Biology

A bird's view of romantic lighting

Someone with a weakness for redheads might not fall for Lucille Ball viewed on a black-and-white television set. Give that viewer a color set, however, and he would probably love Lucy.

Female birds face a similar situation. They prefer mates with particular plumage colors, among other characteristics. However, they require ultraviolet light to detect some alluring colors, researchers have now demonstrated.

Unlike people, birds see the hues produced when ultraviolet light bounces off objects, such as feathers. When researchers screened out ultraviolet light, female birds failed to see those special colors—or the charm of nearby males, report Andrew T.D. Bennett of the University of Bristol in England and his colleagues.

"Although previous studies have postulated a role for ultraviolet light in avian (and reptilian) mate choice, we believe this to be the first study experimentally demonstrating such effects in any vertebrate," the authors assert in the April 4 NATURE.

In a series of experiments, the team studied 32 male and 8 female zebra finches (*Taeniopygia guttata*). Each of four males had its own room in a special cage. A female could view the males, sometimes directly and sometimes through filters that screened out ultraviolet light.

The more a female hops in front of a male, the greater her interest in him, other studies have shown.

In their first experiment, the researchers found that the females hopped more when viewing a male directly. To make sure that these birds weren't just keen on the lighting conditions, the scientists tested the females' response to the rooms after removing the males. The females showed no preference for rooms they viewed in unfiltered light.

To rule out the possibility that ultraviolet light simply enabled female zebra finches to recognize a potential mate more readily, the researchers tested the birds' ability to detect another desirable trait that would show up only under ultraviolet light.

Female zebra finches prefer males with symmetrical plumage patterns or even symmetrical arrangements of ornaments that researchers attach to the birds. So the team put four legbands on each male, two on each leg. Only two of the bands reflected ultraviolet light. The bands appeared identical to the scientists.

Because the female birds could see ultraviolet light, they could tell which males had one light-reflecting band on each leg and which had two on one leg. They showed more interest in the males with the symmetrical bands, the team reports.

Master songsters produce heartier kin

Many species of birds engage in so-called extra-pair copulations. For these affairs, females in some species find males whose song repertoires are bigger than the playlist of their regular partner (SN: 5/4/96, p. 280).

Females probably pick these multisong crooners because their offspring have the best chance of surviving, assert Dennis Hasselquist and his colleagues at Lund University in Sweden.

From 1987 to 1993, the group studied the great reed warblers (*Acrocephalus arundinaceus)* at Kvismaren, Sweden, during the birds' breeding season, from May to July.

The female warblers engaged in extra-pair copulations with neighboring males, but only if the neighbor sang more songs than the female's steady mate.

Using DNA fingerprinting to match males with their offspring, the scientists found that the larger the father's repertoire, the greater the survival rate of his offspring. The group reports its finding in the May 16 NATURE.

"The correlation is not fabulous, but it's there, and yes, it's surprising," says Michael D. Beecher of the University of Washington in Seattle.

Paleontology

Africa yields dinosaur to rival *T. rex*

Poor *Tyrannosaurus rex.* Once considered the largest predatory dinosaur, this North American beast from the end of the Cretaceous period now has to share the title of king carnivore with not one, but two other giants, thanks to recent fossil finds.

While working in the Moroccan Sahara last year, Paul C. Sereno, a paleontologist at the University of Chicago, and his colleagues unearthed a 5.3-foot-long skull and other bones belonging to a poorly known theropod called *Carcharodontosaurus,* they report in the May 17 SCIENCE. The fossils reveal that this 90-million-year-old hunter reached roughly 45 feet in total length, slightly longer than the biggest known *T. rex.* Last year, Argentine scientists announced the discovery of a similar-size South American theropod called *Giganotosaurus* (SN: 9/23/95, p. 199).

Sereno's group also found a previously unknown, smaller Moroccan theropod. They named the fleet predator *Deltadromeus.*

The finds give new insight into how dinosaurs evolved as the once-unified continents split apart and moved toward their modern positions. Similarities between *Carcharodontosaurus*, *Giganotosaurus*, and some North American predators suggest that dinosaurs from different continents intermixed through most of the Cretaceous. By 90 million years ago, however, Africa had separated from other landmasses, leaving its dinosaurs to evolve in unique ways, says Sereno.

H. Larsson *et al.*/SCIENCE

Skull of the Moroccan giant.

Keeping an ear out for Neandertals

The bony chambers of the inner ear reverberate with clues suggesting that Neandertals lived until as late as 34,000 years ago but were not direct human ancestors, a new study finds.

Size and layout of the inner ear—particularly of the semicircular canals, which aid balance—differ greatly in Neandertals and *Homo sapiens*, assert Fred Spoor of University College London and his coworkers. The finding supports classification of the creatures as separate species, they argue in the May 16 NATURE.

Spoor's group obtained computerized tomography (CT) scans of the inner ear in fossils from nine Neandertals, four early *H. sapiens*, three *H. erectus*, and seven australopithecines (which lived more than 3 million years ago), as well as from modern chimpanzees, gorillas, orangutans, and humans.

As in a prior study directed by Spoor (SN: 4/9/94, p. 231), fossil and modern *H. sapiens* had the largest semicircular canals relative to body weight, perhaps reflecting a more pronounced upright stance. Neandertals, according to the recent work, display strikingly small semicircular canals for their large bodies, as well as a distinctive inner ear shape. It is not known if these traits affected the Neandertal gait.

The Neandertal inner ear arrangement also appears in a skull fragment from a 34,000-year-old French site, the scientists contend. That site has yielded bone and ivory ornaments usually attributed to early *H. sapiens*. Neandertals may have traded for these items, Spoor theorizes.

Christopher B. Stringer of the British Museum in London, a proponent of Neandertals as a separate species, calls the new data "extremely important." Milford H. Wolpoff of the University of Michigan in Ann Arbor, who views Neandertals as a regional variant of *H. sapiens*, says no one knows whether Neandertals' inner ears differed markedly from those of humans adapted to cold climates reminiscent of Ice Age Europe.