her limited to captivity, I believed releasing her would not be a rewarding experience. Rather, it would cause an unusually sinking feeling, sentencing this unique design of an individual to a very likely death. So, in the end, we transferred her to another rehabilitator that does education programs as well. I wish them both the best, especially in the training process as vultures disgorge their meals when they are stressed. Still, even that behavior could not mask her beauty, at least in my eyes. 🦅