

## BEHAVIOR OF CAPTIVE SOUTH AMERICAN COWBIRDS

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THROUGH the courtesy of Dr. Herbert Friedmann and officials of the Washington Zoological Society, a number of South American icterids were consigned to me for study in November, 1962. Before being shipped to Austin, Texas, the birds had been held in aviaries or cages in Washington, D. C., for an unspecified period, and some or all had been used in research conducted by Dr. Friedmann. Included in the shipment were a male Bay-winged Cowbird (*Molothrus badius*), two males and a female of the Shiny Cowbird (*Molothrus bonariensis*), and three male Chestnut-fronted Troupials (*Agelaius ruficapillus*). In Austin the individuals of *M. bonariensis* were housed in a large cage with two female Brown-headed Cowbirds (*Molothrus ater*), and the male *M. badius* was placed in an adjacent cage with the three individuals of *A. ruficapillus*. Notes on behavior reported in this paper were made in the course of approximately 16 hours of observation in December, 1962, and January, 1963.

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### INTERSPECIFIC PREENING INVITATION DISPLAY

As reported in detail by Selander and La Rue (1961), individuals of *Molothrus ater* and of the Bronzed Cowbird (*Tangavius aeneus*) frequently solicit preening from other species of birds by giving a special invitation display in which the head is deeply bowed and the feathers of the head and neck are conspicuously ruffed. The display has been observed in both captive and wild birds. Since available field records were summarized in 1961 (Selander and La Rue, *op. cit.*: 490-492), I have seen the display many dozens of times in wild individuals of *M. ater* soliciting preening from Red-winged Blackbirds (*Agelaius phoeniceus*), House Sparrows (*Passer domesticus*), and Dickcissels (*Spiza americana*). Recently, Harrison (1963a) has described a preening invitation display of a captive male Giant Cowbird (*Psomocolax oryzivorus*) directed to a pair of African Blackhead Plovers (*Sarciophorus tectus*); and Chapman (1928) previously reported a field observation of a female Giant Cowbird directing this display to a female Wagler's Oropendola (*Zarhynchus wagleri*) at the latter's nest. The interspecific preening invitation display of *Psomocolax*, as described and illustrated by Harrison (1963a), is similar in form to that of *Tangavius* and *M. ater*.

On 5 December 1962, I was able to elicit preening invitation displays in my captive individuals of *Molothrus bonariensis* by introducing a male

House Sparrow into their cage. The female and the two males of *M. bonariensis* each presented the display to the sparrow several times, and the form of the display seemed identical to that given by *M. ater*. As in the latter species, individuals of *M. bonariensis* were prone to peck at the sparrow after failing to elicit preening responses through presentation of the display.

The two females of *Molothrus ater* in the same cage displayed repeatedly to the House Sparrow; and one female also displayed to a male *M. bonariensis* but was quickly driven away by a peck from the male. On one occasion, while the sparrow was in the cage, the female *M. bonariensis* displayed to a male of the same species, which responded by pecking the female on the head. And once a male and a female of *M. bonariensis* gave mutual preening invitation displays for a few seconds; the bout ended as the male stopped displaying and pecked at the female.

As in *Molothrus ater* (Selander and La Rue, *op. cit.*), intraspecific presentation of the display by *M. bonariensis* is infrequent and invariably fails to elicit allopreening (= heteropreening; for terminology, see Cullen, 1963). As indicated in the preceding paragraph, intraspecific presentation of the display typically evokes aggressive responses by the recipient birds, apparently because displaying cowbirds approach the recipients and violate the critical intervals of spacing (individual distance) normally maintained by cowbirds. Additionally, intraspecific presentation of the display is most likely to occur after an individual of another species has been introduced into a cage and has evoked a "rash" of interspecific displays.

The male *Molothrus badius* habitually solicited preening from the individuals of *Agelaius ruficapillus* with which it was confined and was highly successful in inducing the troupials to preen the feathers of its head and neck (Figure 1). Since *M. badius* is behaviorally and morphologically distinctive enough to have formerly been separated generically (as *Agelaioides*), it is of interest that the interspecific preening invitation display of this species differs from that of other cowbirds.

