NEWS AND NOTES

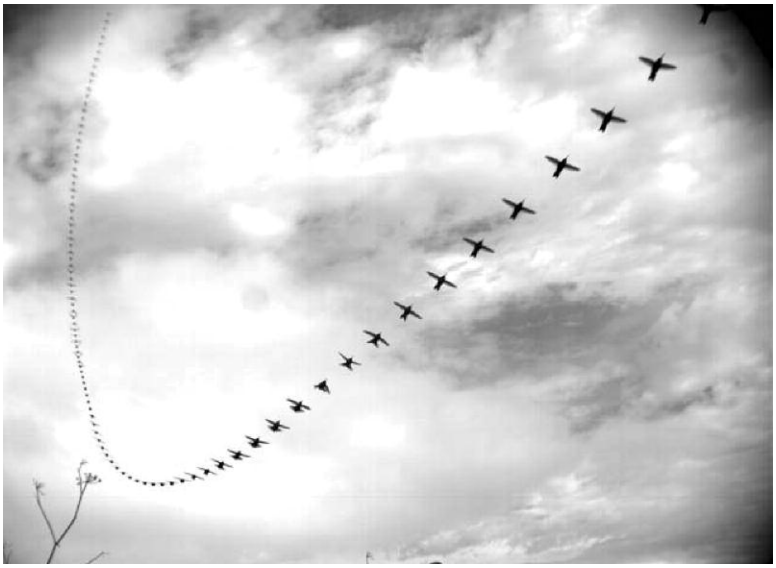
by Paul Hess

Anna's Hummingbird Dive-sound Mystery

"It is a sort of clank. It rings out like a good live blow on musical glass or metal, but the ring dies instantly as if gulped down into some cavern of dead silence," Richard Hunt wrote in 1920 (*Condor* 22:109–110). If a bird's note evokes such a response, it is surely a fascinating sound. It has been a mysterious one as well.

The bird is Anna's Hummingbird, the sound is a loud chirp-like note at the bottom of a male's display dive, and the fascination is whether the source is the bird's voice or its feathers. After 68 years of investigations, the question receives what may be a conclusive answer.

Thomas L. Rodgers suggested in 1940 that the sound is not vocal, but rather is produced aerodynamically by wing or tail feathers (*Condor* 42:86). He attached an outermost tail feather, rectrix 5 ("R5"), to a strip of bamboo and whipped it through the air. Rodgers reported in 1940 that a sharp vibration in this feather was almost identical to the bird's dive note, and no other wing or tail feather produced the sound.



This composite photograph of a male **Anna's Hummingbird** diving to court a female was made using high-speed video. The consecutive images are 0.01 second apart. Note how the bird spreads its tail at the bottom of the dive, which creates a sharp note. *Albany, California; May 2006. © Christopher James Clark.*

Luis F. Baptista and Margaret Matsui raised doubts in 1979 (*Condor* 81:87–89). They demonstrated with spectrograms that the noise resembles a phrase in the hummingbird's song and that no role of tail feathers appears in the spectrographic pattern. Baptista and Matsui concluded that it is vocal and that if the tail feathers are involved, their role is masked by the vocalization.

F. Gary Stiles disagreed in 1982 after his own spectrographic study showed that the sound is similar to notes in the song, but is not identical (*Condor* 84:208–225). He argued further that the note seems too loud for the size of a hummingbird's vocal apparatus and that, inconceivably, the bird would have to give the loud note with its beak open while power-diving at more than 20 meters per second. Finally, Stiles said that no vocal sound from Anna's or any other hummingbird approaches the note in "explosive loudness." He was convinced that air passing through tail feathers is responsible.

Christopher James Clark and Teresa J. Feo reinforce Rodgers' seminal view of a role for the two R5 feathers, reporting in 2008 the most extensive study of the dive sound yet undertaken (*Proceedings of the Royal Society–B* 275:955–962). Audio and video recordings made in the field show that a diving male abruptly spreads its tail at the moment the note is produced. In the laboratory, sounds given by normal R5 feathers in a jet of air produce the frequency and harmonics of the dive sound. The sound still occurs after the leading edge of R5 is removed. However, no sound is produced when the entire R5 is removed or when only the trailing vane of R5 is cut off. Thus, the source of the sound must be the trailing vane of the outermost tail feathers.

