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RELATIVE INCIDENCE OF DISTRESS CALLS OR "SQUEALS" IN MIST-NETTED BIRDS*

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Among the many kinds of vocalization produced by birds, some, such as song, have been subjected to numerous studies, whereas others, such as call notes associated with anxiety, fear, or pain, have been given far less attention. Of the various notes that fall in the last-mentioned category or categories, such distress notes or fear calls as may be termed "squeals," "squalls," "screeches," or "screams" appear to have received remarkably scant notice. For example, Armstrong (1963), in a recent, comprehensive work on bird song and other utterances, includes but one reference centering on this subject. Other specific references known to us pertain to the use of distress calls to repel birds (e.g., Frings and Jumber, 1954, and others cited by Armour, 1963) or to attract and capture them (Ridpath, MS, as cited by Thorpe, 1961: 21). Although discussing avian distress calls at some length, Thorpe (*ibid.*: 17-20) opines that "the full squeal of fear does not need much comment. It often appears to be simply the expression of overwhelming emotion, but no doubt it has an important signal function in many instances . . . ." Calls in the "snarl or screech" category as described by Ficken and Ficken (1962: 112) are not the same as those referred to here, for their breakdown of "audible displays" (in connection with wood-warbler ethology) relates to free-ranging birds and not to ones netted, restrained, or handled. Similarly, the high, thin *eeeee*, or "predator

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alarm" note (Brackbill, 1959; Hailman, 1959), likewise usually given by free or unrestrained birds, is radically different from the type of distress note dealt with in this paper.

Partly because distress sounds have been neglected in previous studies of avian repertoires, and partly because (as many banders have doubtless noticed) some birds caught in mist-nets are prone to squeal, especially when being handled, we began to gather data on the incidence of squealing among individuals of various species. Hence we differ somewhat from Thorpe (1961: 21) in that we believe the "full squeal" does warrant special investigation. We considered a bird to be a squealer if, when caught in the net or when being extricated or held in the hand, it gave one or more distress notes. As it happened, few birds issued but one note; usually if one was sounded, it would be followed by other calls, whether few or many. Consequently we had little difficulty in distinguishing between squealers and non-squealers. Birds giving vent to "non-sharp" or "non-shrill" sounds (as whisper-singing; single or sporadic "normal" call notes; bill-popping; or somewhat muffled utterances associated with struggling) were not counted as squealers. Most of our records were accumulated in 1962 and 1963 in the course of several mist-netting and banding operations in the southeastern United States. A majority of the birds involved in the study was obtained in Baldwin County, Alabama, along net lines established by the junior author in connection with arbovirus-ecology studies. Additional records came from Leon County, Florida, and from localities in Georgia and South Carolina.

LARGER SPECIES-SAMPLES

Table 1 summarizes findings for the larger species-samples, with the number of individuals per sample ranging from 10 (Great Crested Flycatcher) to 132 (Cardinal). From data here given for 18 species, it is clear that no less than 15 displayed intraspecific variation, with some individuals proving to be squealers and others not. In addition to meriting high rank as squealers, the Red-bellied Woodpecker, Tufted Titmouse, and Cardinal may also be considered as decidedly recalcitrant. When removed from nets they are usually characterized by fright, anxiety, and hostility (cf. Low, 1957: 125, 126). It seems that the relative prevalence of distress notes as given by netted or held birds may provide one guide or index as to the various sorts of temperament of different species. In both Tables 1 and 2, it is apparent that distress-call rates may vary markedly among species in a single family; for instance, the White-eyed Vireo is, so to speak, a far more dependable squealer than the Red-eyed Vireo; the same holds true for the Cardinal in contrast to other fringillids, such as the White-throated Sparrow and Rufous-sided Towhee. Of the species included in Table 1, the Carolina Wren comes closest to a 50-50 ratio of squealers to non-squealers and, to judge from the present sample, may be thought of as illustrating a high degree of "behavioral polymorphism" in this respect. It is patent that most of the sampled wood-warblers were not disposed

