

UP, DOWN, FLYING AROUND

Courtship in storks

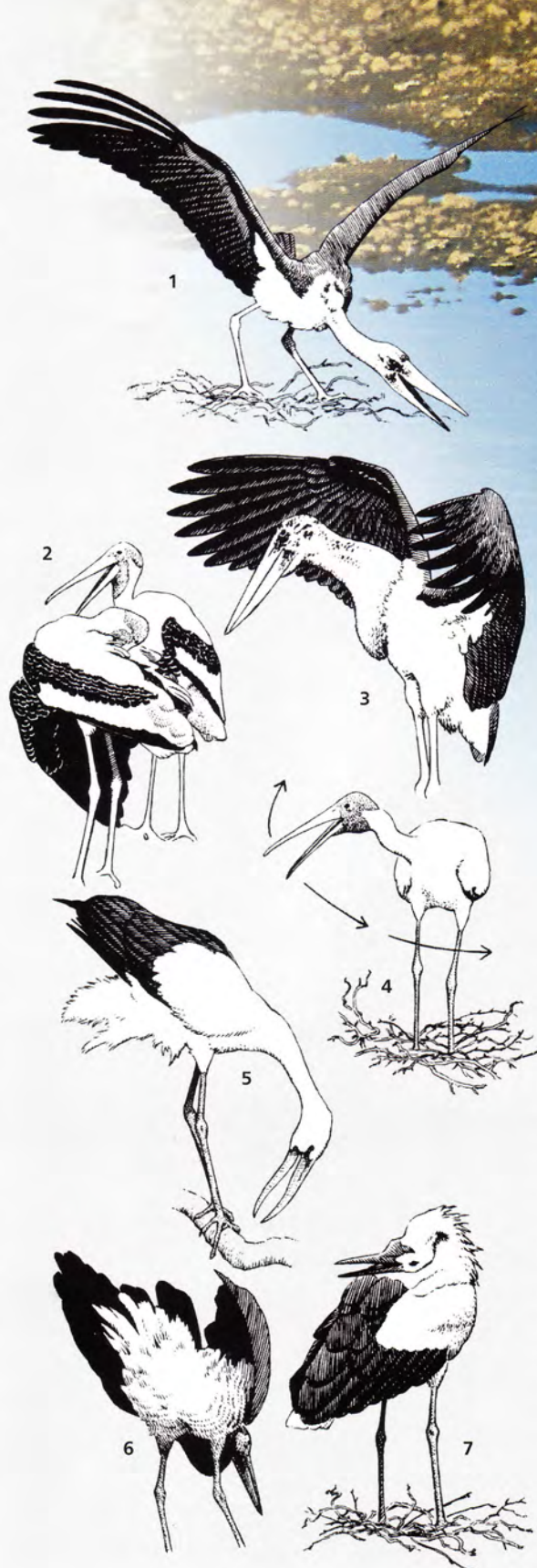
COURTSHIP IS CRITICAL TO ANY BIRD, BUT THE great size of storks makes their displays all the more noticeable. The ritualized behaviors and gestures used by the various species are as repeatable and consistent as their bill shapes and plumage patterns.

The advertisement display of the White stork has been known for centuries, and was illustrated in 13th-century manuscripts. It remains familiar to the people of the villages in which they nest to this day. The display is commonly known as the "up-down," and some version of it is found in most stork species.

The up-down is not only the most typical courtship behavior in storks, but in some species is also the most remarkable. It is a greeting issued when one member of a pair returns to the nest. In giving the display, a stork first raises and then lowers its head in a characteristic, stylized manner. Although the behavior is present in all storks, the exact pattern differs among species. The head movement is usually accompanied by a vocalization, which in the typical storks takes the form of bill clattering, the amount of which is species-specific. The White stork, for example, has a loud, resonant clatter that may last ten seconds or more, while the Black stork clatters only infrequently. Such a difference suggests that within the group the two species are not closely related. The White stork also differs from the other typical storks in that its up-down is not accompanied by whistling.

The up-down behavior is simplest in open-bill and wood storks, in which it consists mainly of raising the head and gaping the bill, and then emitting hissing screams as the head and bill are lowered. Even so, the display differs among the four wood-stork (*Mycteria*) species. The American wood stork does not snap its bill during the display; the Yellow-billed stork gives a single or double snap; the Painted stork gives double or triple snaps; while the Milky stork gives multiple snaps.

Differences in the details of the up-down display demonstrate important distinctions between closely-related storks that would not otherwise be obvious. The up-down of the adjutants includes moving the bill to vertical, accompanied by mooring and squealing. The Marabou and Greater adjutant are similar-looking birds, which do not overlap in range. Their displays differ, however, in that Marabous first throw their head upward and squeal with the bill near vertical, before pointing it downward and clattering loudly, while the Greater adjutant clatters while the bill is pointed upward. The difference in this important pair-bonding activity suggests that the birds would not interbreed should their ranges overlap, and so are best considered as separate species.



Right A pair of Saddle-bill storks in South Africa's Kruger National Park show off the courting display known as "flap-dash," in which the birds run through shallow water flapping their wings.

Left Storks have a wide range of aggressive and courtship displays that vary between species and genera. **1** The last stage of the "clattering threat" in the Yellow-billed stork. **2** "Display preening" in the Painted stork; in this courting pair, the male in front is preening behind the wing. **3** A marabou showing the "anxiety stretch" in response to disturbance by people on the ground under the nest. **4** A male Yellow-billed stork giving an "up-down" display as his newly acquired mate approaches the nest-site. **5** A courting male Asian open-bill stork performing the "advertising sway" at a potential nest-site. **6** "Head-shaking crouch" of a male White-bellied stork as a potential mate approaches. **7** "Full back," a position in the "up-down" display of White storks.



Black-necked and Saddle-bill storks display infrequently because of their long-lasting pair bond. The up-down of the Black-necked stork is a spectacular greeting that includes rapid fluttering of fully extended wings and clattering of bills, but the head is not raised. These two species and the Jabiru share a distinctive display given on the foraging grounds, the "flap-dash," in which a bird dashes wildly through the water while vigorously flapping its wings.

The typical storks are distinguished from the wood storks in that they alone exhibit a head-shaking crouch, in which the male crouches on its nest and shakes its head from side to side as if saying "No." That is in fact probably the message of the display, since it is given as a warning when another bird approaches the nest.

The wood storks share three unique displays: flying around, in which a male that has just accepted a female leaves its nest and flies in a circle around the site before returning; gaping, in which a bird holds its parted mandibles open; and display preening, a mock behavior in which the male pretends to comb the feathers on its wing with its bill. The displays of the open-bill storks strongly resemble those of wood storks, especially their simple up-down and also their copulation clattering, in which a male clatters his mandibles during copulation while knocking them against the bill of the female. As a result of such resemblances, the wood storks and open-bill storks are thought to be more closely related to each other than they are to other storks. Open-bills also have a unique display, the advertising sway, in which a

displaying male bends its head down between its legs and repeatedly shifts its weight from one foot to the other.

Comparative behavioral observations have discovered both similarities and differences among species that not only suggest systematic relationships but also reveal much about the underlying biology of the birds. Even so, much remains to be discovered about the nuances of bird behavior, its evolutionary roots, its real-life importance, and its geographic variability.