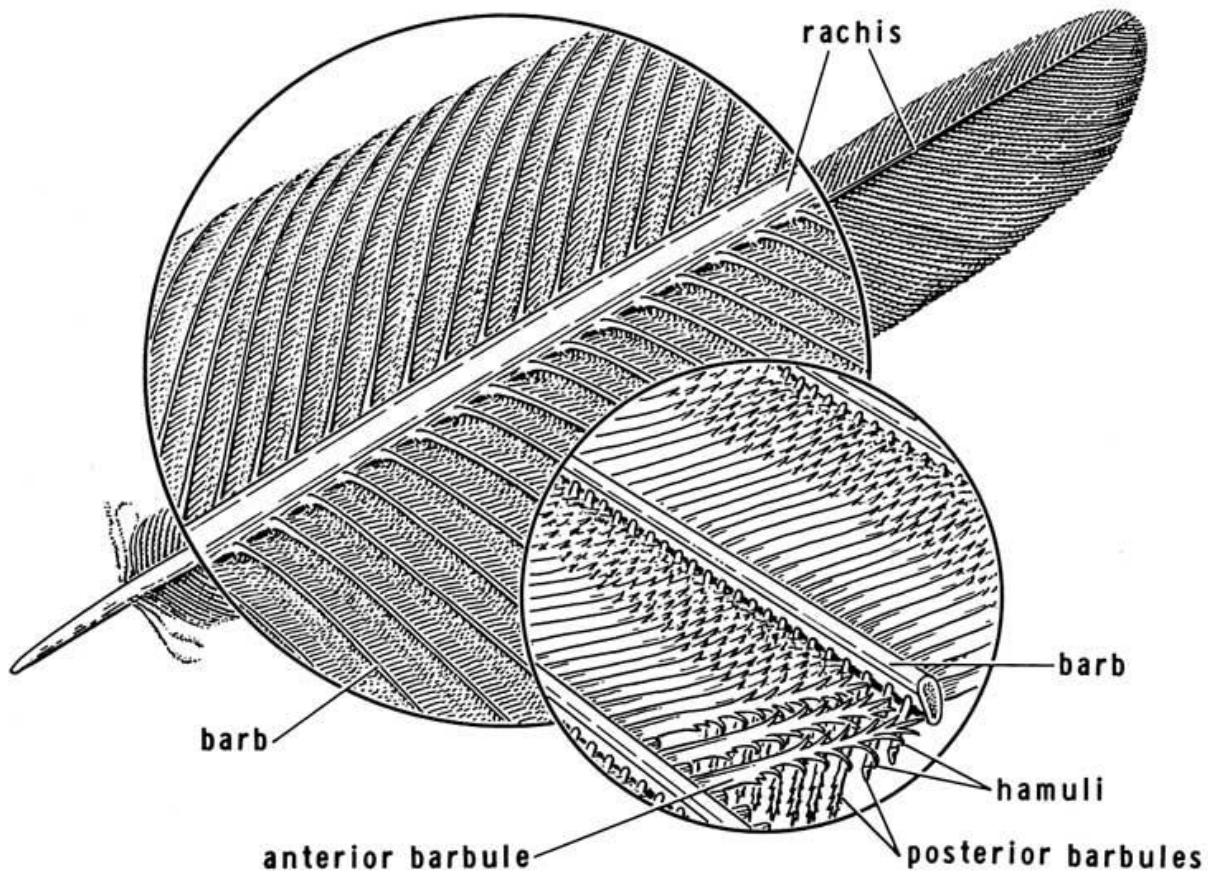


BIRD NOTES

"Hope" is the thing with feathers -
That perches in the soul -
And sings the tunes without the words -
And never stops - at all -
Emily Dickinson

Contour, Semiplumes, Down, Filoplumes, Bristles, Powder-down, all names for the various types of feathers found on birds; around 25,000 of them adorn a tundra swan, less than 1000 on a ruby throated hummingbird. All birds, and only birds, have feathers. Observed under a microscope, a single feather is composed of more than a million interlocking parts (as illustrated in the drawing below). The hook-like hamuli hold the anterior and posterior barbules together, which gives a feather its light weight strength.



