



## ScienceWatch – An Avian Illusionist

**“To my knowledge no other animals make constructions which produce perspective.” – J. Endler**

There are 20 species of bowerbirds, relatives of crows and jays (corvids) that live in Australia and New Guinea. A male bowerbird spends much of his time constructing a bower, an elaborate structure complete with showy decorations in order to attract a mate. Some species build a maypole-type bower, composed of sticks placed around a small tree and covered with a rooftop. Others build more elaborate “avenue” bowers. For the great

bowerbird (*Ptilonorhynchus nuchalis*) this consists of a 0.6 meter (1.96 ft.) twig-lined avenue composed of two stick walls and ending in an open court.

Some bowerbirds place colorful objects, meant to impress females, on the floor of the court. The male great bowerbird lines the floor of his court with a collection of gray to white stones, bones and shells known as gesso. He then spends most of his time arranging the objects that make up the gesso and surveying the result from the avenue. If a female likes his handiwork she enters his bower and stands in the stick-covered avenue, watching the male who squawks, hops and tosses colorful ornaments while standing in the court in view of the female. If she likes what she sees mating promptly ensues in the bower (<http://www.youtube.com/watch?v=VBPbB2bd39g>).

John Endler, an evolutionary ecologist at Deakin University, Victoria, Australia, has been studying the mating behavior of these birds for several years. In 2010 he and his colleagues noticed that males arrange the gesso in a gradient according to size. Smaller objects are placed where the avenue opens onto the display court. Larger objects are arranged more distant from the opening. When the researchers reversed the gradient the builder quickly restored the objects to their original distribution, re-creating the original gradient.



Why should a male great bowerbird be so particular about the arrangement of the objects that line the floor of his court? The size gradient creates an illusion—what artists call

“forced perspective”. For the female standing in the avenue, forced perspective makes all the gesso objects appear to be the same size, so the court appears smaller than it really is.

Why male great bowerbirds bother to create the illusion is now evident. In the January 20, 2012 issue of *Science* Endler and his colleague, Laura Kelley report that males most skilled at designing the forced-perspective illusion achieve the most mating success. The scientists measured the regularity of the size gradient and found that males able to craft the forced perspective so that the floor of the court appeared more evenly sized from the female’s viewpoint mated more frequently than less fussy males.

The authors suggest several possibilities for what is happening from the female’s viewpoint: females may prefer a “regular” guy, i.e., one who makes an even appearing floor; the illusion may make him appear larger or more conspicuous; the illusion may make the objects he presents more conspicuous; the illusion may hold her attention longer. All are equally possible because how the female actually perceives the illusion and what role it plays in shaping her mating choices are currently unknown.

According to Barton Anderson, a psychologist specializing in visual perception, “(the) data suggest that male bowerbirds appear to consider the viewpoint of their potential mates ... and the ones who do this best are rewarded with a higher rate of mating success. Just what matters, and why it matters, remain open and intriguing questions.”

Saul Scheinbach