Owls hunt at night, depending on keen eyesight, acute directional hearing, and stealth to swoop down upon unsuspecting prey. Hunting styles vary between species. Some owls hunt from a perch, waiting on prey to pass by like southern deer hunters sitting in camouflaged tree stands. Upon spotting a victim, these owls soar off their perch and pounce with open wings and extended talons. Other owls do their hunting on the wing, scanning the ground for potential snacks. Owls that hunt from the sky dive straight at their prey until the last possible second when they pull up their heads, extend their talons, and hit the prey with both feet hard enough to stun it. Fishing owls skim low over water or wade at the edges of rivers and lakes to snatch up fish and crayfish.

Eagles, hawks, and other large birds of prey fly faster than owls, but what owls lack in speed, they make up in acute hearing and silence of flight. Thanks to asymmetrical placement of exterior ears and specialized inner ear structures, owls can detect sounds that are inaudible to other birds. An owl’s specialized feather structure reduces the noise normally produced by flight. Silent flight contributes to hunting success not only by allowing owls to hear their prey but to keep prey from hearing the owls. Most of an owl’s prey species hear best at frequencies that correspond with the frequencies at which the owl’s plumage reduces noise. The owl’s own hearing is most acute at these frequencies. In 2010, Thomas Geyer and associated scientists at Thuringian State Institute for Environment and Geology in Germany demonstrated that noise levels during flight are several decibels lower for a barn owl than for a common kestrel or Harris hawk. While high-frequency noise is reduced significantly, lower frequency noise is not

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affected by plumage, leading the scientists to state, “The flight of owls is just as quiet as necessary.”

In addition to slow flight speed, several adaptations of feathers and wings contribute to silent flight:

1. Serrations, also known as edge combs, on the leading edge of wing feathers. Most bird species have hard, straight edges on their wing feathers. Serrated edge combs allow incoming air to flow through rather than across the leading edge of the wing. This reduces airflow speed across the wing which in turn affects the pressure gradient and results in noise reduction.

2. Flexible fringe on the trailing edge of wing feathers. Unlike the hard-trailing edges found on most bird feathers, the trailing edge of an owl feather has a soft fringe that reduces trailing turbulence and thus shifts noise toward the lower end of the frequency scale. Both fringes and serrations vary in size depending on the species of owl.

3. Downy texture on the dorsal surface of feathers. The velvety soft surface of wing feathers is unique to owls; other birds have flat, hard-surfaced feathers. An owl’s downy feathers join together to form a cushioning canopy that decreases friction between overlapping feathers. The decrease in feather friction translates as a decrease in noise frequency above two kilohertz.

These feather characteristics are unique to owls though they are not found in fishing owls. Why fishing owls failed to develop these characteristic feathers is debatable. As wading and fishing avians, they might not be dependent on silent flight for effective hunting since fish can’t hear approaching birds. A second possibility is that these specialized structures might result in birds getting wetter than they would with normal feathers.

Ornithologists are not the only scientists interested in the acoustic stealth of owls. Engineers seeking ways to reduce noise in wind turbines, airplanes, fans, and automobiles all look to the structure of an owl’s wing for answers. Measuring aeroacoustics on living creatures, however, is considerably more complex than measuring the same on human-made objects like propellers and pickup trucks. Temperature, wind speed, clouds, precipitation, and the individuality of owls often stump the efforts of engineers to obtain hard, dependable data in the wild. An owl that unexpectedly flaps its wings or veers far off the expected course can skewer the most carefully planned tests. Tests with specially prepared wings conducted in artificial environments such as wind tunnels have the advantage of controllable environmental conditions and repeatability, but results obtained with a prepared wing will be different than those obtained from the wing of a living bird.
Over the 50-plus years that the Werner Wildlife Museum has been in existence, many community members have contributed time and energy to keep it viable. When founder Herman Werner lacked time and personnel to keep the museum open in the 1960s, members of the Casper Artists’ Guild stepped in and did everything from mop floors to give tours. Later, volunteer Fred Eiserman devoted his knowledge and energy to writing the many essays posted on museum walls and assembling the museum’s collection of Wyoming game fish. Each spring at the exhibit of fine crafts, volunteers from the Casper Needle Guild set up shop in the Africa-Arctic Room to demonstrate needlework skills to open-house attendees. The Wildlife Study Group lecture series would be impossible without the speakers who volunteer their time and knowledge, including Audubon Naturalist Zach Hutchinson who has repeatedly entertained and informed audiences ranging from age 3 to 83.

