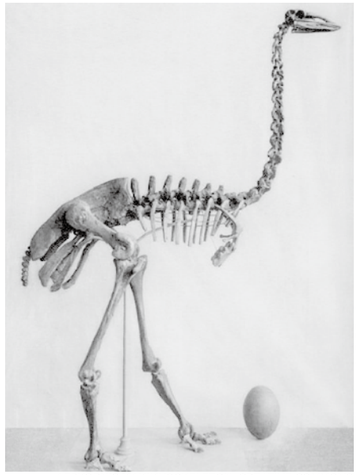

***AEPYORNIS MAXIMUS* SKELETON** CREATIVE COMMONS

bigger & bigger

The largest extinct giant of all?

For most of the past 170 years *Aepyornis maximus*, the largest of Madagascar's elephant birds with an estimated average body mass of 450 kilograms, was considered the heaviest avian species ever to have walked the earth. However, in 2016 evidence emerged that *A. maximus* might not be the largest extinct bird after all. The authors of a paper on mirihungs, a lineage of gigantic goose relatives that existed in Australia until approximately 50 000 years ago, estimated average body masses for female and male *Dromornis stirtoni* of 450 and 530 kilograms respectively.

While the mirihung paper was being published, however, two UK-based researchers were working on the first taxonomic reassessment of elephant birds in more than half a century. The first description of elephant birds in western scientific literature in 1851 preluded a flurry of species descriptions as competitive Victorian-era taxonomists scrambled to demonstrate their own status as an authority on newly discovered extinct taxa. After a deluge of descriptions in the 1890s and a handful in the early 20th century, no fewer than 15 species of elephant bird had been described. Confusion reigned. One species described during the dizzying 1890s was *A. titan*, which Charles Andrews argued was the largest of the elephant birds. But *A. titan* subsequently lost its species status and was incorporated within *A. maximus*.

For the new elephant bird study, James Hansford and Samuel Turvey examined and painstakingly measured 346 bone specimens from museums in Madagascar, Europe and North America. They used cutting-edge multivariate analyses to identify clusters of morphologically similar remains and, crucially, incorporated statistical techniques that account for size variation within species, including sexual dimorphism. Their analysis, published in 2018, suggests there were in fact just four elephant bird species, down from 15 recognised in the early 1900s and seven more recently. Now two species belong to the genus *Aepyornis* and one to *Mullerornis*, the smallest of the elephant birds.

The study's most unexpected result, however, involved the fourth species. Several of the largest specimens thought to be *A. maximus* turned out to belong not only to a new species, but also a new genus. The authors named it *Vorombe*, a Malagasy word meaning 'big bird'. As this was the species originally named *A. titan* in 1894, it duly became *Vorombe titan*. Moreover, Andrews' assertion that this was the largest elephant bird has finally been vindicated: the estimated average mass of *Vorombe* is 650 kilograms, with some individuals as heavy as 730 kilograms (and in the case of one tantalisingly incomplete specimen, possibly 860 kilograms).

The (re-)discovery of this truly enormous elephant bird means that this family's claim to including the largest avian species known to have existed on earth is secure, at least for now. Like other members of its family, *Vorombe* seems to have occurred primarily in the semi-arid south-west of Madagascar. While much remains to be learned about this avian giant, just knowing that such a behemoth roamed this biologically remarkable island deepens the intrigue surrounding the creatures that used to inhabit it.

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Reference

Hansford JP and Turvey ST. 2018. 'Unexpected diversity within the extinct elephant birds (Aves: Aepyornithidae) and a new identity for the world's largest bird.' *Royal Society Open Science* 5: 181295.

FEELING chirpy

DUNCAN BUTCHART

A pair of Fiscal Flycatchers duetting. In urban settings, songbirds sing louder, simpler songs to be heard over the constant, pervasive traffic drone.

Over the past few decades, numerous studies have shown that noise pollution from traffic can have an impact on birds and other wildlife. The most obvious effect on birds is a change in song structure to communicate in a noisy environment, but more insidious impacts include altered habitat use, increased stress levels, decreased foraging efficiency and even reduced chick growth rates and breeding success.

The best evidence for these impacts comes from experiments designed to tease apart the impacts of noise from other potentially confounding variables associated with human-modified habitats. Such experiments typically can only be conducted at a very small scale in space and time, but the Covid-19 pandemic created a vast natural experiment. An elegant study by Elizabeth Derryberry and colleagues published in *Science* (370: 575–579) shows how White-crowned Sparrows around San Francisco altered their songs in response to the lockdown.

The study compared male sparrow songs during the lockdown with those in the same areas in previous years. In 2015 and 2016, sparrows in urban areas experienced background noise levels nearly three times louder than their rural cousins and sang more loudly to compensate for the noisy soundscape. During the lockdown in April–May 2020, background noise levels dropped in both habitats, but much more so in urban areas, to the point that there was no difference between urban and rural sites. Based on the number of vehicles crossing the Golden Gate Bridge, traffic levels in San Francisco at the peak of the lockdown were similar to those in the mid-1950s!

The sparrows responded to the reduced traffic noise by singing more softly, yet their songs were audible at roughly twice the distance than during 'normal' traffic conditions. This explains why many birders reported that their garden birds were singing more loudly during the Covid lockdown (see *African Birdlife* 8(5): 20–23). Given the inverse square rule, a doubling in song transmission distance means that birds (and birders) would hear four times as many sparrows during lockdown.

Prior to lockdown, the songs of urban male sparrows had a narrower frequency range than rural males to reduce overlap with the low-frequency traffic drone. However, experiments have shown that sparrows assess the fitness of other males by the rate and frequency range of their trilled notes. The faster the trill and the greater the frequency range of each note in the trill, the more intimidating the male. This means that urban sparrows should rapidly switch to more complex songs in the absence of traffic noise; as expected, the urban sparrows greatly extended the frequency range of their trills during lockdown.

Greater communication distances and increased information content in male song most probably reduce territorial conflicts, decreasing stress levels and increasing the energy available for other activities such as breeding. The study suggests that birds readily adapt to noise pollution and can revert rapidly to 'normal' if the noise is removed. However, it also indicates the subtle and often complex impacts of sound pollution on birds, a topic that is often overlooked compared to the many more overt human impacts on birds.

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