Clark and Feo list further findings. The mechanism is not a whistle; it is a flutter like that of a flag or the reed of a wind instrument vibrating at its resonant frequency. High-speed video shows that the trailing vane flutters at the same frequency as the sound, whereas the shaft and the leading vane are immobile. Wind-tunnel tests demonstrate that the sound depends on air velocity; it is produced only above a critical minimum of about 20 meters per second, approximately the bird's actual speed at the bottom of the dive. All these lines of evidence point to the tail.

Four video files of the dives and five audio files of the sounds are available free on the Royal Society–B website. Access them online <journals.royalsociety.org/content/102024> using two steps: Click on the 22 April 2008 *Proceedings*, and then click on Article 11, pp. 955–962, for the abstract and files.

Sage-Grouse Translocations

The "Sage Grouse," as it was long known to birders and ornithologists, has for many years been regarded as an avian icon of the vast sagelands in western North America. Two species of sage-grouse, the widespread Greater and the range-restricted Gunnison, are currently recognized taxonomically. They also are recognized as requiring significant human help to assure their survival in extensive areas of swiftly deteriorating habitat.

The critical need for both species is management of sagebrush rangelands that are increasingly beset by agricultural and building development, overgrazing, invasive grasses, wildfires, drought, mining, oil and gas drilling, fragmentation by roads and utility corridors, and damage by off-road vehicles (see *Birding*, June 2004, p. 240). State and local wildlife agencies in much of the sage-grouse range are working to balance the birds' requirements and humans' activities. At the federal level, petitions for protection under the Endangered Species Act remain matters of contention for the Gunnison as a whole and for certain populations of the Greater.

Yet, even in some places where habitat appears to be satisfactory, sage-grouse have declined or disappeared. Mostly these are small, isolated subpopulations containing as few as several dozen birds. Wildlife agencies made 56 attempts between 1933 and 1990 to reestablish or augment small groups by importing birds from larger, more stable populations. More than 7,200 sage-grouse were "translocated" in New Mexico, Oregon, Montana, Wyoming, Utah, Colorado, Idaho, and British Columbia. Only three of the attempts—one each in Colorado, Utah, and Idaho—were judged to be successful, as reported by Kerry P. Reese and John W. Connelly in 1997 (*Wildlife Biology* 3:235–241).

Researchers from Brigham Young University and the Utah Division of Wildlife Resources conducted a carefully controlled project in 2003–2005. They translocated 137 adult female Greater Sage-Grouse into a remnant population of 100–120 birds in the Strawberry Valley in north-central Utah and tracked each of the introduced birds from year to year by radiotelemetry and intensive field observations. Rick J. Baxter, Jerran T. Flinders, and Dean L. Mitchell report in 2008 (*Journal of Wildlife Management* 72:179–186) that the project succeeded by virtually every measure: integration with the resident population, fidelity to the new courtship lek, annual survival, nesting propensity, nest success, and productivity. The authors suggest that using their stringent methods can help to assure success in future translocations.

In one of the successful attempts noted by Reese and Connelly, the Colorado Division of Wildlife took 30 sage-grouse (now the Gunnison species) from the core Gunnison Basin population in 1971–1972 and established a new population near Poncha Pass in the San Luis Valley. It persists today, and 2008 brings an ironic twist to its story from two Colorado Division of Wildlife biologists. Michael L. Phillips tells *Birding* that unusually deep snow in the 2007–2008 winter may have caused at least 20% mortality in Gunnison Basin birds. This is significant because, he estimates, the Basin holds 85% of the total Gunnison Sage-Grouse population of 5,500 in Colorado and Utah. In contrast, winter conditions were much more favorable at Poncha Pass, where Brad Weinmeister reports that the current population of 44 evidently suffered no mortality.

The Poncha Pass and Strawberry Valley projects demonstrate what Baxter and his coauthors conclude in their study: Translocations can be an effective tool to conserve and augment small and declining sage-grouse populations.

In efforts to augment declining populations of **Greater Sage-Grouse** and Gunnison Sage-Grouse, wildlife biologists have successfully translocated birds from areas with relatively stable populations to places where numbers had dwindled severely. *Mono County, California; April 2007. © Brian E. Small.*

Macaulay Library's Treasury of Sounds

Birders of a certain age can recall the excitement when bird songs became widely available on vinyl records. We could hear vocalizations of far-away species that we had known only from phonetic transcriptions in field guides. Many of those records originated at the Cornell Lab of Ornithology, most famously the two-volume *American Bird Songs* by Peter Paul Kellogg and Arthur A. Allen in 1942 and 1951, and the first Peterson *Field Guide to Bird Songs of Eastern and Central North America* in 1959.

