

## Of Mimics and Drowned Crows

“Nothing is lasting that is feigned.”

-- *English Proverb*

The Breeding Bird Survey was initiated in 1966 to track the status and trends of North American bird populations. The BBS is jointly coordinated by the U.S. Geological Survey's Patuxent Wildlife Research Center and the Canadian Wildlife Service. Chandler Robbins and colleagues at Patuxent conceived the survey as a means to track bird population trends that were possibly impacted by widespread use of the pesticide DDT.

For 14 years, I conducted two BBS routes in northwestern California. Route surveyors must adhere to a strict protocol: routes must be 24.5 miles long with 50 permanent stations located a half-mile apart. The surveyor spends 3 minutes—no more, no less—tallying all birds seen or heard at each station. Starting times must be 30 minutes before sunrise. I usually performed my routes near the summer solstice, meaning I began around 5:10 am. Because the first hour or two of the survey is conducted in a low-light situation and dense vegetation obscures many birds even when there is sunlight, the lion's share of total detections are of the “heard-only” variety.

I commonly would hear two closely related species early in my routes: Black-throated Gray Warbler and Hermit Warbler. Although the two don't physically resemble each other, their songs can be maddeningly similar. Furthermore, each species takes it one step further and mimics the other. Luckily, the species, to some degree, sort out according to the dominant kind of vegetation, with black-throated grays preferring oaks and brush fields and hermits preferring conifers. As a scientist, I always tried to return from the field with clean data, as correct information serves as the foundation for ... well, everything that was to come: route species lists, numbers of each species detected, population trend analyses, and more.

Both warbler species have several songs. With some individuals, their identity is a slam-dunk. However, with others, one is left guessing. Each year, I had a high degree of confidence for all of the “heard-only” species I'd recorded ... except for the hermit-black-throated gray conundrum. Sheepishly, I'd note what I heard the best that I could.

Over the years, I discussed the problem with several friends who also conducted BBS routes. These conversations unearthed nuances that resulted in an even murkier situation: both species would sing a certain type of song early in the season, then switch to a different tune as the weeks progressed. In the end, one thing became clear: no researcher worth his or her salt would ever try to determine population trends for these two species based solely on BBS route data!

Intrigued, I began to research mimicry in birds: Why do they do it? What are the advantages of such behavior? In the end, much of what I learned dredged up facts I'd first heard during college biology courses. Meanwhile, other facets of mimicry I unearthed

were a revelation, leaving me marveling at the role that natural selection plays in the shaping of species.

In nature, mimicry is defined as looking, acting, smelling, or sounding like something else, such as another organism or other natural object. It is a form of deception practiced by a variety of animals to gain some advantage or protection. In this light, the Northern Mockingbird is not a mimic, but instead, a song appropriator. Because many scientists use the terms interchangeably with respect to vocal mimicry, I've elected to do the same.

Vocal mimicry—as practiced by species such as Gray Catbird, northern mockingbird, and Australia's Superb Lyrebird—has two functions. A male's large repertoire of songs is thought to convey "fitness" to the female. The mimic's borrowed, "sampled" songs of other bird and animal species—including machinery and musical instruments—are appropriated to impress females and usually are sung during the breeding season.

Australia is considered a hotbed of vocal mimicry. In 1950, A.J. Marshall published a paper entitled "The Function of Vocal Mimicry in Birds," placing over 50 Australian species into categories deemed "master," "minor," and "casual." The most-accomplished mimics shared two traits: they lived in woodlands and were strongly territorial. Marshall suggested that "lack of visibility places a premium on sound" and "it is biologically advantageous for individuals to make more and more sound in order that territorial rivals and members of the opposite sex will be constantly aware of their presence." Mimicking other species can discourage those species from appropriating precious nesting sites and food sources, either through creating an illusion of a competing male or of a predator.

Perhaps you've seen video footage on YouTube of the Superb Lyrebird, whose arresting sonatas incorporate car alarms and engines, crying babies, barking dogs, and human voices. The lyrebird's rendition of sawmill whistles, explosions, rifle-shots, rock-crushers, hydraulic rams, and chainsaws are as spot-on as they are disconcerting, for they serve to document the bevy of development activities that have encroached upon the bird's territory.

The Northern Mockingbird, whose Latin name *Mimus polyglottos* means "many-tongued mimic," is the most-likely mimic to be found near my home in northwestern California. The songs of birds are not the only sounds it copies: car alarms, police whistles, flute concertos, crickets, frog croaks, and squeaky gates also have been sampled. One male mocker was heard imitating 59 other bird species during a 1-hour period; a single bird can boast a repertoire of up to 200 songs.