Typically the display of the male *Molothrus badius* began as the bird crouched down on its tarsi and sidled along a perch toward a troupial; as the cowbird approached, the body was almost horizontal, the bill was directed downward, and the tail was strongly flicked down and up. During the approach the movements of the cowbird were rapid and jerking, and the entire plumage was moderately compressed. When the cowbird was about three inches from the troupial, tail-flicking ceased and the cowbird stopped but remained crouched; then the neck was pulled in and the bill was slowly raised to an angle of approximately 20° above the horizontal. Generally at this point the troupial approached the cowbird, which in turn

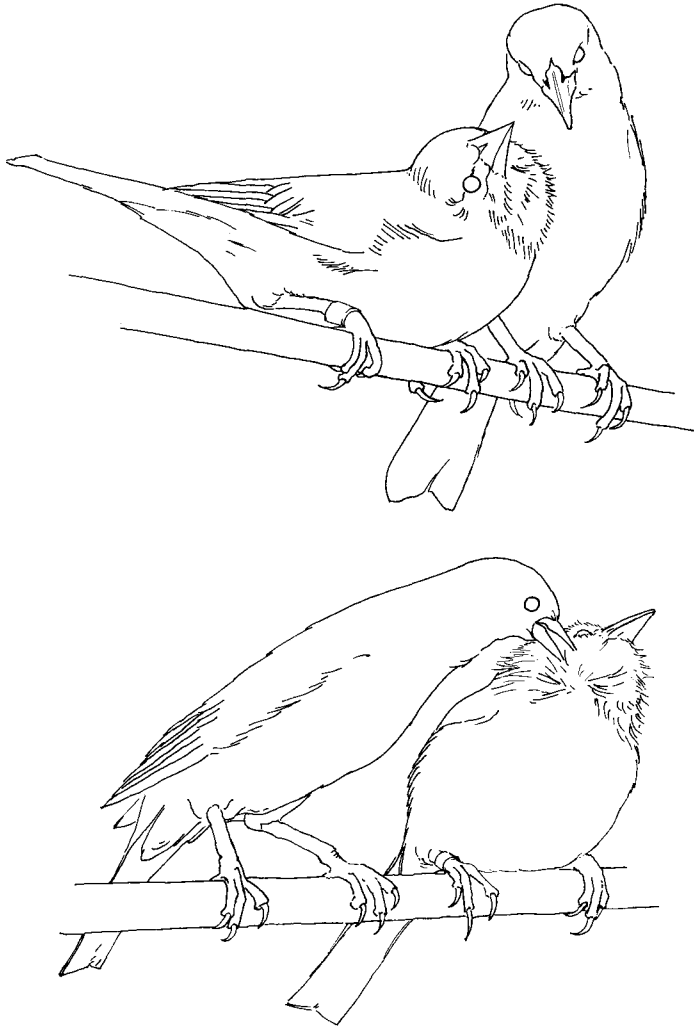


Figure 1. Upper, male Bay-winged Cowbird (left) solicits preening from male Chestnut-fronted Troupial (right). Lower, male Chestnut-fronted Troupial gapes into plumage of displaying male Bay-winged Cowbird. (Drawn from frames of 16 mm motion picture.)

responded to the troupial as follows: the feathers of the head and neck were fluffed, the bill moved up to an angle of approximately  $80^\circ$  above the horizontal, and, typically, the bill was opened slightly (Figure 1). Often the *M. badius* also leaned away from the troupial and, cocking the head, presented the highly ruffed feathers of the side of the head (Figure

1, upper). The troupials almost invariably responded to this display, and soon the recipient troupial preened or gaped into the feathers of the head of the male cowbird (Figure 1, lower). As the troupial responded, the cowbird remained almost motionless but sometimes slowly opened and closed the bill and blinked an eye as the troupial preened feathers near it. Harrison (1963b) has described "open-billed allopreening" in the Rothschild Grackle (*Leucopsar rothschildi*), in which a female gaped into the plumage of a male. As Harrison notes, the movement is similar to the gaping pattern normally used in foraging by many icterids, sturnids, and certain other birds and may not be functional in preening. I have often seen Red-winged Blackbirds gape into the plumage of displaying individuals of *M. ater*.