TABLE 1. SUMMARY OF DATA ON RELATIVE INCIDENCE OF "SQUEALING" BY BIRDS HANDLED AT MIST-NETS*

Species (Individuals in Parentheses)	"Squealers" No.	"Squealers" Percent
Red-bellied Woodpecker. *Centurus carolinus.* (12)	12	100
Tufted Titmouse. *Parus bicolor.* (36)	36	100
Cardinal. *Richmondena cardinalis.* (132)	128	97
White-eyed Vireo. *Vireo griseus.* (121)	108	89
Catbird. *Dumetella carolinensis.* (15)	12	80
Great Crested Flycatcher. *Myiarchus crinitus.* (10)	7	70
Veery. *Hylocichla fuscescens.* (26)	16	62
Carolina Wren. *Thryothorus ludovicianus.* (56)	25	45
Red-eyed Vireo. *Vireo olivaceus.* (39)	15	38
White-throated Sparrow. *Zonotrichia albicollis.* (18)	6	33
Summer Tanager. *Piranga rubra.* (21)	6	29
Rufous-sided Towhee. *Pipilo erythrophthalmus.* (18)	4	22
Wood Thrush. *Hylocichla mustelina.* (28)	6	21
Acadian Flycatcher. *Empidonax virescens.* (16)	3	12
Prothonotary Warbler. *Protonotaria citrea.* (17)	2	12
Hooded Warbler. *Wilsonia citrina.* (50)	4	8
Blue Jay. *Cyanocitta cristata.* (16)	1	6
Kentucky Warbler. *Oporornis formosus.* (19)	0	0

*Where each species-sample pertains to 10 or more individuals.

to give distress calls. Even so, some warblers, such as the Prothonotary and Hooded, may prove to have higher rates than, say, the Blue Jay, which proved a surprisingly quiet bird when ensnared.

SMALLER SPECIES-SAMPLES

(A) The following birds were squealers: Yellow-billed Cuckoo (*Coccyzus americanus*), 4; Yellow-shafted Flicker (*Colaptes auratus*), 2; Pileated Woodpecker (*Dryocopus pileatus*), 1; Red-headed Woodpecker (*Melanerpes erythrocephalus*), 1; Yellow-throated Vireo

(*Vireo flavifrons*), 2; Yellowthroat (*Geothlypis trichas*), 1; Eastern Meadowlark (*Sturnella magna*), 1.

(B) The following birds were non-squealers: Broad-winged Hawk (*Buteo platypterus*), 1; Downy Woodpecker (*Dendrocopos pubescens*), 3; Hermit Thrush (*Hylocichla guttata*), 1; Gray-cheeked Thrush (*Hylocichla minima*), 4; Starling (*Sturnus vulgaris*), 1; Black-and-white Warbler (*Mniotilta varia*), 4; Swainson's Warbler (*Limnothlypis swainsonii*), 5; Parula Warbler (*Parula americana*), 4; Magnolia Warbler (*Dendroica magnolia*), 1; Chestnut-sided Warbler (*Dendroica pensylvanica*), 2; Myrtle Warbler (*Dendroica coronata*), 1; Northern Waterthrush (*Seiurus noveboracensis*), 1; Louisiana Waterthrush (*Seiurus motacilla*), 1; Canada Warbler (*Wilsonia canadensis*), 1; American Redstart (*Setophaga ruticilla*), 2; House Sparrow (*Passer domesticus*), 3; Brown-headed Cowbird (*Molothrus ater*), 1; Blue Grosbeak (*Guiraca caerulea*), 1; Bachman's Sparrow (*Aimophila aestivalis*), 2; Chipping Sparrow (*Spizella passerina*), 2.

(C) The following species were represented by both squealers and non-squealers, thus:

	No. Squealers	No. Non-Squealers
Mockingbird. *Mimus polyglottos.* (3)	2	1
Brown Thrasher. *Toxostoma rufum.* (2)	1	1
Swainson's Thrush. *Hylocichla ustulata.* (4)	2	2
Hairy Woodpecker. *Dendrocopos villosus* (6)	2	4
Indigo Bunting. *Passerina cyanea.* (3)	1	2
Worm-eating Warbler. *Helmitheros vermivorus.* (4)	1	3
Ovenbird. *Seiurus noveboracensis.* (4)	1	3
Eastern Wood Pewee. *Contopus virens.* (6)	1	5
Carolina Chickadee. *Parus carolinensis.* (7)	1	6

TABLE 2. SUMMARY OF DATA ON RELATIVE INCIDENCE OF "SQUEALING" IN EXAMPLES OF CERTAIN AVIAN FAMILIES AND OTHER TAXONOMIC SUBGROUPS