Only birds and humans are capable of mimicking speech. Years ago, I kidded a friend of mine who did TV and radio commercials and public service announcements, "Prepare yourself. One day, you're gonna be walking down the sidewalk, minding your own business. From the tangled dark of a hedgerow will come a voice: exotic, yet maddeningly familiar. "Taste the Difference... Northcoast Co-op Bakery bread... Vote for Julie Fulkerson, 3rd District Supervisor." One tribe of Algonquins named the northern mockingbird *Cencontlatolly*—"four hundred tongues." Truth be told, mockers

are not known to mimic human voices, nor has the species learned 400 songs. Birds that *are* capable of imitating human speech include Gray Parrot, several species of mynahs, magpies, crows, and, occasionally, the European Blackbird and European Robin. However, considering how quickly the Northern Mockingbird learned to imitate the beeps emanating from stoplights at crosswalks for the blind, who can say what they might be capable of, given the time?

Birds can mimic not only complex songs of other species but also their shorter “calls.” These alternate vocalizations convey different types of information, such as the presence of food or predators, or serve as a means of keeping the flock or family group together while it forages. Steller’s Jays mimic the call of the Red-shouldered Hawk. The raptor’s call is a loud, screaming “ke yar,” which drops in pitch toward the end. The jay’s rendition is so good that, even among accomplished birders, an uttered, “Is that the real deal, or merely a ‘Blue-shouldered Hawk’?” is often met with a shoulder shrug.

Less-frequently acknowledged is the ability of certain birds to *visually* mimic other species. Mimicry, camouflage, and deceptive behavior are three strategies adopted—usually by prey—to fool predators. However, sometimes the tables are turned, with predators the ones utilizing mimicry in order to sneak up on prey.

Take the case of the Zone-tailed Hawk, a species that ranges from South America to the southwestern United States. It is the only North American hawk that resembles a turkey vulture in all plumages. Like the Turkey Vulture, with which it associates, the zone-tailed holds its wings in a shallow “V” while soaring. Both species tilt and teeter from side-to-side, as if the sky was suddenly bereft of the thermals that keep them aloft.

It is the model-mimic relationship—a design template, if you will—that has resulted in the similar appearance of the two species. Blackish overall coloration? Check. Long, narrow, blackish wings? Check. Long, narrow tail? Check. The main difference is that the Zone-tailed Hawk, the mimic, is about 25% smaller than its model, the Turkey Vulture.

Clearly, natural selection has resulted in the Zone-tailed Hawk mimicking the appearance and behavior of the Turkey Vulture. The reason? Since Turkey Vultures feed on dead animals, their presence doesn’t represent a threat to live ones. Conversely, Zone-tailed Hawks feed on live vertebrates such as small birds, mammals like ground squirrels and chipmunks, amphibians, reptiles, and, rarely, fish. When a predator resembles its prey or a harmless third party, the situation is termed aggressive mimicry or aggressive disguise. Although the hawk’s similarity to Turkey Vultures likely originated as an aggressive disguise, it also helps the raptor avoid being mobbed by potential prey, such as songbirds. Prey of the Zone-tailed Hawk that has become accustomed to the ubiquitous presence of soaring turkey vultures has become conditioned, lulled into complacency.

Many hawk species exhibit color morphs, meaning an overall coloration that is lighter or darker than the norm. Zone-tailed Hawks do not exhibit a light-colored phase. Neither do Turkey Vultures. This supports the theory that the hawk has gained a competitive

advantage by mimicking the vulture. Even the Zone-tailed Hawk's smaller size relative to Turkey Vultures may be advantageous, because it is difficult to judge the size of objects against the sky, as potential prey are required to do. The hawk's smaller size may allow it to fly nearer to prey, if prey judge the distance of familiar objects by apparent size as humans do.

In some respects, the bird world does not differ much from the human one. Remember the schoolyard bully who extorted lunch money or food from his smaller, meeker fellow students? Seabirds, too, have a caste system where smaller birds are harassed, mugged, and have their food pirated by larger birds. This behavior, termed kleptoparasitism—or simply parasitism—occurs when a pirate species steals food from its host's bill or forces it to drop or regurgitate its prey.

The Kermadec Petrel is a seabird in the genus *Pterodroma* that forages widely in both hemispheres of the Pacific Ocean. It nests on island groups in the southern hemisphere that include Easter, Lord Howe, Kermadec, Austral, and Pitcairn. This petrel shares the wide expanse of Pacific Ocean with four species that regularly pirate food from it: the South Polar Skua and the Pomarine, Parasitic, and Long-tailed Jaegers.