To some degree the posture of the displaying *Molothrus badius* suggested that of sun-bathing cowbirds and other icterids, but it differed in that the wings remained folded and the body feathers were not erected. Only the feathers of the head and neck were ruffed, and these were erected to a greater extent than I have seen in any displaying individual of *M. ater*, *M. bonariensis*, or *Tangavius*.

On some occasions, the *Molothrus badius* displayed to a troupial without making the tail-flicking, sidling approach described above. Instead, the cowbird, finding itself perched near a troupial, crouched and slowly assumed the display posture shown in Figure 1.

As in other species of cowbirds, the preening invitation display of *Molothrus badius* was not accompanied by vocalizations; but once the *M. badius* sang a typical song (see beyond) as it made a tail-flicking approach to a troupial.

When a male House Sparrow was placed in the cage with the male *Molothrus badius*, the latter quickly approached and gave the preening invitation display.

Allopreening sessions involving the *Molothrus badius* and the troupials rarely lasted more than 20 seconds and usually ended as the male cowbird ceased displaying, sleeked the feathers of the head and neck, and, assuming an upright position, threatened the troupial away with a head-up display which was similar in form to that given by other cowbirds (Selander and La Rue, *op. cit.*: Figure 1E) but differed in involving a lesser extension of the neck. Continuous and gradual transitions between preening invitation display and head-up display were noted. In all encounters the male *M. badius* easily dominated the troupials.

#### DISCUSSION

It is apparent that the behavior pattern of soliciting preening from other species of birds appeared early in the evolution of the cowbird line of the

Icteridae, for *Molothrus badius* is on good evidence considered the most primitive species of cowbird (Friedmann, 1929). If the behavior of the captive male *M. badius* is typical of the species, it is also clear that the form of the preening invitation display changed in the course of evolution of *Molothrus bonariensis* and other, more advanced, species of cowbirds. Information on the form of the display, if any, in the Screaming Cowbird (*Molothrus rufo-axillaris*) would be especially interesting, since this species is morphologically and behaviorally intermediate between *M. badius* and *M. bonariensis* (Friedmann, *op. cit.*: 343-346).

In the head-bowed preening invitation display of *Tangavius*, *Psomocolax*, *Molothrus bonariensis*, and *M. ater*, the bill is concealed from direct view of the recipient of the display; and this component of the display is considered to have significant appeasing function (Selander and La Rue, *op. cit.*: 499). But in *M. badius* the bill is conspicuously displayed, being directed more or less vertically upward, as in the head-up display, which in icterids has a threat function and reflects a strong tendency to attack (Selander and Giller, 1961; Ficken, 1963: 53-55). It was my impression that the vertical position of the bill of the displaying male *M. badius* did in fact weakly intimidate the troupials, which were often reluctant to come close to the cowbird and allopreened by stretching over from a position several inches away (Figure 1, lower). In short, the displaying *M. badius* seemed to be simultaneously soliciting preening and controlling the degree of approach of the troupials and the intensity of their allopreening by weakly threatening with elevated bill, whereas other species of cowbirds utilizing head-bowed displays are more passive and apparently rely to a greater extent on appeasing elements of their display to minimize the likelihood of attack by recipients. I have no doubt that there are significant differences in motivational factors underlying the displays in *M. badius* and in the other, more advanced, species of cowbirds.

In a previous paper, La Rue and I suggested that the preening invitation display in *Molothrus ater* and in *Tangavius* might function to forestall aggressive action by potential hosts of these brood parasites by lessening the attack tendencies of the hosts. Thus we suggested the possibility that the display is one of a series of adaptations for parasitism. However, Friedmann (1963: 29-31) was inclined to reject our hypothesis and instead sought to explain the occurrence of the behavior in cowbirds in terms of a "memory induced" reaction based on early experience of care by adults of other species." I cannot accept this as a casual explanation, since, for reasons discussed previously (Selander and La Rue, *op. cit.*), a satisfactory interpretation must consider not only possible ontogenetic factors but also the adaptiveness of the behavior. In any event, Friedmann's suggestion is

refuted by the fact that *M. badius* invites preening from other species although it incubates its own eggs and rears its own young.