When a bird's wings begin their down stroke, the hook-like hamuli lock the anterior and posterior barbules together to form a rigid surface which helps provide optimum lift and forward propulsion. As the bird begins its upstroke, the barbules separate, which lets the bird's wings easily complete the effort with little resistance.

Providing insulation for the bird, and making flight possible, are the two main functions of feathers. Other functions include concealing the bird, especially when on the nest with young, sexual displays, and species recognition.

All of the bird's feathers are replaced annually. They are composed of keratin—a hard protein material which is the same substance that comprises our finger and toe nails. All feathers are an outgrowth of specialized cells in the bird's dermal layer of skin. A newly developing feather pushes up into the base of the older feather, eventually forcing the older feather out of the skin altogether.

There are 6 major types of feathers. Not all feather types are on each species.

Contour ---are feathers which provide shape to the bird. They all are to some degree pennaceous (closely knit and flat), especially in the wing and tail feathers. The outer flight feathers have a leading edge which is smaller than the trailing edge. Wing feathers are also known as remiges. Tail feathers are called rectrices.

Semiplumes --- are small feathers which are located beneath the contour feathers and are usually under the wing and abdominal feathers. Their primary function is for insulation.



Great Egret by Darlene Boucher

Filoplumes --- are long hair-like feathers which occur primarily at the base of the wing and tail feathers. Movement of the filoplumes is sensed by specialized cells located at the base of the filoplumes and which monitor the position of the wings and tail during flight.

Adult Down --- are most common in waterfowl and other aquatic birds. Located underneath the contour feathers, they provide an important layer of insulation.

Bristles --- are pennaceous feather without barbs or barbules. They are located around the eye for protection. They are also located around the mouth where they are known as rictal bristles. They occur commonly in insectivorous birds and are thought to function as sensory organs.

Powder-down --- are unique feathers which disintegrate into fine powder which the bird finds helpful in waterproofing and grooming. This type of feather grows continuously and occurs in large numbers on the breast and abdomen of herons and bitterns.



Painted Bunting by David Morgan

brown hues. Carotenoids derived from a bird's diet result in yellows and reds. Porphyrins produced by the breakdown of hemoglobin and bile produce greens, reds, and brown. Whites and blues are not produced by pigments but by the interaction of white light with the structure of the feather. So the blue of the Blue Jay one admires is not due to a substance at all.

How feathers evolved from their reptilian past is not known. The most common theory is that feathers arose from frayed reptilian scales. Eventually, these elongating early feathers evolved, after many millions of years, into the great variety of shapes and colors we enjoy today. This diversity and beauty of feathers had its consequences, however. The more showy and ornate feathers found their way into women's fashions in the 19th century which led many bird species to the brink of extinction. In response, Congress passed a number of laws which helped reverse the killing of species for the sake of fashion. The Lacey Act of 1900 and the Weeks-McLean Act of 1913 preceded the more inclusive Migratory Bird Treaty Act (MBTA) of 1918. The MBTA protected migratory birds between United States and Canada and remains in-force today. It states that it is unlawful to pursue, hunt, take, capture, sell or kill migratory birds. It also does not discriminate between live and dead birds and protects all body parts including **FEATHERS**, eggs, and nests. So, yes, in answer to a common question: It is illegal to possess feathers unless it is from a legally killed game bird or a non-native species such as a House Sparrow or Starling.

Perhaps the aspect of feathers that I find most enjoyable and fascinating is the variety of colors which birds have. From the brilliant colors of tropical tanagers to the beautiful subtle coloration of the Cedar waxwing, birds are rivaled only perhaps by coral reef fish in the variety of their colors. Author and artist Maryjo Koch, in her book [Bird Egg Feather Nest](#), writes that when painting birds, "There never seems to be enough colors in an artist's paint box." Feather colors are due to a variety of pigments and structural adaptions.

Melanins produce black, grays, tans, and



Questions and/or comments? Send them to me at eapyeritz@gmail.com.