Most of the seabirds in the genus *Pterodroma* have long, narrow wings—a high aspect ratio—and long tails. However, the Kermadec Petrel “breaks the mold” by sporting an extremely short tail and wings that are broad, pointed, and slightly crooked at the wrist. They have a large, white patch in their otherwise dark wings, as does the skua. The petrel's wing adaptations, together with its large pectoral muscles, are believed by scientists to mimic the appearance of subadult and nonbreeding Pomarine Jaeger adults and South Polar Skuas. In addition, the petrel's short tail mimics the skua. Because skuas have very short tails and rely on fast acceleration to surprise their avian hosts, the unique morphological features of the Kermadec Petrel, compared with others in its genus, are consistent with those expected for a pirate-mimic.

Skuas and jaegers do not pirate food from members of their own species. Especially when viewed from a great distance, the petrel's similarity to the skua and jaeger reduces or eliminates the number of times it will be pursued and forced to give up its food.

Conveying the personality of a bird in a few short sentences can be a daunting task. Robert Cushman Murphy, in *The Oceanic Birds of South America, Vol. I*, published in 1936, successfully accomplished that feat with his description of the Brown (aka Antarctic) Skua, a close relative of the South Polar Skua:

The skuas look and act like miniature eagles. They fear nothing, never seek to avoid being conspicuous, and, by every token of behavior, they are lords of the far south. In effect, they are gulls which have turned into hawks. Not only are they the enemies of every creature they can master, living almost entirely by ravin and slaughter, but they also have the appearance of a bird of prey in the general color of their plumage, the pointed, erectile hackles on the neck, the hooked bill, and the long, sharp, curved claws, which seem incongruous on webbed feet.... Energy is

apparent in every movement of the skua—in its rapacity, in the quantity of food it can ingest in a few moments, and in the volume and continuousness of the screams that issue from its throat.

Natural selection pressures exerted upon the Kermadec Petrel have spawned a “solution” not often achieved: quasi-concealment by fitting in, looking like one’s enemy. This is an example of Batesian mimicry, where, over time, the petrel host mimics its dangerous model, skuas and jaegers. The plot thickens when one discovers that the Kermadec Petrel pirates food from other seabird species such as Wedge-tailed Shearwaters and Juan Fernandez Petrels. In fact, the combination of the Kermadec Petrel’s appearance and aggressive behavior results in a pirating success rate similar to that of parasitic and long-tailed jaegers—although considerably lower than that of the skua.

The slow, millwheel grinding and shaping of the Kermadec Petrel via natural selection is a testament to the rapacious nature of skuas and jaegers as unrelenting sea pirates.

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I recently read an account of an upstart challenging the primacy of the Starbucks coffee chain. However, ferreting out the name of the “David” who dared to challenge the “gustatory Goliath” wasn’t easy, because... it’s actually Starbucks itself. With declining sales in a down economy and customers rejecting a corporate ethos, management decided to shake things up a bit by launching a new lines of stores—but with a twist. No Starbucks sign, no logos inside. Interiors that reek of bland conformity have been replaced with localized names and funky stylings, designed to obfuscate the corporate presence behind them. The goal of these changes, stated Starbucks’ senior vice president of global design, is to give the stores a “community personality.”

*I know what you’re thinking, ‘cause I’m thinking it, too.* Isn’t Starbucks’ faux reinvention a kind of mimicry? Isn’t the company trying to appear like something else to gain some advantage or protection? If nothing else, re-tooling its image into that of an ersatz community coffee shop has created work for publishers of dictionaries. Behold this addition to the upcoming edition of the *Oxford University Press Concise Science Dictionary*: “anti-corporate mimicry.”

Starbucks’ attempt at a make-over prompts a host of questions. Is it possible for a corporate giant—with more than 16,000 stores—to do funky, independent, mom & pop coffee shops? Shouldn’t the mere presence of a senior vice president of global design exclude Starbucks from being considered a community coffee shop? And finally, isn’t the premise of a community coffee shop based on local control—with owners who dwell in and are vested in the local community?

Proverbs from around the world counsel us to remain true to our inherent nature. They caution against undertaking wholesale appearance or behavior modifications simply to “fit in.” A Burmese proverb warns, “Sparrows who emulate peacocks are likely to break a thigh.” Similarly, from Japan, “The crow that mimics a cormorant gets drowned.”

However, these proverbs pertain to overnight re-invention, rather than the slow, incremental change fostered by natural selection. Only time will tell if Starbucks' unique brand of business model mimicry will prove successful, or if it will simply become an evolutionary dead-end.

“Nothing prevents our being natural so much as the desire to appear so.”  
-- Rochefoucauld, *Maxims*, 1665