Cornell's collection of natural sounds, now named the Macaulay Library, has grown to 175,000 recordings of birds, mammals, amphibians, fish, and insects. A rapidly increasing video archive documents many aspects of behavior beyond vocalizations.

The audio recordings include two-thirds of the world's bird species, a substantial proportion of which are available online <birds.cornell.edu/macaulaylibrary>. We can study thousands of vocal differences among species and variations within species on a scale far greater than any stack of CDs could offer. In many cases, these are simultaneously visible as waveforms, sonograms, and power spectra (time slices of the sonograms).

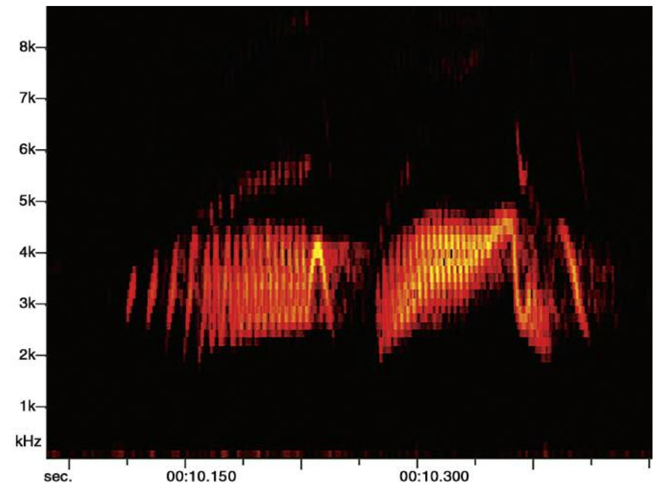
The following four comparisons are examples of what can be learned. In a companion feature prepared by the Library especially for *Birding*, a WebExtra <aba.org/birding/v40n5p32w1.html> lists the Macaulay URL where an audio file of each vocalization is accompanied visually by its sonogram and waveform in motion.

- See graphically how the Alder Flycatcher and the Willow Flycatcher songs are fundamentally different, even in cases where a difference may be ambiguous to the ear.
- Compare three geographically distinct White-breasted Nuthatch calls: *yank yank* in the East, *ti-ti-ti-ti* in the interior West, and *chuey chuey chuey* on the Pacific slope.
- Hear an immense array of Yellow Warbler songs, including the classic *sweet-sweet-sweet-sweeter-sweet*, tricky types that might be mistaken for a Chestnut-sided Warbler, and inscrutable variants that may not bring any species to mind.
- Find dozens of variations among Fox Sparrow songs, which show striking differences not only among geographic dialects but also within individual birds' repertoires.

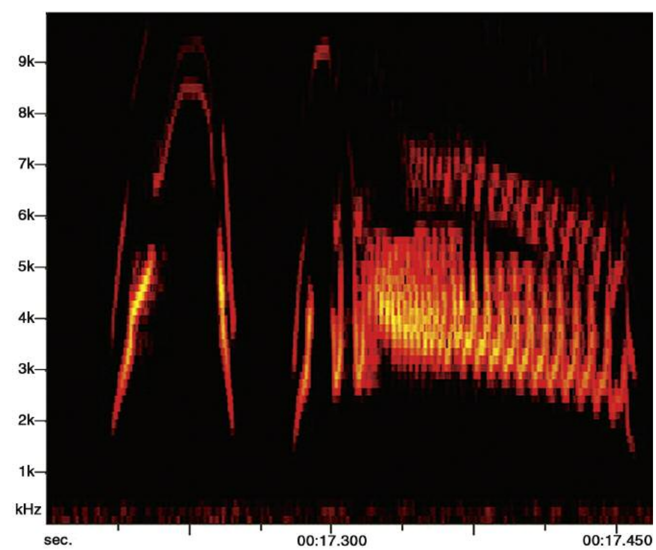
The website, as noted above, is not limited to North American birds. It includes 60 sunbirds, 58 barbets, 51 antwrens, 29 cisticolas, and hundreds more birds worldwide. Here, we can learn why the various cisticola species go by such names as Rattling, Zitting, Siffling, Singing, Croaking, Whistling, Wing-snapping, Chattering, Churring, Chirping, Trilling, and Wailing—remarkable cases of evolutionary diversification in closely related species.