The fact that *Molothrus badius* is not brood parasitic indicates that the preening invitation behavior did not evolve in cowbirds specifically as an adaptation for brood parasitism, but, of course, it does not exclude the possibility that *M. ater* and other brood-parasitic species use the display to appease potential hosts. Moreover, it should be noted that *M. badius* practices nest parasitism (see Weller, 1959, for terminology), appropriating nests of other species for its own use, frequently by fighting with and driving out the owners of occupied nests (Friedmann, 1929). In agonistic encounters between individuals of *M. badius* and nest owners of other species, it is possible that an effective appeasing display would be advantageous to the cowbirds. Indeed, it is perhaps easier to envision an adaptive function of the display along this line in *M. badius* than in *M. ater*, in which agonistic interactions with hosts apparently are relatively less frequent. Therefore, the hypothesis that the interspecific preening invitation displays of cowbirds are adaptively related to parasitism cannot be dismissed.

#### OTHER DISPLAYS AND SONG

The behavior of *Molothrus bonariensis* is generally similar to that of its close relative *M. ater*, but *M. bonariensis* seems stronger, more vigorous, and more alert. The head-up display is similar if not identical in the two species.

In describing the bowing ruff-out display of males of *Molothrus bonariensis*, Friedmann (1929: 70) noted that "at its fullest extent the bowing forward is carried only half as far as in the display of the North American species [*M. ater*], i.e. not quite to a horizontal position." However, the ruff-out displays of the males that I have observed did not differ from those of *M. ater* in the extent of bowing. In both species the full display has a terminal phase in which the male bows deeply and vigorously wipes the bill against the ground or perch. The bill-wiping part of the full display most frequently appears when a male is displaying to another male, and it is often omitted in undirected displays and in those directed to females. Laskey (1950) detected this variation in the displays of wild individuals of *M. ater*, and I have studied it in both wild and caged birds.

The ruff-out display of *Molothrus bonariensis* is performed more slowly than that of *M. ater*. Three complete displays of the former species were timed at between three and one-half and four seconds, whereas full displays of *M. ater* have a duration of between two and two and one-half seconds.

The song of *Molothrus bonariensis* ("true courtship song" of Friedmann's terminology; 1929: 71) consists of three or four low, "bubbling"