The main contingent of Werner volunteers who help keep the museum open include Art Van Rensselaer, Pat Hick, Kim Gay, Mike Bardgett, and Haeley Snider. Gay came to the Werner after 20 years of teaching elementary education and 50 years of loving Wyoming wildlife. Van Rensselaer also came to the Werner from the public-school system after many years as an educator and administrator. He regularly contributes his wildlife photographs to the Werner for use in the newsletter and on advertising posters. Having retired from a career with Hilltop National Bank, Hick now arrives at the Werner each Monday and Friday afternoon to greet visitors and lead tours. Bardgett, a retired Marine and lifelong wildlife enthusiast, donates his time and expertise as a lecturer for the wildlife study group and museum tour guide. Snider is a wildlife management student at Casper College who greets and guides visitors at special events and open houses. Each one of these volunteers has spent hours keeping the museum doors open, assisting at special programs, distributing posters, and staffing informational booths at community functions.

The Werner Wildlife Museum also relies on a board of advisors that meets monthly to discuss and implement new ideas that support and improve the museum. At this time, advisors include William Price, John Stevenson, Julia Whyde, Don Whyde, and Stacey Scott. They are currently working on a long-term marketing program for the museum that will eventually increase both the museum’s educational value and the number of visitors that come through the doors.

Thanks to everyone who has helped keep the museum running since 1964. Anyone interested in being a part of the Werner Wildlife Museum can contact the staff at 307-235-2108 or drop by the museum during regular hours.

Art Van Rensselaer, photographer and lecturer.
Volunteer Kim Gay.
Pat Hick and the Werner’s famous photo-bombing possum.
North America is home to over 800 species of birds. Half of these species make their homes in or migrate through Wyoming each year, varying in size from the golden eagle with a maximum wingspan of 8 feet down to the tiny rufus hummingbird that lays an egg less than half an inch long. Big or small, their bodies are covered by an arrangement of feathers that provides insulation and weatherproofing, facilitates flight, and contributes to camouflage and mating displays.

A feather generally consists of a central shaft called a “rachis” that is edged on two sides by microstructures of interlocking barbs that form a “vane.” Located at the base of the rachis is the “calamus,” a hollow tube that fastens the feather into the skin. Based on structure and body location, feathers typically fall into one of seven categories: wing, tail, contour, semiplume, down, filoplume, and bristle.

Wing feathers, also known as “remiges,” are large flight feathers attached by ligaments to the wing bones. Primary remiges are located on the outer half of the wing. Birds manipulate these long feathers to provide thrust for forward movement. Secondary remiges are shorter and less controllable than primaries. They overlap each other to form a structure that contributes to lift. The leading edge of a remige is shorter and stiffer than the trailing edge to prevent the feather from twisting during flight.

Tail feathers, also known as “rectrices,” are fan-shaped, rudder-like feathers that enable birds to steer through the air. Most bird species have six pair of rectrices with the outer pairs being less symmetrical than the inner pairs. Only the two central rectrices are attached to bone.

Contour feathers are small feathers with weatherproof tops and fluffy bases. These feathers smoothly overlap each other to streamline bodies for better flight. Contour feathers called “coverts” specifically streamline areas where flight feathers connect to bone.

Filoplumes are short whisker-like feathers associated with contour feathers. They are sensory and/or decorative in function.

Semiplumes are fluffy feathers that form a layer of insulation beneath other feathers.

Down is similar to semiplumes but has little or no central rachis. These short fluffy feathers lie next to the body where they act to conserve body heat.

Bristles are stiff, simple feathers that generally lack vanes. They are believed to provide protection especially when located on the head and face.

Since a bird without feathers is liable to become dinner for a hungry predator, avians spend a good deal of time taking care of their feathers, a process known as preening. Using their bills, they remove dirt,

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The autumn wildlife presentation series got off to a stellar start with Stacey Scott’s program on sage-grouse conservation and ecology. Back at the Werner by popular demand, Scott is a Natrona County rancher who has been studying and counting sage grouse for over 60 years. He is chairman of the Bates Hole/Shirley Basin Local Sage-Grouse Working Group and was on the committee that wrote the 2003 State Conservation Plan. He is also a member of the Werner Wildlife Museum Advisory board.

October’s program was entitled “Slither and Hiss: Snakes of Wyoming.” Presenter India Hayford shared information and pictures of several of Wyoming’s most common snakes, including bullsnakes and prairie rattlers, and one of the most uncommon, the midget faded rattlesnake of southwestern Wyoming.

Not all birds fly south for the winter. Ever wondered how those species that overwinter in Wyoming deal with the state’s subzero temperatures, harsh wind, and frozen landscape? In November, join Audubon Society birding experts Donna and Bruce Walgren for “Staying Alive: How Birds Survive a Wyoming Winter” and find out!

December’s program, “Getting Stuffed: The Art of Taxidermy” is an encore performance by taxidermist John Stevenson who will discuss his art and craft, this time with a special emphasis on tanning. Stevenson is responsible for a number of the Werner’s displays including Snowflake the albino mule deer and many items inside the antique taxidermy shop.

In January, naturalist Mike Bardgett will return to the Werner to present “Gone Too Soon: Wyoming’s Threatened and Endangered Species.” Bardgett is a longtime Werner volunteer and lecturer.