Six web pages trace the past, present, and future of Cornell's 80-year leadership in recording natural sounds. The genesis of that leadership was a classic case of serendipity. In May 1929, a movie company asked Arthur Allen to aid in

Differences between the harsh *rray-bee-o* of **Alder Flycatcher** (upper) and the buzzy *fitz-bew* of **Willow Flycatcher** (lower) are evident in this pair of spectrographic images. Listen to these songs in direct links from the WebExtra for this article <aba.org/birding/v40n5p32w1.html>.



Maine; July 1997. Sonogram courtesy of © Macaulay Library, Cornell Lab of Ornithology.



Maryland; May 1997. Sonogram courtesy of © Macaulay Library, Cornell Lab of Ornithology.

recording bird songs on sound film. Allen and his graduate student Peter Paul Kellogg gave it a go, and their experimental equipment did the trick. At least two of those path-breaking recordings are on the website: a Song Sparrow's brief rendition and a Rose-breasted Grosbeak's series of songs.

The website's usefulness to birders only hints at the Macaulay Library's importance as a scientific treasure for research, education, conservation—not to mention the commercial value Allen and Kellogg demonstrated in 1929. If filmmakers take notice, we need never again hear the soundtrack gaffe of a tropical bird singing in a boreal forest. That would deny us a laugh, but it would be a victory for science.

Beck's Petrel and Its Finders

Confirmed rediscovery of Beck's Petrel (*Pseudobulweria becki*) in the western Pacific Ocean made ornithological headlines in March 2008. The announcement by Hadoram Shirihai resurrects a seabird lost to science for nearly 80 years and revives the name of an ornithologist from California who originally discovered it.

The resurrection came on 4 August 2007 in the Bismarck Archipelago east of Papua New Guinea, where Shirihai salvaged a freshly dead Beck's that had recently fledged (*Bulletin of the British Ornithologists' Club* 128:3–16). It was only the third specimen ever found. He photographed more than 30 Beck's Petrels during the voyage but considers the specimen as marking "the first certain rediscovery." His instant-classic paper extensively describes Beck's plumage, jizz, behavior, distribution, and abundance. It remains to be learned where the species breeds.

This bird's namesake is Rollo Beck, principal collector on the American Museum of Natural History's famous Whitney South Sea Expedition in 1920–1929. The expedition visited 600 islands and produced thousands of specimens, including many unknown to science. Among them were two petrels of uncertain identity, one collected in the Bismarck Archipelago in 1928 and the other in the Solomon Islands in 1929.

Rollo Beck collects specimens in the Galapagos Islands while leading a famous California Academy of Sciences expedition in 1905–1906, a quarter-century before he discovered the bird named Beck's Petrel. *Date unknown. With permission of the © Museum of Vertebrate Zoology, University of California, Berkeley.*

Based on the first specimen, the museum's seabird expert, Robert Cushman Murphy, classified them as a new species (*American Museum Novitates* 322:1–2). Murphy's formal description allowed him to name the species, and he wrote, "It seems appropriate that the name of Rollo H. Beck, who has collected more Tubinares [tubenoses] than any other man, should be commemorated within the group, and the receipt of this very interesting undescribed petrel gives an opportunity to pay him a well-deserved tribute."

Seven new landbird species and subspecies discovered on the expedition are also named *becki* in the explorer's honor, but this important ornithological pioneer is practically unknown to birders. Not much has been written outside the scientific literature about his adventures and their historic results. Two online resources help to fill the void: a detailed biographical sketch by Roger Wolfe at the Monterey Seabirds website <montereyseabirds.com/RolloBeckBio.htm> and an exhibit of annotated photographs at the Pacific Grove Museum of Natural History <pgmuseum.org/beck/index~1.htm>.

In his *Bulletin* paper, Shirihai mentions something that seabirders will appreciate. As Barbara and Richard Mearns note in their book *The Bird Collectors* (Academic Press 1998), Beck was the first ornithologist who used "chum" to attract tubenoses to a boat. Shirihai points out that Rollo Beck's own method is exactly what "proved the key to rediscovering 'his' petrel."

A taxonomic note: Beck's Petrel is a subspecies of Tahiti Petrel (*Pseudobulweria rostrata*) in *Clements Checklist of Birds of the World*, the American Birding Association's official world list. Seabird expert Steve N. G. Howell disagrees. As he departed for a birding voyage from New Zealand to Japan in April 2008, Howell told *Birding*: "I definitely consider it a good species. I saw one in 2007 on this route, and it's very different from Tahiti Petrel. Calling it a subspecies is a little like saying Elegant Tern is a subspecies of Royal Tern." Howell was hoping to document more Beck's Petrels, and he succeeded. The voyagers found 11 on a single day.