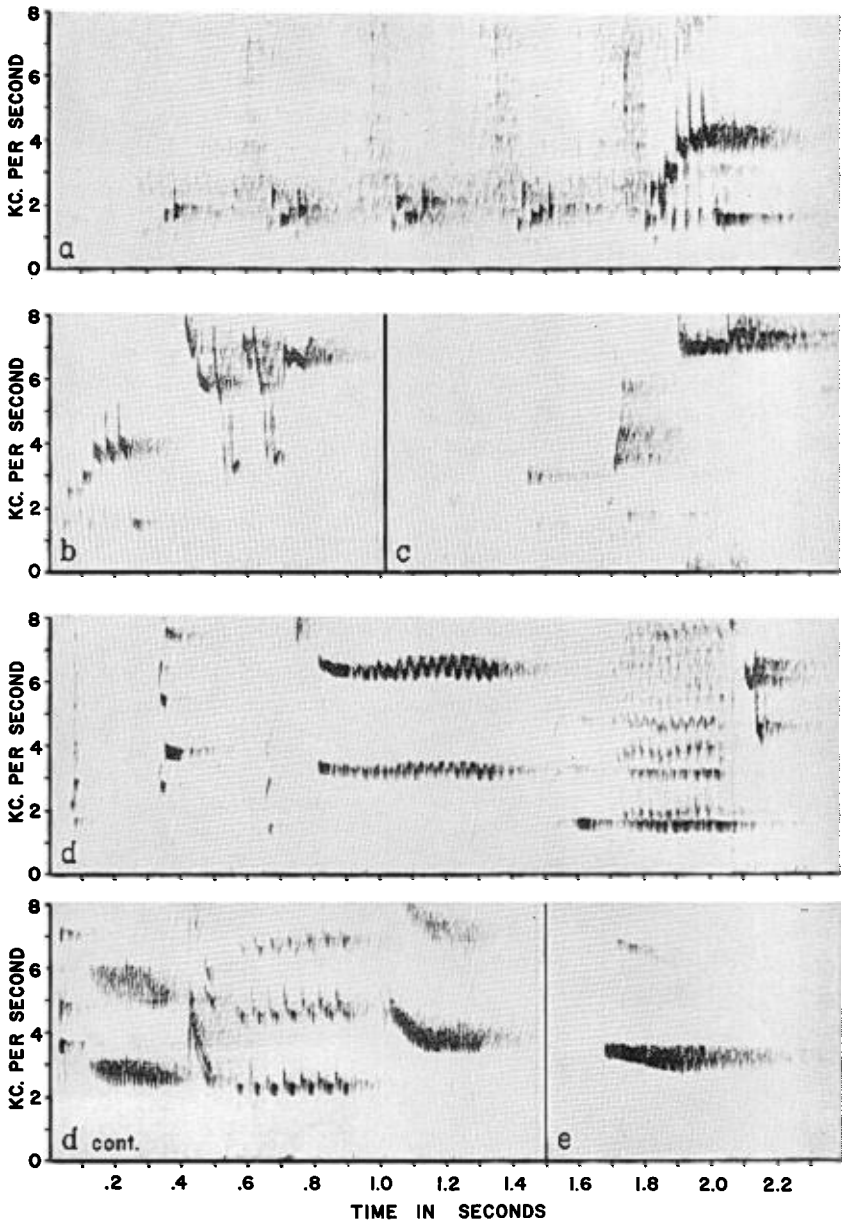


Figure 2. Frequency/time sonagrams (wide band-pass, high-shape filter setting) of vocalizations of cowbirds. A, song of male Shiny Cowbird; B, terminal part of song of male Shiny Cowbird, followed by whistling phrase; C, song of male Brown-headed Cowbird (recorded from a bird trapped near Austin, Texas); D, song of male Bay-winged Cowbird; E, *peeeoh* note of male Bay-winged Cowbird.

*purr* notes followed by an ascending series of short notes described as *pe-tss-tseeee* (Figure 2, A). The duration of the song is approximately two seconds, which is nearly twice that of the *bub ko lum tseee* song of males of *M. ater*, as shown in Figure 2, c. Occasionally the songs of my captive males of *M. bonariensis* were followed by a loud, high-pitched phrase (Figure 2, B) that does not clearly correspond to any vocalization mentioned by Friedmann (1929), unless it is a version of the "plaintive whistle," a call which may be equivalent to the "flight whistle" of males of *M. ater*.

Friedmann (1929: 5) noted that *Molothrus badius* "has no courtship display of any kind," and my observations of the captive male tend to support this conclusion. I failed to observe any behavior corresponding to the bowing ruff-out displays of other cowbirds. While singing the bird simply perched with the bill tilted up slightly above the horizontal. Apart from head-up and preening invitation, no displays were performed by the captive male.

The song of the male *Molothrus badius* is very different from that of the other cowbirds, as previously noted by Friedmann (1929: 7). As shown in the example in Figure 2, D, the song consists of a variable series of *chip* notes, trills, and whistles. In addition to the song, the captive male cowbird gave a harsh *chuck* warning note and a loud, whistling *peeeooh* note (Figure 2, E), both of which have been described by Friedmann (*op. cit.*: 9-10).

#### SUMMARY

Captive male and female Shiny Cowbirds (*Molothrus bonariensis*) solicited allopreening from a House Sparrow (*Passer domesticus*), employing a head-bowed invitation display similar in form to that of the Brown-headed Cowbird (*Molothrus ater*), Bronzed Cowbird (*Tangavius aeneus*), and Giant Cowbird (*Psomocolax oryzivorus*). A comparable interspecific preening invitation display of a captive male Bay-winged Cowbird (*Molothrus badius*) was effective in eliciting allopreening responses from Chestnut-fronted Troupials (*Agelaius ruficapillus*) and was also directed to a House Sparrow. The display of the Bay-winged Cowbird differed from that of other cowbirds in having the bill directed more or less vertically upward rather than downward.

The possible adaptiveness of preening invitation display in relation to brood and nest parasitism in cowbirds is discussed.

The bowing ruff-out display of male Shiny Cowbirds is similar in form to that of male Brown-headed Cowbirds but is performed more slowly. A comparable display was not observed in the Bay-winged Cowbird. The



songs of three species of *Molothrus* are illustrated with sound spectrographs.

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