All wildlife study programs take place at 7 p.m. on the third Thursday of each month and are free and open to the public. Reservations are appreciated, but walk-ins are always welcome.
debris, and parasites from their feathers and smooth any plumage that has gotten disturbed or blown out of place. The barbs that form feather vanes are similar to a zipper: if sections split apart, a bird can rejoin them by running its beak along the length of the separation, essentially zipping them back together. Water birds wax their feathers to keep them waterproof, using a substance that is secreted from a gland under the tail. Other birds use a similar substance to keep their feathers neat and protected from damage. Regular bathing, whether in water or in dust, is essential to ridding feathers of dead skin, parasites, and any excess oil.

However meticulously birds care for them, feathers are not living organs, so broken rachises and stripped vanes don’t heal. In order for a bird to maintain a healthy set of feathers, it undergoes a regular molt or replacement of feathers. All body and flight feathers are replaced in a complete molt. In a partial molt, flight feathers generally remain intact, and only body feathers are replaced. The following is some general information about molting. Species, age, sex, habitat, breeding, and migratory/sedentary status affect timing, type, and number of molts.

Birds go through several plumage sequences in the first year of their lives. Natal down, the sparse plumage possessed by hatchlings, is replaced by juvenile plumage in a complete molt. Two partial molts precede a final complete molt to adult plumage. Juvenile birds have duller plumage than mature birds, often exhibiting spotted or mottled feathers that provide excellent camouflage for defenseless birds who are just learning to fly.

In adult birds, molting is commonly a yearly event though some species go through the process twice or, in the case of drake long-tailed ducks, three times a year. Multiple molts are more common in birds that live in environments where weather or vegetation takes a toll on feathers. The common white tern of the tropics molts almost continuously, halting the process only during nesting season. In most species, single feathers that are lost between molts are replaced with new growth regardless of the normal molting season.

In temperate regions, day length triggers hormonal changes that initiate molting. Molt is a physically stressful time during which birds replace up to 40 percent of their dry weight. Production of new plumage draws heavily on energy reserves, especially protein. Molt also increases vulnerability to environmental conditions and attack by predators. To avoid being impaired by voluminous feather loss, most species stagger the process of replacing feathers over a period of weeks or years. Passerines generally molt in six to 12 weeks while it takes two years for some raptors to complete the process. Waterfowl, including swans, ducks, and pelicans, are often “synchronous molters,” losing and replacing all their feathers in less than a month. Scientists think synchronous molting evolved because waterfowl have heavy bodies relative to their wing spans. Since the loss of even a few feathers compromises their ability to fly, it’s most efficient for them to retreat to an isolated riparian, lake, or tidewater location and complete the molting process quickly.

Molting doesn’t only assure birds a healthy set of feathers. Some species, including tanagers and warblers, undergo a partial molt before breeding season to replace drab feathers with bright plumage calculated to attract the ladies. Birds usually spend a small part of the year in this bright “alternate plumage.” Following nesting, they undergo a complete molt in order to revert back to drab “basic plumage” the rest of the year. Though only males put on colorful feathers, females undergo the partial molt as well. Other species, such as the white-tailed ptarmigan, molt before cold weather sets in, replacing drab summer plumage with winter white feathers that will provide camouflage in the snow.

Feathers are perhaps the most complex manifestation of any vertebrate integumentary system in existence. That feathers evolved from reptilian scales is a theory beloved by many paleontologists, but more recent studies suggest that feathers began as new structures that developed between reptilian scales. Scientists also believe that feathers originally developed in response to a need for thermoregulation and were much later modified for flight. Among the many flight origin theories are the “arboreal hypothesis,” flight developed from birds jumping out of trees, and the “running raptor hypothesis,” early birds developed flight to aid in running and jumping after flying and jumping insects.
Casper College Support Personnel

BY: India Hayford, Museum Assistant

It takes a lot of people to keep the Werner Wildlife Museum up and running. Maintenance, IT, and security staff from Casper College work hard to keep the lights on, the phones and computers running, the galleries clean, the walks shoveled, and the display improvements happening.

This year support personnel have installed security cameras, fixed doors, put up murals, and generally made the museum a safer, more accessible place. The fine CC security staff works around the clock keeping an eye on the place as well as responding to occasional calls for assistance. Without custodial staff Dennis Otto and Mercedes Spenneberg keeping those endless stretches of glass fence and terrazzo floor clean, visitors would be hard-pressed to see the exhibits at all. We owe a very special thanks to physical plant administrative assistant Lynnea Cook who is a never failing, never quailing source of information and support. Pictured here are just a few of the folks who keep the Werner operating smoothly.

Vince Edmondson, Casper College painter, painted the ice mural’s surround.

James Kane, campus security officer.

Casper College grounds crew left to right: Dave Mondle, Tyrone Young, Chris Carlson, and Alan Rhodes.
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