Taxonomic Group	No. Indiv.	No. Spp.	Percent "Squealers" (Approx.)
Fringillidae (Grosbeaks, Finches, etc.) (Subfamily Richmondeninae)	132	1	97
Vireonidae (Vireos) (Subgenus *Vireo*: *V. griseus*)	121	1	89
Mimidae (Mimic-Thrushes)	20	3	75
Picidae (Woodpeckers)	25	6	72
Vireonidae (Vireos) (Subgenus *Vireosylva*: *V. olivaceus*)	39	1	38
Turdidae (Thrushes and Allies)	63	5	38
Tyrannidae (Tyrant Flycatchers)	32	3	34
Fringillidae (Grosbeaks, Finches, etc.) (Subfamily Emberizinae)	44	6	25
Parulidae (Wood-Warblers)	113	15	7

Further contrasts, if only suggestive, are evident if the data from the smaller samples are compared with those in Table 1. One preliminary indication is that the squealing rates in *Dendrocopos* run lower than in representatives of other woodpecker genera. Another is that *Empidonax* and *Contopus* have lower rates than *Myiarchus* (in fact, Acadian Flycatchers often "fall asleep" in the hand). If we view the total sample in terms of various taxonomic units (Table 2), we find that Cardinals, White-eyed Vireos, mimic-thrushes, and woodpeckers tend to exhibit high distress-call rates; whereas the Red-eyed Vireos, thrushes, flycatchers, and emberizine finches have lower ones. As a whole, the wood-warblers are notable in manifesting very low rates.

ADDITIONAL NOTES AND DISCUSSION

Probably most banders could supply remembered or impressionistic data pertaining to distress notes in netted birds. Harking back to banding activities in the 1950's, the senior author distinctly recalls that some Savannah Sparrows (*Passerculus sandwichensis*), but not all, issued squealing notes. Among many Pygmy and Brown-headed nuthatches (*Sitta pygmaea* and *S. pusilla*) caught and banded (Norris, 1958), there were no instances of distress calls. It is perhaps inadvisable to offer more illustrations of this kind, however, inasmuch as they are based on memory or after-impression rather than on specific field notes.

When a bird was caught on more than one occasion, it was fairly consistent in showing the same type of response the second time as it did the first. For example, among 10 individual Carolina Wrens that were caught twice (usually on separate days), four gave distress notes on both occasions, four did not squeal either time, and two squealed the first time but not the second. More data are needed on temporal variations in squealing propensity in given individuals. Age, seasonal, and ecogeographic variations could likewise be explored. Once larger samples are available, it will also be of interest to see whether there are sexual differences in proneness to give distress notes. In this connection, John Ogden (1963: letter) has informed me that among 10 Evening Grosbeaks (*Hesperiphona vespertina*) that he banded (in March, 1962, at Maryville, Tennessee), the five females "gave distress calls continually as they were removed from the nets," and that "there was never a peep" from the five males (Ogden added that the males spent more time trying to bite him).

Studies of distress notes or fear squeals of birds that are caught and handled could be made from other vantage points. It seems safe to assume that in birds distress notes constitute a relatively simple and purely inherent or innate kind of utterance unmodified by the learning process. Moreover, it would seem that such calls may be regarded as a relatively conservative element of behavior—hence a trait of potential, if limited, taxonomic value. (By crude analogy, it seems reasonable to assume that in humans the nature of "unlearned screams," and perhaps other inarticulate utterances associated with extreme fear or distress, reflect one aspect of the

basic biological constitution, little influenced by culture, and that careful analytical study of such sounds might provide another line of evidence with respect to questions bearing on racial similarities and dissimilarities.) If the assumption that the nature of avian distress calls is not readily modified by environmental factors is correct, the recording and audiospectrographic analysis of such vocalizations of various species might, like spectrographic studies of songs and other components of birds' repertoires, shed some light on phylogenetic relationships.

SUMMARY

Data are presented on the relative incidence of "distress notes," or "fear squeals," in birds captured in mist-nets in 1962-1963 in the southeastern United States. Some 55 species and 745 individuals, mostly songbirds and allies, were represented in the study. In certain species (e.g., Red-bellied Woodpecker, Cardinal, White-eyed Vireo) a high proportion of the sampled individuals, when caught, removed from nets, or held in hand, issued distress calls; in some (Carolina Wren, Red-eyed Vireo) less than half the individuals squealed; and in others squealing was either very infrequent (Hooded Warbler, Blue Jay) or unrecorded (e.g., Kentucky and other warblers). The distress note, which has been given little attention heretofore in studies of the avian repertoire, is regarded as a conservative behavioral element which, if closely studied (as by audiospectrographic analysis), might prove to be a trait of taxonomic value.

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